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THE UNIVERSITY OF NEW HAVEN

GRADUATE SCHOOL

CONTRIBUTING FACTORS TO
SUCCESS VERSUS FAILURE OF THE
STARTUP BUSINESS:

STARTUP BUSINESS SUCCESS
VERSUS FAILURE PREDICTION
MODELS

A DISSERTATION

Submitted in partial fulfillment of the requirement for the degree of
DOCTOR OF SCIENCE IN MANAGEMENT SYSTEMS

BY

ROBERT N. LUSSIER

WEST HAVEN, CONNECTICUT

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LIST OF ABBREVIATIONS

The following are abbreviations used in the startup business success versus failure prediction model:

$$S/F = f(\text{capt}, \text{rkfc}, \text{inex}, \text{maex}, \text{plan}, \text{prad}, \text{educ}, \text{staf}, \\ \text{psti}, \text{ecti}, \text{age}, \text{part}, \text{pent}, \text{mior}, \text{mrkt})$$

Dependent Variable:

S/F Success vs. Failure

Independent Variables:

capt capital
rkfc record keeping and financial control
inex industry experience
maex management experience
plan planning
prad professional advisors
educ education
staf staffing
psti product/service timing
ecti economic timing
age age of owner
part partners
pent parents owned a business
mior minority
mrkt marketing skills

GLOSSARY

insolvency: The inability to pay all debts as and when they come due.

business failures: Companies involved in court proceedings or voluntary actions involving losses to creditors (Dun + Bradstreet 1991, i).

Chapter 7: Companies that are bankrupt and liquidated either voluntarily or non-voluntarily.

Chapter 11: Companies involved in court proceedings with the intent of making arrangement for payments to creditors and continuing in business.

startup business: A firm that is zero to ten years old.

successful startup business: A firm not involved in Chapter 7 or 11, have been in operation for ten years or less.

management experience: A job with a management title and having decision making authority in the areas of planning, organizing, staffing, leading, and controlling.

planning: A specific plan states the purpose of the business and objectives; it specifies strategic moves necessary to accomplish the objectives. The plan includes a cost-profit projection. The plan is based on a comparison to competition and a determination of how the firm will compete--low prices; superior- quality, service, location, selection; new product-service, etc.

generic models: Models used with firms of all industries employing 0-300 employees.

industry models: Models used with firms in a specific industry group (manufacturing, finance, construction, service, and retail) employing 0-300 employees.

size models: Models used with firms of all industries employing a set number of employees (0-10, 11-25, 26-50)

ABSTRACT

Business failure is both frequent and potentially damaging yet central to the efficient operation of the market economy. A better understanding of business failure can help lead to fewer business failures in the future, resulting in better utilization of our limited resources.

The purpose of this study was to develop and test a generic startup business success vs. failure prediction model through causal survey research in New England. Four generic models were developed and tested, all significant at the .05 level, using discriminant analysis and factor analysis. The four models will reliably outperform random classification of success vs. failure 95 percent of the time. The accuracy rate of the four models' ability to predict a specific business as being successful or failed varies from model to model between 62 to 65 percent. There is no significant difference between the four generic models. The eight variables distinguishing between success and failure Generic Model 1 are: use of professional advisors, planning, staffing, education, parents owning a business, minority, industry experience, and record keeping and financial control.

The sample of 216 businesses (108 failed businesses and their 108 successful company matches based on industry, size, location, and age of the business) was subdivided by industry. Five industry models, all significant at the .05 level, were developed. All five industry models

are more accurate at predicting businesses as successful and failed than the four generic models. The five industry models, with their predictive ability are: manufacturing- 95%, finance- 86%, construction- 81%, service- 80%, and retailing- 80%. The sample of 216 was again subdivided by size of business. Two size models, significant at the .05 level, were developed for firms employing 0-10 and 11-25 people, with accuracy rates of 75 and 81 percent respectively. For a comparison of generic, industry and size models, see Figure 17 and Table 64 on pages 182-184. Specific models can be used by entrepreneurs, investors, lenders, suppliers, educators, consultants, and public policy makers to aid in decision making. It is recommended that further study focus on models developed for specific industry groups based on company size.

In addition to developing a startup business success vs. failure prediction model, the study answered two questions (through testing 30 hypotheses): 1. Do successful and failed business CEOs agree on the contributing factors to startup business failure? 2. Do successful and failed businesses start with equal resources? The CEOs disagreed, at the .05 level, on the importance of three of the fifteen variables: being a minority, product/service timing, and parents owning a business. The businesses did not start with equal resources in three areas: failed CEOs stated that their business had less staffing difficulties, made greater use of professional advisors, and they have a higher level of education than successful CEOs.

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CHAPTER 1

BACKGROUND OF THE PROBLEM

The background of the problem is divided into four major sections: introduction, the need for the study, purpose of the study, and the significance of the study.

INTRODUCTION

Business Failure Rate

Business failure is both frequent and potentially damaging yet central to the efficient operation of the market economy (Cooper, Dunkelberg, Woo, and Dennis 1990). According to Dun + Bradstreet (1991), business failures are a key indicator of the strength of American business. There has been a high rate of business failure in the United States, with an acceleration of the problem over the past five years to an average of over 58,000 failures per year. Between 1931 and 1940 the average yearly number of failures was 16,462; between 1941 and 1950 the yearly average rate was 5,447; between 1951 and 1960 the rate was 11,747; between 1961 and 1970 the rate was 13,221; between 1971 and 1980 the rate dropped to 9,406; between 1981 and 1990 the rate increased dramatically to 47,298. For a listing of failures for each year, see Chapter 2, Table 2, Failure Trends Since 1931.

On August 8th of 1990, *The Wall Street Journal* reported that Massachusetts business failures in the first four months nearly quadrupled from the year-earlier period. Failures were up 156 percent in Vermont, 100 percent in Rhode Island and 97 percent in New Hampshire. On April 26th of 1991, *The Wall Street Journal* reported that "Failures by U.S. Businesses Rose 54% In 1st Quarter, Highest Level Since 1984." The number of failures in the first quarter rose to 20,881 from 13,577. New England had the largest percentage rise in the quarter, with failures more than doubling to 1,308. There were more bankruptcies reported in the first quarter of 1991 in New England than in all of 1989. Connecticut bankruptcies surged to 250 from 40. On May 24, 1991, *The Wall Street Journal* reported that "Business Failures in U.S. Jumped 58% During April." Nearly every major industry group was hit by higher business failures. Failures were spread across the country, but hardest hit were New England, the Middle Atlantic, and Pacific regions.

According to Wood (1989), when individuals and businesses fail, they do not pay their bills. The amount businesses do not collect due to bad debts has been increasing in recent years. Bad debts almost doubled between 1981 and 1986. In 1981 \$36 of every \$100,000 in sales was not collected, in 1983 it went up to \$60, in 1985 to \$66, and in 1986 bad debts increased to \$70 per \$100,000 of sales. In 1988 the Federal Reserve reported corporate debt in America at \$1.5 trillion dollars. Approximately \$6 billion of the total corporate debt was delinquent.

With delinquent loan problems, particularly in Savings and Loan, the need to recognize and avoid bad loans is critical. Identifying high risk businesses that will fail can lead to rejection of loans and thus

fewer delinquent loans. For current loans, the earlier the business problems are identified and recognized, the better are the chances to avoid delinquent loans (Gopinath, 1991).

The Need For Early Recognition of Business Problems

Dealing with the problems of a troubled business requires that owners be willing to take the time to conduct an honest evaluation of their company (McTevia, 1990). It is generally believed that due to various reasons, incumbent managements of failing firms delay the recognition of the severity of their problems (Gopinath 1991; Gilad, Kaish, and Loeb 1985; Lorange and Nelson 1987; Miller 1977; Cameron, Kim, and Whetten 1987; Staw, Sandelands, and Dutton 1981; Nelson 1981; Farrar 1990; Ioannou 1990). With success, management teams acquire over time an illusion of invulnerability (Lorinc, 1990). Even companies seemingly headed toward success encounter severe problems. Too many managers wait until the business begins to slide before addressing the need for change because they do not understand the early warning signs of failure. Too often the action is taken too late, resulting in business failure (Sommers and Koc, 1987). The earlier the business problems are identified and recognized, the better are the chances to avoid failure (Gopinath, 1991). Using strategies such as Chapter 11, if it is used at an earlier time while the firm is still in a viable position and while management still feels positive about the future of its company, increases the likelihood of long term survival of the troubled firm (Farid, 1991).

Problems With Existing Business Failure Studies

Bruno, Leidecker, and Harder (1987) stated that although the subject of business failure is of prime importance to those who intend to launch a business, but very little research has been conducted on the subject. At the twenty-eighth annual meeting of the Eastern Academy of Management (1991), Pearce stated that there is a great need to better understand how businesses fail and how to avoid failure. According to Pearce and Robbins (1991), neither academics nor practitioners have succeeded in designing a model to guide strategic management action during periods of financial decline. Developing such a model will focus future theory testing efforts and accelerate the advancement of strategic management practice.

Many articles and books have focused on the topic of business failure. However, there are fewer than ten broadly based empirical research studies. Even three of the best empirical studies have reported disappointing results.

The first study by Cooper, Dunkelberg, Woo, and Dennis (1990) examined over 250 independent variables "predictors" potentially related to new business survival and/or growth, all factors equal. However, taken together these variables explained only about 9 percent of the variance in survival and only about 7 percent of the variance in growth. These researchers reported that they were disappointed with their limited ability to explain survival/discontinuance. Using the same data, Cooper, Gascon, and Woo (1991) claim to have developed a model which

appears to provide better predictions of the prospects for success than others reported in the literature.

According to Storey, Keasey, Watson, and Wynarczyk (1987), there is an absence of a clear theoretical model of the process by which business failure occurs. Present models serve only as helpful descriptions rather than as predictive models. The authors admit, that like their predecessors, their progress in producing a satisfactory model of failure has been extremely limited. They state their inability to isolate influences of failure and formally incorporate them into a predictive model.

The third study by Reynolds' (1987) estimated the relative significance of selected predictive variables. Of the six major independent variables, only one, the age of the firm, was reported as having a major impact.

Stuart and Abetti (1987), Sandberg and Hofer (1987), and Reynolds and Miller (1989) also reported weak results. In addition to the above major studies, other empirical research studies [Sommers and Koc (1989); Hoad and Rosco (1964); Bruno, Leidecker, and Harder (1987); O'Neill and Duker 1986); Dunkelberg and Cooper (1982); Gopinath (1991)] stated, in their conclusion, that there are numerous opportunities for research related to the work they reported on business failure. Two studies made specific recommendations. First, Cooper, Dunkelberg, Woo, and Dennis (1990) state that there is a need for further research to better understand the many factors influencing new firm formation, survival, and growth. Second, Reynolds (1987) recommends research to better understand business survival vs. nonsurvival. He goes on to encourage

researchers to sample diverse industries rather than intensive case studies.

OPERATIONAL DEFINITIONS

insolvency : The inability to pay all debts as and when they come due.

business failures: Companies involved in court proceedings or voluntary actions involving losses to creditors (Dun + Bradstreet 1991, i).

Chapter 7: Companies that are bankrupt and liquidated either voluntarily or non-voluntarily.

Chapter 11: Companies involved in court proceedings with the intent of making arrangement for payments to creditors and continuing in business.

startup business: A firm that is zero to ten years old.

successful startup business: A firm not involved in Chapter 7 or 11, have been in operation for ten years or less, and make industry average, or greater, profits. A firm making less than industry average profits is a survivor, not successful.

The key to the definition of business failure is the loss to creditors due to insolvency. Firms that go out of business without loss to creditors are not considered business failures even though they go out of business. They are considered discontinued rather than failures.

Both Chapter 7 and Chapter 11 companies are considered failures due to the loss to creditors. Although business failures do not represent total closing, failures have the most severe impact upon the economy (Dun + Bradstreet, 1991). Approximately half of the failures reported by Dun + Bradstreet (1991) consists of firms which started within the previous five years.

Companies submit a petition for Chapter 11 protection because of financial insolvency or expected future financial threats to the business and its existence and ask for court protection throughout these financial troubles. As stated by Farid (1991), the intent of the Chapter 11 statute is to temporarily protect an organization from financial threats and the likelihood of liquidation by reducing financial drains, at least in the near term. The buffering from creditors provides a troubled firm with the time needed for redefining its business or for implementing change. The choice of when to file for Chapter 11 protection is on a continuum. Management can file in the early stages of the problems while it is not yet insolvent or at a late stage when the firm has been insolvent for a period of time. The major costs of filing Chapter 11 include administration and legal fees, the reaction of stakeholders (including the stigma) , and the risk of liquidation. The court usually allows the debtor's management to continue running the business unless management is incompetent or untrustworthy (Miller, Jacob, and Liu, 1990).

Solvency and age are the keys to the definition of success. Lauzen (1985) states that the critical period for a business is the first five years. As reported by Reynolds (1987), older firms are less likely to

fail. Reynolds and Miller (1989) found the hazard rates are quite low for the first two years and begin to rise in the third year to a peak in about the fourth year. Most U.S. businesses only survive about 25 years (Karp 1990). There is no set profit needed to be considered successful. Chapter 2, American Business Failure and Discontinuance Rates, contains more details on failure rates.

THE NEED FOR THE STUDY

This section outlines three areas of gaps in present studies. They are large vs. small business failure, Dun + Bradstreet causes of failure, and business failure prediction studies.

Large vs. Small Business Failure

Many of the studies designed to develop predictive models of business failure are based on financial ratios. The companies analyzed in these studies include publicly held firms where financial data is available. However, most businesses are small and private, so financial data is not available to the general public. Excluding proprietorships, partnerships, and nonpublic corporations greatly decreases the generalizations that can be made about the models' predictability of business failures (Storey, Keasey, Watson, and Wynarczyk, 1987).

Symptoms of failure are common in new and small businesses (Stockton, 1989). Discontinuance rates are related inversely to a firm's size, with very small businesses accounting for the bulk of failures

(Bates and Nucci, 1989). The fundamental characteristic which distinguishes small from large businesses is their relatively high probability of failure. Failure rates are more than ten times higher for new small firms than for large, well established firms. The threat of failure is always close at hand for the small firm. Failure prediction models and the case-study material appear to have been conducted for the large company sector where data are more plentiful yet failure is much less common. Small firms are not simply "scaled down" versions of large businesses (Storey, Keasey, Watson, and Wynarczyk, 1987). Empirical results derived from big business don't necessarily apply to small business. The minority, large public firms commonly studied are not representative of the small firm.

The researcher focused on developing a model applicable to startup businesses which are most frequently small firms.

Dun + Bradstreet Causes of Failure

Dun + Bradstreet is the most commonly used source of failure information (Alves, 1978). Most new business data (or samples to collect new business data) are drawn directly or indirectly from the files of Dun + Bradstreet (Cooper, Dunkelberg, Woo, and Dennis 1990): (for example Birch (1987 and 1989), Tyebjee and Bruno (1982), Wood (1989), and Small Business Administration.) According to Dun + Bradstreet (1991), approximately 31 percent of failed businesses failed in three years or less; half of the failures reported consists of firms which started within the previous five years.

Over the last ten years, Dun + Bradstreet has changed its listings of causes of failure three times. See Table 1, Dun + Bradstreet Causes of Failure.

Table 1. DUN + BRADSTREET CAUSES OF FAILURE

	1981	1982	1983
Neglect	.7%	.3%	.6%
Fraud	.3	.1	.3
Lack of industry experience	11.1	9.2	9.9
Lack of management experience	12.5	9.0	9.8
Unbalanced experience	19.2	18.0	23.8
Incompetence	45.6	46.3	54.3
Disaster	.5	.3	1.3
Reason unknown	10.1	16.8	.0
TOTAL	100.0%	100.0%	100.0%

23 subheadings also used

	1984	1985	1986	1987
Neglect	3.6%	2.7%	1.8%	1.6%
Disaster	.8	.6	.5	.4
Fraud	.6	.5	.3	.3
Economic factors	60.0	66.3	70.2	71.7
Experience	23.3	22.8	20.4	20.3
Sales	17.2	14.1	11.5	11.1
Expenses	6.8	8.3	7.5	8.1
Customers	1.6	1.7	.7	.4
Assets	.9	.8	.3	.2
Capital	1.3	1.0	.4	.5
TOTALS	100%	100%	100%	100%

42 subheadings also used

	1988	1989	1990
Neglect	2.0%	2.5%	3.4%
Disaster	.9	1.1	1.6
Fraud	.8	1.2	1.0
Economic factors	57.2	41.0	47.4
Experience	12.0	20.6	7.1
Finance	26.2	32.5	38.4
Strategy	.9	1.1	1.1
TOTALS	100.0%	100.0%	100.0%

21 subheadings also used

Source: Business Failure Record. New York, NY: Dun + Bradstreet, 1981-1990.

The headings of major cause identified have changed over the past ten years, yet the major causes of failure reported by Dun + Bradstreet have not changed. Reviewing Table 1, 1988-1990, one can see that the economic factors are the major cause of business failure, averaging 48.5 percent. However, what is not shown are the subheadings which include inadequate profits, inadequate sales, poor growth prospects, and others. The second major cause of failure is finance, averaging 24.3 percent. Finance subheadings include heavy operating expenses, burdensome debt, and insufficient capital. These two causes account for an approximate average of 75 percent of all business failures. If one were to ask the average person with no knowledge of business, "whether a company which has high expenses, inadequate sales, and insufficient profits will it fail" Most people would say yes. Dun + Bradstreet listed causes of failure are really symptoms, not causes of failure. Why doesn't the firm have adequate sales and profits? The study identifies actual contributing factors to failure rather than its symptoms.

Business data, or samples to collect new business data, are drawn directly or indirectly from the files of Dun + Bradstreet (Cooper, Dunkelberg, Woo, and Dennis 1990). Many studies are based on Dun + Bradstreet data assuming the data are accurate. However, Shapero and Giglierano (1982) offer sympathy to those trying to use the current data banks with their attendant problems. They had to clean up the D+B tapes for their study by calling each company to verify data reported by Dun + Bradstreet. Shapero and Giglierano (1982) would not speculate on the likelihood of accuracy by anyone reporting to Dun + Bradstreet.

Although Dun + Bradstreet is the most popular data base, it is not the only data base used for business failure reports. Other sources include The Small Business Administration, The National Federation of Independent Business, the Department of Commerce, the *Survey of Current Business*, state unemployment insurance files (Tauzell, 1982), *Moody's Manuals* (Stettler, 1985), *COMPUSTAT file* (El-Zayaty 1986; Koh and Killough 1990), *The F+S Index of Corporate Changes* and *The Wall Street Journal Index* (Moses, 1990), and the *Yellow Pages* (Shapero and Giglierano, 1982).

According to Birley (1985), all major data sets have deficiencies. Tyebjee and Bruno (1982) state that there is a limitation of availability of viable data bases upon which objective research can be conducted; if this type of data is to be used for research purposes, a more careful and consistent documentation will be necessary. To accomplish this end, the researcher would find it desirable to establish an instrument by which to systematically measure the process of evolution of new startup firms. To overcome data bank accuracy problems, this study used primary company data rather than secondary data banks.

Business Failure Prediction Studies

Most of the studies conducted to predict business failure are based on financial ratios (Alves 1978; Storey, Keasey, Watson, and Wynarczyk 1987; Wight 1985; Moses and Liao 1987; Stettler 1985; El-Zayaty 1986; Aly 1986; Alix and Heupel, 1990; Raun 1990; Koh and Killough 1990; Moses 1990; Platt and Platt 1990, Karamessinis 1985).

Commonly used financial ratios include profitability, solvency, and liquidity. Mervin was the first to suggest using ratios, but the use of ratios to predict failure became common through the work of Beaver (Alves, 1978).

El-Zayalty (1986) found that business failure prediction models using an ex ante basis are poor predictors of bankruptcy and fail to adequately identify firms in financial distress. He states that business failure prediction models have about a 97 percent Type II error rate (firms predicted as going to fail that do not actually fail). El-Zayaty's study found that of 132 businesses predicted to fail, only 5 were discontinued over a five-year period. Gilbert, Krishnagopal, and Schwartz (1990) state that financial ratio-based models are unable to distinguish bankrupt from other distressed firms.

What do these ratio data really tell us about failure? According to Stockton (1989), ratios identify symptoms not causes of failure. Storey, Keasey, Watson, and Wynarczyk (1987) state that ratios will not diagnose the cause of that problem and certainly will not identify the course of action for the firm to take to avoid failure. According to Summers and Koc (1987), the conventional financial performance indicators warn of failure almost always too late. Woolf (1985) contends that there are problems when relying on unaudited valuations supplied by managers. Moses and Liao (1987) conducted a survey and reported that banks prefer to develop internal models tailored to their clients and needs rather than use the prediction ratio models from the literature. This research identifies the actual contributing factors to failure rather than the symptoms identified through financial ratios.

A large proportion of small company failures are young, and data on the performance of these companies are unavailable. This means that failure prediction models cannot be calibrated. When they can be calculated, care should be taken in interpreting ex-post discrimination results as being equivalent to prediction results (Storey, Keasey, Watson, and Wynarczyk, 1987). In addition, small businesses tend to keep poor records. On such records the ratio analysis is based (Lauzen 1985; Wood 1989). Without accurate data, the models will not be effective.

While most prediction studies are concerned with mature businesses, the researcher is more concerned with identifying variables that distinguish success from failure so that the person starting a new business can benefit as well as the mature business.

Prediction studies tend to be based on financial ratios, quantitative data lacking qualitative factors. The research of Storey, Keasey, Watson, and Wynarczyk (1987) indicates that at least as good predictions may be obtained from qualitative data as can be achieved from using traditional financial ratios. The Alves's study (1978) concluded that nonfinancial information improved the predictive accuracy of failure prediction models. Gilbert, Krishnagopal, and Schwartz (1990) concluded that resolution of distress is determined by nonfinancial factor.

This research looked at quantitative factors, not financial ratios, and qualitative factors contributing to success and failure.

PURPOSE OF THE STUDY

Developing and Testing a Startup Business Success vs. Failure Prediction Model

The purpose of this study is to develop and test a generic model that will predict startup business success vs. failure.

The dependent variable of the model is success vs. failure. The independent variables are the contributing factors distinguishing business success vs. failure. The independent variables were identified through the literature search.

The Development of a startup business success vs. failure model can help to explain why businesses succeed or fail as well as to aid in the prediction of business failure. The development and testing of the model is presented in Chapter 4, Testing and Developing the Startup Business Success versus Failure Prediction Model. The significance of the study will be presented later in this chapter.

Questions

In addition to developing a startup business success vs. failure prediction model, the study answers the two questions below. In Chapter 3, 30 hypotheses and statistical test methods are presented as a means of answering the two questions:

Question 1

1. Do successful and failed business CEOs agree on the contributing factors to startup business failure?

To determine if there is agreement on the contributing factors to businesses failure, a questionnaire was developed based on reasons for failure identified as independent variables in the model. The responses of the CEOs of successful and failed businesses are compared statistically to determine if there are significant differences. Results are presented in Chapter 5, Results Question 1: Hypotheses 1 - 15. If successful and failed CEOs disagree on the reasons businesses fail, then the present studies that do not survey failed business may be of limited value.

Question 2

2. Do successful and failed businesses start with equal resources?

To determine if there is a significant difference in the startup resources between the successful and failed firms, a series of questions based on the independent variables in the model were developed. The answers of the successful and failed groups are compared statistically to determine if there is a significant difference. Results are presented in Chapter 6, Results Question 2: Hypotheses 16 - 30. The more significant the differences are between the successful; and failed

groups, the more accurate the model. If there are no differences, the model will not be an accurate predictor of successful vs. failed business.

SIGNIFICANCE OF THE STUDY

Storey, Keasey, Watson, and Wynarczyk (1987) stated that it is clear that business failure is both frequent and potentially damaging yet central to the efficient operation of the market economy. Business failures do result in a substantial misallocation of societal resources. Business failure imposes social and possibly private costs. Private cost may occur if the owner's personal savings are lost. Losses to creditors also result from business failure. Research can be of practical assistance to banks and other private sector financial institutions. Social cost may occur if the entry of the business results in reducing the profits of existing firms. There are clear gains to financial institutions and individuals able to avoid investing in firms likely to fail. The social benefits of failure studies are that some individuals may be discouraged from starting a non-viable business. It may also help public policy makers in selective assistance, either to prevent failure or to promote further growth.

Business failure means misallocation of resources (Alves, 1978). Analyzing business failures is of interest to firm management, investors, lenders, and auditors (Shelton, 1986).

According to Reynolds (1987), new business firms are considered a major source of new jobs, economic growth, technical innovation, and economic flexibility. New business may provide a major strategic

advantage for the United States in world competition. Studies that give more complete, precise understanding of the dynamics of new firms development and factors affecting their survival have considerable policy and managerial significance. Research that identifies those factors associated with survival and nonsurvival is of great interest to those starting new firms, investors, potential employees, and public policy makers concerned with economic development.

Lauzen (1985) stated that the owner of the firm should closely monitor the elements that determine success or failure. Early recognition of a problem loan is an important issue in bank credit policy and loan monitoring systems. Problems loans have adverse effects on bank liquidity and increase the possibility of loss of interest or principal or both. As interest goes unpaid, revenues decline, and as loan principal is written down, assets decline. Time spent on collection is diverted from business development. The effort of collection gives rise to other expenses as professionals are employed, third-party costs incurred, etc. The earlier the business problems are identified and recognized, the better are the chances to avoid bad loans (Gopinath, 1991). Managers are in a unique position to spot these symptoms of failure early. The way they respond to these symptoms may determine the success or failure of a firm (Stockton, 1989).

A predictive model of survival that can be used before major financial and other investments have been made can lead to caution and abortion of "high risk" businesses. Such research benefits entrepreneurs, those who assist, train and advise them, and those who

provide capital for their ventures. The model can also be helpful to public policy makers. (Cooper, Gascon, Woo, 1991).

Summary

To summarize Chapter 1, based on the problem and need for the study, this research was conducted to gain a better understanding of the contributing factors to startup business success vs. failure. The development of the startup business success vs. failure model can help to explain why businesses succeed and fail as well as aid in the prediction of business failure. A better understanding of business failure can help lead to fewer business failures in the future, resulting in better utilization of limited resources.

CHAPTER 2

REVIEW OF RELEVANT RESEARCH

This chapter has four major sections: Number of American Business Failures, American Business Failure and Discontinuance Rates, Contributing Factors to Success vs. Failure in Business, and Variables Related to Success vs. Failure in Business.

NUMBER OF AMERICAN BUSINESS FAILURES

It is clear that business failure is both frequent and potentially damaging yet central to the efficient operation of the market economy (Cooper, Dunkelberg, Woo, and Dennis 1990).

According to Dun + Bradstreet (1991), business failures are a key indicator of the strength of American business. There has been a high rate of business failure in the United States. Over the past ten years an average of over 47,000 businesses failed per year in America.

The data for this section is presented in Table format. For details concerning the number of business failures, refer to the following Tables: Table 2, Failure Trends Since 1931, Table 3, Business Failures by Regions; and Table 4, Business Failure by New England State.

Table 2. FAILURE TRENDS SINCE 1931

Year	Number of Failures	Year	Number of Failures	Year	Number of Failures
1931	28,285	1951	8,058	1971	10,326
1932	31,822	1952	7,611	1972	9,566
1933	19,859	1953	8,862	1973	9,345
1934	12,091	1954	11,086	1974	9,915
1935	12,244	1955	10,969	1975	11,432
1936	9,607	1956	12,686	1976	9,628
1937	9,490	1957	13,739	1977	7,919
1938	12,836	1958	14,964	1978	6,619
1939	14,768	1959	14,053	1979	7,564
1940	13,619	1960	15,445	1980	11,742
1941	11,848	1961	17,075	1981	16,794
1942	9,405	1962	15,782	1982	24,908
1943	3,221	1963	14,374	1983	31,334
1944	1,222	1964	13,501	1984	52,078
1945	809	1965	13,514	1985	57,253
1946	1,129	1966	13,061	1986	61,616
1947	3,474	1967	12,364	1987	61,111
1948	5,250	1968	9,636	1988	57,097
1949	9,246	1969	9,154	1989	50,361
1950	9,162	1970	10,748	1990p	60,432

p = preliminary

Source: *Business Failure Record*. New York, NY: Dun + Bradstreet, 1991, p. 2.

Table 3. BUSINESS FAILURE BY REGIONS

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
New England	553	650	831	1203	1228	1109	1021	1052	1282	3057
Middle Atlantic	2143	2854	3349	5132	4498	3997	3985	4626	4176	6736
E. North Central	660	1165	1467	8930	9995	9671	9591	9064	8822	8308
W. North Central	1209	1831	2080	3264	4892	5258	5214	4003	3164	3823
South Atlantic	1942	3064	3799	6233	6555	6290	6969	7255	7537	9720
E. South Central	1134	1736	1996	3271	3276	3016	3195	3000	2866	3655
W. South Central	1599	2416	3643	5364	7943	12,752	12,763	10,542	8414	9738
Mountain	757	1868	3113	4760	5359	5920	5912	5740	4213	4781
Pacific	632	6210	7156	13,921	13,507	13,603	12,461	11,815	9887	10,614

Source: *Business Failure Record*. New York, NY: Dun + Bradstreet, 1991, p. 2.

Table 4. BUSINESS FAILURE BY NEW ENGLAND STATE

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Maine	77	94	90	105	80	59	60	84	132	197
New Hampshire	11	56	72	102	61	56	134	165	125	275
Vermont	25	14	32	55	38	29	48	54	51	74
Massachusetts	226	331	398	513	683	725	633	555	771	1898
Connecticut	178	97	163	324	306	202	111	152	147	430
Rhode Island	36	58	76	104	60	38	35	42	56	183

Source: *Business Failure Record*. New York, NY: Dun + Bradstreet, 1991, p. 2.

AMERICAN BUSINESS FAILURE AND DISCONTINUANCE RATES

Predicting the survival pattern for a population of new firms is a different matter from predicting the survival of specific firms (Carrol, 1983). Adding to the confusion of discontinuance rates is folklore. Comments like 50 percent of new firms disappear in 18 months or 75 percent in five years give the impression of high death rates of new firms. If the failure rate is so high, it should be a common phenomena with substantial data. Accurate predictions of new firm success should be widely available, but they are not (Reynolds and Miller, 1989).

The percentage of business failure rates reported vary. As stated by Reynolds (1987), it is widely believed that the failure rate of new firms is extremely high, yet the data are often confusing and misleading. To find that 40 percent of failed companies are less than a year old does not suggest a high initial death rate, for it is unrelated to the number of new firms initiated. Identifying the birth date, final disposition, and actual time over which life occurred is both complex and treated unsystematically by most studies (Timmons, 1985). One systematic study by Tauzell (1982) found that about 90 percent of firms survived each of the first three years; over a five-year period 59 percent could be expected to survive. One could describe this as an annual survival rate of 90 percent or a failure rate of 40 percent in five years.

Phillips and Kirchoff (1988) conducted a six-year study of 3.6 million firms and found that two out of five, 40 percent, new firms

survive at least six years. Hoad and Rosco (1964) tracked specific samples of new firms and reported discontinuance rates for new non-technical firms ranging from 50 percent after two years to 35 percent after three years. Shapero and Giglierano (1982) found discontinuance rates of 34 percent after two years and 50 percent after five years. Cooper, Dunkelberg, Woo, and Dennis (1990) conducted a study which revealed 77 percent of new businesses formed in America during the mid-1980s survived at least three years. Another 19 percent closed. Reynolds and Miller (1989) found a 78 percent survival rate after four years. They found that time has a major effect on failure rates. The authors state that hazard rates are quite low for the first two years, begin to rise in the third year to a peak in about the fourth year, and then begin to drop slightly in the eighth year.

Most new business data (or samples to collect new business data) are drawn directly or indirectly from the files of Dun + Bradstreet (Cooper, Dunkelberg, Woo, and Dennis 1990). According to Dun + Bradstreet (1991), approximately 31 percent of failed businesses failed in three years or less, half of the failures reported consists of firms which started within the previous five years. See Table 5, Failure by Age of Business.

Table 5. FAILURE BY AGE OF BUSINESS

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990p
One	1.4%	2.0%	2.7%	15.4%	14.5%	13.1%	10.2%	10.8%	9.0%	8.0%
Two	7.9	8.1	8.7	12.9	14.0	13.6	12.4	12.2	11.2	10.3
Three	13.5	12.6	13.3	11.4	11.0	11.9	11.3	11.5	11.2	10.3
Total	22.8%	22.7%	24.7%	39.7%	39.5%	38.6%	33.9%	34.5%	31.4%	28.6%
Total Three Years or Less										
Four	14.1	11.7	12.3	9.7	8.4	8.6	9.3	9.9	10.0	9.5%
Five	12.2	11.1	10.0	7.6	8.2	7.3	7.6	8.2	8.4	8.4
Total	49.1%	45.5%	47.0%	57.0%	56.1%	54.5%	50.8%	52.6%	49.8%	46.5%
Total Five Years or Less										
Six	9.7	9.4	8.8	6.8	6.5	6.5	6.5	6.3	7.2	7.2%
Seven	7.2	8.0	7.0	5.5	5.3	5.3	5.5	5.3	5.3	6.1
Eight	5.5	6.1	6.2	4.7	4.4	4.7	4.6	4.5	4.5	4.4
Nine	4.4	4.3	4.6	3.7	4.1	4.1	4.2	3.8	3.8	4.0
Ten	3.9	3.6	3.6	2.9	3.3	3.5	3.7	3.4	3.5	3.7
Total	30.7%	31.4%	30.2%	23.6%	23.6%	24.1%	24.5%	23.3%	24.3%	25.4%
Total Six-Ten Years										
> Ten	20.2%	23.1%	22.8%	19.4%	20.3%	21.4%	24.7%	24.1%	25.9%	28.1%
Total										
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

p = preliminary

Source: *Business Failure Record*. New York, NY: Dun + Bradstreet, 1981-1991.

Reynolds and Miller (1989) selected to view business failures on a yearly basis. That proportion of businesses that fail in a given year is the hazard rate for that year. The hazard rates provides a useful measure of the risk of death. Focusing on a yearly basis, Reynolds (1987) found an overall annual discontinuance rate of 9 percent, with businesses two to three years old being less likely to "not survive" than either new businesses or those four years or older. Jacoby (1971) and Shapero and Giglierano (1982) also reported approximately 9 percent disappearance rate annually. Tauzell (1982) found a 10 percent failure rate for all industry sectors in a careful analysis of new firms survival based on entry and attribution from state unemployment insurance files. Cooper, Dunkelberg, Woo, and Dennis (1990) found a yearly discontinuance rate of 10.9 percent. Overall, the researcher concludes that the failure rate is approximately 10 percent per year, or 90 percent of all businesses survive annually.

CONTRIBUTING FACTORS TO SUCCESS VS. FAILURE IN BUSINESS

This section has fifteen subsections, one for each of the major variables identified in the literature: capital, record keeping and financial control, industry experience, management experience, planning, professional advisors, education, staffing, product/industry selection, economic timing, age, partners, parents, minority, and marketing. This section also lists the studies that identify the factors contributing to success vs. failure in business. In addition, the methodology of the major studies will be discussed the first time the study is presented.

Capital as a Contributing Factor

Barren (1989) defines undercapitalization as the lack of capital needed to sustain the high cost of growth. It is one of the leading causes of business failure, especially among start-up companies. A firm that starts out with an operating plan, that projects monthly financial data, and that works against a defined operating forecast is more capable of determining real capital needs and attracting appropriate capital than a company that fails to take these actions. One of the primary principles of capital formation is determining the reasons for the firm's capital needs, the amount needed, its proposed usage, and purpose. If an outside capital source is needed, it is important to establish what form of capital sources (debt financing or equity financing) is most appropriate. Capital formation should fit a company's needs while providing it with the flexibility to operate and grow.

Bruno, Leidecker, and Harder (1987) studied ten failed high-technology businesses, founded between 1960 and 1964, in the San Francisco area. Their work provided some insight into the problem of business failure. One of the eight variables they identified as contributing to business failure was initial undercapitalization.

Cooper, Dunkelberg, Woo, and Dennis (1990) conducted a three-year longitudinal study of 2,992 entrepreneurs and their firms. They believe the study is the largest longitudinal study yet undertaken. The companies represent all industries (nine classifications) and all geographic areas of the United States. The researchers contrasted the

2,292 firms that survived with the 573 firms that had discontinued by the third year. Surviving entrepreneurs tended to have more capital. They become larger in size than discontinued businesses by assembling more capital and partners thus, increasing the probability of survival.

Cooper, Gascon, and Woo (1991) used the data from the prior study and used 1,053 (those not missing values pertaining to resource variables) of the firms to develop a predictive model to classify firms as failures, survivals, and growth companies. They found that the amount of capital raised was positively associated with venture survival. A greater pool of capital permits more ambitious strategies flexibility for surviving mistakes, and the ability to buy time.

Dun + Bradstreet (1990) has identified capital/financing as the second most common cause of business failure over the past ten years.

Flahvin (1985) identified lack of capital and lack of financial control and accounting information as major internal factors that contribute to failure.

Kennedy (1985) reported that in order to be successful a firm must obtain proper financing.

Lamont (1969) conducted a dissertation on startup businesses that correlated starting capital and successfulness.

Lauzen (1985) stated that the first five years is the critical period for a small business; the owner should closely monitor the factors that determine success or failure. Lauzen identified undercapitalization as a common problem of business which can lead to failure.

McQueen (1989) reported the results of a study of bankers who listed undercapitalization as the main cause of business failure. While there are no easy or clear answers to the causes of failure, some signals warn that troubles exist. One signal being unplanned expansion, the downfall of many businesses.

O'Neill and Duker (1986) compared 32 successful and 11 unsuccessful small businesses in Connecticut by survey. They found that the successful firms had a lower level of debt and a lower level of capital intensity.

Reynolds (1987) stated that new business firms are now considered a major source of new jobs, economic growth, technical innovation, and economic flexibility. He conducted a longitudinal study of 548 firms (from Dun's Marketing Services) representing all industry sectors and all regions of Minnesota to gain a more complete and precise understanding of the dynamics of new firm development, their societal contributions, and factors affecting their survival. He found relatively few differences between survivors and nonsurvivors. Reynolds did not specifically state that capital was or was not a contributing factor to success or failure. However, he did report that attention to financial matters was a significant factor in successful vs. failed businesses. Successful business owners placed a higher emphasis on financial matters than did those who failed.

Reynolds and Miller (1989) used the data from the Reynolds study to develop a predictive model of success vs. failure using logit regression. They did not specifically state that capital was or was not a contributing factor to success vs. failure. Reynolds and Miller did

however state that there is no difference in the initial financial support, informal or formal, between firms that survive and those that disappear. They define financial support as the first major outside funding a firm receives, such as a major bank loan, private placement of stock, public offering of stock, etc.

Thompson's article (1988) contended that failure to get the right people with the right skills and attitudes, rather than a lack of capital, is what causes businesses to fail. He states that entrepreneurs who have good marketing and management skills often find that they can get by with less money.

Tyebjee and Bruno (1982) conducted a study of 197 California firms from 17 different three-digit SIC codes, using Dun + Bradstreet credit reports as a source of information, to determine the characteristics of the startups. They compared their research results to those reported elsewhere, analyzed successful versus less successful firms, and discontinuance rates. They reported that the average amount of startup capital is considerably lower for the firms that failed. The less successful firms had much lower startup capital than the medium and highly successful companies.

Vesper (1990) devoted an entire chapter of his book to "Success and Failure Factors." He reviewed a number of studies which utilized a variety of methodologies in examining factors associated with business failure. Vesper reported that it is clear that some companies have been retarded substantially in formation, while others have failed, due to a lack of capital.

Wight (1985) reported that analysis of failed companies reveal three common and important factors that appear in most insolvents: 1. poor management, 2. lack of liquidity, and 3. lack of profits. A symptom of liquidity problems is low capitalization.

Woodruff and Alexander (1958) did not report capital as a cause of failure among ten small manufacturers. In each of these failures, additional capital could presumably have extended survival, but never was it clear that more capital would have allowed success.

See Table 6, Lack of Capital as a Contributing Factor to Failure, for a summary of the authors who agree and disagree concerning capital as a cause of failure.

Table 6. LACK OF CAPITAL AS A CONTRIBUTING FACTOR TO FAILURE

	Stated as being a Factor	Stated as NOT being a Factor	Not Mentioned as a Factor
Barren	X		
Bruno, Leidecker, + Harder	X		
2 Cooper/Dunkelberg/Woo/Dennis	X		
1 Cooper, Gason, + Woo	X		
Crawford			X
Dun + Bradstreet	X		
Flahvin	X		
Hoad + Rosco			X
Kennedy	X		
Lamont	X		
Lauzen	X		
McQueen	X		
O'Neil + Ducker		X	
4 Reynolds	?		
3 Reynolds + Miller	?		
Sommers + Koc			X
Thompson		X	
Tyebjee + Bruno	X		
Vesper	X		
Wight	X		
Wood			X
Woodruff + Alexander		X	
TOTAL	15 / 68%	3 / 14%	4 / 18%

1-4 Order of significance of study

? Author did not list variable as being a factor but did discuss a related issue.

Record Keeping and Financial Control as a Contributing Factor

Bruno, Leidecker, and Harder (1987) identified insufficient internal and financial controls as causes for failure.

Dun + Bradstreet (1991) listed inventory difficulties, heavy operating expenses, overexpansion, and receivables difficulties as subheadings of causes of failure. D+B also listed fraud which can result from poor records and lack of control.

Flahvin (1985) stated that the lack of financial control and accounting information is an internal factors that contributes to failure.

Lauzen (1985) found that inadequate financial record keeping is a typical trouble spot. Financial statements can help discover areas of weakness and identify strengths. Steps the owner can take to ensure the success of the firm are to minimize loss on accounts receivables by conducting credit checks and following up on collections.

Reynolds (1987) reported that attention to financial matters was a significant factors in successful vs. failed businesses. Successful business owners placed a higher emphasis on financial matters than did those who failed.

Reynolds and Miller (1989) found that new firms which reported to be emphasizing attention to financial administration had lower hazard rates over the subsequent four years than firms not reporting such an emphasis. The difference was significant at the .001 level.

Sigoloff (1985) did not specifically state that lack of records and financial control is a cause of failure. However, he did state that

when a firm begins to experience problems, there is a need for change. One way to determine the need for transition is greater use of analytical decision making. One of the four most critical points in recognizing the need for transition is inadequate fiscal control.

Vesper (1990) stated that Woodruff's and Alexander's study found that none of the unsuccessful firms had good financial records, but all of the successful businesses did have complete records and made full use of them.

Wight (1985) did not specifically state that lack of records and financial control is a cause of failure. However, he does contend that warning signs of profit problems can be predicted early through the use of simple analytical ratios or refined techniques, where ratios are given a predetermined weighting so as to produce a numerical value meant to predict early failure.

Wood (1989) listed lack of business records first when reporting SCORE's listing of the nine most prevalent causes of American business failure.

See Table 7, Lack of Records and Financial Control as a Contributing Factor to Failure, for a summary of the authors who agree concerning records and financial control as a cause of failure.

Table 7. LACK OF RECORDS AND FINANCIAL CONTROL AS A CONTRIBUTING FACTOR TO FAILURE

	Stated as being a Factor	Stated as NOT being a Factor	Not Mentioned as a Factor
Bruno, Leidecker, + Harder	X		
2 Cooper/Dunkelberg/Woo/Dennis			X
1 Cooper, Gason, + Woo	X		X
Crawford			X
Dun + Bradstreet	X		
Flahvin	X		
Hoad + Rosco			X
Kennedy			X
Lauzen	X		
McQueen			X
4 Reynolds	X		
3 Reynolds + Miller	X		
Sigoloff	?		
Sommers + Koc			X
Thompson			X
Tyebjee + Bruno	X		
Vesper	X		
Wight	?		
Wood	X		
TOTAL	10 / 56%	0 / 0%	8 / 44%

1-4 Order of significance of study

? Author did not list variable as being a factor but did discuss a related issue.

Industry Experience as a Contributing Factor

Alves (1978) found that the industry experience between the successful and failed matched forty-one pairs was significantly different. The successful company managers had greater numbers of years of industry experience than the failed managers. Alves contends that industry experience is a contributing factor to failure.

Cooper and Bruno (1977) studied San Francisco peninsula high-technology startups and reported that one of the main correlates of success was coming from prior employment with large organizations, or incubators, in a related product area.

Cooper, Dunkelberg, Woo, + Dennis's (1990, 7) sample of 2,994 respondents revealed that about one-third of all new ventures appeared to be direct attempts to utilize knowledge or contacts gained in existing organizations. However, the report of the results can be considered ambiguous for use in this study. "Similarity to the owner's prior employment activity did not result in a higher survival rate, but great dissimilarity resulted in a higher discontinuance rate."

Cooper, Gascon + Woo (1991) found that industry experience prior to starting one's own firm was significantly different among the 2,292 successful managers vs. the 573 failed managers. Cooper, Gascon + Woo conclude that starting a business similar to the one owners did before starting their business contributed to both the survival and growth of their firm.

Crawford's (1974) dissertation reported that retailer's previous retail experience among successful retailers and unsuccessful retailers was significantly different. He concludes that prior industry experience is a contributing factor to success vs. failure.

Dun + Bradstreet (1991) listed lack of line experience as a subheading under the major heading, experience causes of business failure. D+B reported lack of line experience as a contributing factor to failure.

Flahvin (1985) stated that it is the contention of many experts that a strong relationship exists between previous occupational experience and the capacity to successfully own and manage a business.

Hoad + Rosco (1964) did not specifically identify industry experience as a factor determining success or failure. However, they did state that a variety of experience (type of experience not specified) is beneficial to the owner of the startup firm.

Kent, Sexton, Van Auken, and Young (1982) conducted a study to determine if lifetime experiences differ significantly between managers and entrepreneurs. The sample was drawn from the Action Council Members of the National Federation of Independent Business. They received 1370 completed questionnaires from all geographic regions and industry classifications. The general conclusion reached is that lifetime experiences of entrepreneurs and managers are significantly different and that these differences allow for a high degree of predictability in determining those who will initiate a venture and those who choose to manage. However, individual lifetime experiences rarely separate entrepreneurs from managers.

Lamont (1969) found that successful entrepreneurs either had or acquired key skills of the particular line of work.

McQueen (1989) stated that experts generally have agreed that it is the inexperience of owners that causes a business to fail. However, in reading the article one is not clear if he is referring to the lack of management and/or industry experience, or some other type of experience.

Roure's study (1987) showed that a team's core joint experience, leader joint experience, and principals' joint experience were positively related to the success of the ventures.

Sigoloff (1985) did not specifically identify industry experience as a contributing factor to failure. However, he did state that failure can result when management diversifies out of its field of expertise.

The study of Teach, Tarpley, and Schwartz (1986) of 237 software firms found that success has positive correlation with prior industry experience.

Vesper (1990) stated that venture capitalists are expressing concern about prior experience. They ask for information about the "track record" of founders who want capital for a new company. Venture capitalists want to see a history of unique achievement in the particular field to be entered, evidence that the founder has the special expertise that shows that s/he can do a better job in the particular field of entry than anyone else already there.

Wood (1989) contended that companies get into trouble initially because of their owners' poor decisions and inexperience. However, in reading the article, one is not clear if he is referring to the lack of

management and/or industry experience or to some other type of experience.

See Table 8, Lack of Industry Experience as a Contributing Factor to Failure, for a summary of the authors who agree and disagree concerning experience as a cause of failure.

Table 8. LACK OF INDUSTRY EXPERIENCE AS A CONTRIBUTING FACTOR TO FAILURE

	Stated as being a Factor	Stated as NOT being a Factor	Not Mentioned as a Factor
Alves	X		
Bruno, Leidecker, + Harder			X
Cooper + Bruno	X		
2 Cooper/Dunkelberg/Woo/Dennis		?	
1 Cooper, Gason, + Woo	X		
Crawford	X		
Dun + Bradstreet	X		
Flahvin	X		
Hoad + Rosco	?		
Kennedy			X
Kent/Sexton/Van Auken/Young	?		
Lamont	X		
Lauzen			X
McQueen	?		
4 Reynolds			X
3 Reynolds + Miller			X
Roure	X		
Sigoloff	X		
Sommers + Koc			X
Teach, Tarpley, + Schwartz	X		
Thompson			X
Vesper	X		
Wight			X
Wood	?		
TOTAL	15 / 63%	1 / 4%	8 / 33%

1-4 Order of significance of study ? Author did not list variable as being a factor but did discuss a related issue.

Management Experience as a Contributing Factor

Alves (1978), in his dissertation, focused on developing a prediction model of small business failure utilizing financial and nonfinancial data. His investigation examined a group of SEC registered small manufacturers who met the Small Business Administration loan/loan guarantee requirements. The sample size was eight-two firms, half of which was classified as failed by Dun + Bradstreet. The failed firms were matched with healthy firms based on industry. Alves identified six nonfinancial variables in his study, one of which was management experience. However, the difference in management experience between the failed and successful companies was not significant. Therefore, Alves contends that management experience is not a contributing factor to failure.

Bruno, Leidecker, and Harder (1987) did not specifically state that management experience was a factor in success or. failure. However, they did identify seven major factors for failure problems, one of which was the lack of development of an effective management team. Their survey revealed that 90 percent of respondents cited an ineffective management and employee team as a factor in the failure of their firm.

Cooper, Dunkelberg, Woo, and Dennis (1990) found that of their sample of 2,994, most business owners brought some supervisory experience to the job. Just 19 percent reported no experience. However, supervisory experience was not related to survival. The reason appeared to be that most new owners spent more time "doing" than in

"supervising," One in four owners reported spending more than 25 percent of their time directly producing a product or service compared to less than one in ten spending that much time managing people. Virtually none spent that much time planning firm growth or arranging financing functions, the tasks typically associated with managing a business.

Cooper, Gascon, and Woo (1991) listed management experience as a variable contributing to success or failure. They defined management experience as having supervised one or more managers prior to going into the venture. However, within their sample of 1,053, management experience was not a significant factor associated with survival.

Dun + Bradstreet (1991) identify lack of management experience as a primary reason for failure. However, the percentage of firms identified as having failed due to a lack of management experience is low: it averaged 11.86 percent between 1981 and 1987 and 1.6 percent between 1988 and 1990.

Dunkelberg + Cooper (1982) conducted a survey of 1,805 small business owners using factor analysis to determine three entrepreneurial typologies: growth, independence, and craftsmanship. The questionnaire was sent to 6,225 members of the National Federation of Independent Business. Only 29 percent of the questionnaires were returned. The questions were based heavily on variables determined to be contributing factors to success in business. Regarding management experience, only 19 percent of the respondents stated that they had no management experience prior to operating their business while 48 percent listed supervisory experience. According to Dunkelberg and Cooper, experience in

supervising managers or in having had one's own business provided a particularly strong background for becoming an entrepreneur.

Farrar (1990) did not specifically identify lack of management experience as a factor of success or failure. However, he did state that an early warning signal of failure is ineffective management, usually caused by management bureaucracy, management lethargy, management egotism, and management greed. Deterioration of the sales trend soon follows, starting a chain reaction of increasing inventories and payables, rising expenses, and less cash. Having management experience prior to starting a business can help to develop effectiveness.

Flahvin (1985) identified lack of management skill and experience as one of the top five reasons for business failure.

Gorman's and Sahlman's study (1986) of venture capitalists' views on why ventures fail, found that the most frequently mentioned problems include ineffective management.

Goslin's and Barge's survey (1986) of venture capitalists' opinions found that the quality of management team is of primary importance, and the elements of this factor in order of importance are: management experience, marketing experience, and balance on the team, finance experience, and realism about the venture's shortcomings.

Hoad and Rosco (1964) did not specifically identify lack of management experience as a factor of success or failure. However, they did state that managerial experience was less important than a variety of experience.

Kennedy (1985) did not specifically identify lack of management experience as a factor of success or failure. However, he did state that

over 90 percent of failures are caused by managerial incompetence. Having management experience prior to starting a business can help to develop competence.

Lauzen (1985) did not specifically identify lack of management experience as a factor of success or failure. However, he did suggest that one of the steps the owner can take to ensure the success of the business is to develop good managerial skills.

McQueen (1989) stated that experts generally have agreed that it is the inexperience of owners that causes the business to fail. However, in reading the article, one is not clear if he is referring to the lack of management and/or industry experience or some other type of experience.

Sommers and Koc (1989) conducted a study to identify the causes of failure and to find ways to prevent and reverse their effects. They analyzed roughly 100 high-growth rate companies in the telecommunications, computer equipment, instruments, and electronic components industries. Sommers and Koc identified three key forces at work in high-growth, high-technology companies: 1. Expansion brings greater size, complexity, and risks; 2. change in the basis of a competition affecting the core business may be caused by changes in competitor's actions, customers, new technologies, and other factors; 3. diversification into markets and products might bring the company outside its core business. The authors did not specifically identify lack of management experience as a factor of success or failure. However, they did recommend upgrading management. Present managers must

continue to upgrade their skill, and sustaining growth requires bringing in new management with increased breadth and depth of capabilities.

Steck (1985) did not specifically identify lack of management experience as a factor of success or failure. However, he did state that the failure to put a competent management team into place in time is perhaps the most severe and avoidable of the common entrepreneurial problems.

Stuart and Abetti (1987) stated that the level of management experience should be helpful to success. Those who had supervised managers or managed a business prior to launching the current venture should do better. Their breadth of experience would better prepare them for the wide range of problems confronting new ventures. In Stuart's and Abetti's (1988) study of fifty-two technical ventures, they found that senior managerial experience in prior venture startups was the single greatest influence on performance.

Teach's, Tarpley's, and Schwartz's study (1986) of 237 software firms found that success has positive correlation with prior employment in mid-management as opposed to lower or higher management.

Thompson (1988) did not specifically identify lack of management experience as a factor of success or failure. However, he did state that entrepreneurs who have good marketing and management skills often find that they can get by with less money than managers with poor skills.

Vesper (1990) stated that when looking at list of causes of failure, it is apparent that management practices figure heavily at least downstream from startup. It usually appears that when a business fails, many things can be found to be weak in the way of management

practices. The extent to which they are causes versus symptoms of failure is less clear. Applying better management practices may not turn a losing company into a winner, but it can make it more likely that the startup will be successful.

Wight (1985) stated that an analysis of failed companies reveals three common and important factors that appear in most insolvents. The number one cause is poor management. Having management experience prior to starting a business can help to develop competence.

Wood (1989) contends that companies get into trouble initially because of their owners' poor decisions and inexperience. However, in reading the article, one is not clear if he is referring to the lack of management and/or industry experience or to some other type of experience.

For research purposes, management experience is defined as: a job with a management title which involves decision making authority in the areas of planning, organizing, staffing, leading, and controlling.

See Table 9, Lack of Management Experience as a Contributing Factor to Failure, for a summary of the authors who agree and disagree concerning experience as a cause of failure.

Table 9. LACK OF MANAGEMENT EXPERIENCE AS A CONTRIBUTING FACTOR

	Stated as being a Factor	Stated as NOT being a Factor	Not Mentioned as a Factor
Alves		X	
Bruno, Leidecker, + Harder	?		
2 Cooper/Dunkelberg/Woo/Dennis		X	
1 Cooper, Gason, + Woo		X	
Crawford			X
Dun + Bradstreet	X		
Dunkelberg + Cooper	X		
Farrar	?		
Flahvin	X		
Gorman + Sahlman	?		
Goslin + Barge	?		
Hoad + Rosco		?	
Kennedy	?		
Lauzen	?		
McQueen	?		
O'Neill + Ducker		X	
4 Reynolds			X
3 Reynolds + Miller			X
Sommers + Koc	?		
Steck	?		
Stuart + Abetti	X		
Teach, Tarpley, + Schwartz	X		
Thompson	?		
Vesper	?		
Wight	?		
Wood	?		
TOTAL	18 / 72%	4 / 16%	3 / 12%

1-4 Order of significance of study ? Author did not list variable as being a factor but did discuss a related issue.

Planning as a Contributing Factor

Barren (1989) did not specifically identify planning as a contributing factor to failure. However, he did state that a firm that starts out with an operating plan, that projects monthly financial data, and that works against a defined operating forecast is more capable of determining real capital needs and attracting appropriate capital than a company that fails to develop such plans.

Bruno, Leidecker, and Harder (1987) did not specifically state that planning is a cause of failure. However, many of their identified causes are directly related to poor planning.

Cooper, Dunkelberg, Woo, and Dennis (1990) stated that many business experts emphasize the need for planning a new business venture, while others focus on the need for entrepreneurial alertness. Their sample of 2,994 was a product of both. Forty-three percent of respondents reported deliberate planning and decision-making as the most typical process of business entry.

Hoad and Rosco (1964) did not specifically identify planning as a contributing factor to success or failure. However, they did find that the typical time lapse between thinking of starting a company and when it was established ranged from zero to over twenty-four months, with no particular correlation to successfulness. More important appeared to be taking action of some sort, as opposed to thinking, study, and experimental anticipation.

Karp (1990) stated that market and economic influences are not the sole reasons for business failure. Another reason for failure is the

lack of a strategic business plan. If owners expect their companies to survive, they need to anticipate the future by systematically and formally planning their survival. Planning must be accomplished at an early stage, with formal ownership and operating management succession plans. Developed plans require early implementation, consistent monitoring, and frequent evaluations.

Kennedy (1985) did not specifically identify planning as a contributing factor to failure. However, he did state that preparations that should precede a startup include a thorough self-assessment and the development of a business plan.

King (1985) clearly stated that one of the major causes of business failures is the lack of planning.

Lauzen (1985) did not specifically identify planning as a contributing factor to failure. However, he did state that the development of a five-year business plan, which is broken down into annual goals of sales and profitability, is essential.

O'Neill and Ducker (1986) did not specifically identify planning as a contributing factor to failure. However, they did test the hypotheses that the content of strategy would be the same for both failed and successful firms. The null hypotheses was rejected because there was a significant difference between the strategies of the successful and failed firms.

Reynolds (1987) did not specifically identify planning as a contributing factor to failure. However, he did state that managerial emphasis on implementing strategy is correlated with a firm's survival. One assumes that the firm first plans the strategy then implements it.

Reynolds and Miller (1989) did not specifically identify planning vs. nonplanning as a contributing factor to failure. However, they did ask a series of fourteen different questions regarding competitive strategies of successful and failed businesses. Four were statistically significant in relation to the probability of survival. Firms that emphasized lower prices were more likely to be out of business. Firms that emphasized better service, focussed on customized products or services, or provided distinctive products or services were more likely to survive.

Roure (1987), in his attempt to develop a model of predicting the financial success of technological startups, identified planning of technology development, time for product development, and product superiority as contributing factors to success.

Sigoloff (1985) did not specifically identify planning as a contributing factor to failure. However, he did state that confusion about business mission can lead to failure when management moves out of its field of expertise.

Sommers and Koc (1987) did not specifically identify planning as a contributing factor to failure. However, they did state that there is a need to plan and prepare for dealing with replacement of the founding product and resizing and restructuring to succeed in the long run.

Teach, Tarpley, Schwartz, and Brawley (1987) did not specifically identify planning as a contributing factor to failure. However, they did report that software startups that did formal planning grew larger on the average than those that did not.

Thompson (1988) did not specifically identify planning as a contributing factor to failure. However, he did state that a business plan is needed. The discipline of writing a business plan starts with precisely articulating just what sort of business is anticipated. The major obstacle to committing ideas to paper is time. Owners want to be actively involved in building the business rather than planning.

Vesper (1990) stated that planning is a particular management practice whose influence upon success, although management might prefer it otherwise, has historically been less than clear. If the new venture needs a large amount of external capital, generally there is no choice but to develop detailed lists of steps that will be taken and forecasts of what events will follow. However, entrepreneurs who are not required by such exigencies to develop plans simply start doing what is required to get the company into action and gradually expand to larger levels of activity, doing forecasting and planning only as needed from step to step.

Wood (1989) contends that many corporate deaths could have been avoided if owners and managers had done their homework before starting businesses and followed a set of planned operating guidelines once they opened.

For research purposes, planning is defined as: stating the purpose of the business and objectives; it specifies strategic moves necessary to accomplish the objectives. The plan includes a cost-profit projection. The plan is based on a comparison with competition and a determination of how the firm will compete (low prices; superior-quality, service, location, selection; new product-service; etc.).

See Table 10, Lack of Planning as a Contributing Factor to Failure, for a summary of the authors who agree and disagree concerning planning as a cause of failure.

Table 10. LACK OF PLANNING AS A CONTRIBUTING FACTOR TO FAILURE

	Stated as being a Factor	Stated as NOT being a Factor	Not Mentioned as a Factor
Barren	?		
Bruno, Leidecker, + Harder	?		
2 Cooper/Dunkelberg/Woo/Dennis	X		
1 Cooper, Gason, + Woo			X
Crawford			X
Dun + Bradstreet			X
Dunkelberg + Cooper			X
Flahvin			X
Hoad + Rosco		?	
Karp	X		
Kennedy	?		
King	X		
Lauzen	?		
McQueen			X
O'Neill + Ducker	?		
4 Reynolds	?		
3 Reynolds + Miller	?		
Roure	X		
Sigoloff	?		
Sommers + Koc	?		
Teach/Tarpley/Schwartz/Brawley	?		
Thompson	?		
Vesper		?	
Wight			X
Wood	X		
TOTAL	16 / 64%	3 / 8%	7 / 28%

1-4 Order of significance of study ? Author did not list variable as being a factor but did discuss a related issue.

Professional Advisors as a Contributing Factor

Cooper, Dunkelberg, Woo, and Dennis (1990) found that new business owners sought counsel from a variety of sources when planning their venture. Accountants were most often considered very important sources. Bankers, other business owners, and suppliers were also frequently characterized as very important. However, the relative importance of information sources changed as a business matured. While the perceived value of accountants and suppliers retained their initial level of importance, most other business information sources, particularly bankers and lawyers, declined in use and importance. Those who thought government sources very important were less likely to survive, all other factors being equal.

Cooper, Gascon, and Woo (1991) determined that there was a .10 level of significance between the use of professional advisors (accountants, bankers, and lawyers) of successful and failed businesses. Successful owners sought the advise of professional advisors more often than the failed owners.

Crawford (1974) reported that successful retailers had a significantly higher level use of professional advisers than the unsuccessful retailers. However, he also found that the use of lawyers and special consultants was not significantly different between successful and failed managers.

Flahvin (1985) did not specifically state that not seeking advise from professional advisors leads to failure. However, she does state

that it is a mistake to start out without consulting an adviser or accountant and that many small operators are unable to communicate effectively with banks and finance companies.

Hoad + Rosco (1964) found that a significant percentage of successful owners sought counsel from all advisers (lawyers, bankers, accountants, and future customers) except consultants.

O'Neill + Ducker (1986) hypothesized that there would be no relationship between success and the use of outside advisers. The test results supported the alternative hypothesis: the use of accountants appeared to affect a firm's success. The unsuccessful firms reported receiving less advice from accounts. However, other advisers seemed to have no effect on success or failure.

Vesper (1990) did not specifically state that not seeking advice from professional advisors leads to failure. He reported that studies of correlation between use of this assistance and success offer mixed results. Clearly, for some tasks advisors are essential. He stated that successful entrepreneurs seek professional help in anticipation of problems as opposed to typical entrepreneurs who seek professional help in response to problems.

Wight (1985) did not specifically state that not seeking advice from professional advisors leads to failure. However, he does recommend using external professional advisers to solve problems.

See Table 11, Lack of Professional Advisers as a Contributing Factor to Failure, for a summary of the authors who agree that not to consult advisers can lead to failure.

Table 11. LACK OF PROFESSIONAL ADVISERS AS A CONTRIBUTING FACTOR TO FAILURE

	Stated as being a Factor	Stated as NOT being a Factor	Not Mentioned as a Factor
Bruno, Leidecker, + Harder			X
2 Cooper/Dunkelberg/Woo/Dennis	X		
1 Cooper, Gason, + Woo	X		
Crawford	X		
Dun + Bradstreet			X
Flahvin	?		
Hoad + Rosco	X		
Kennedy	X		
Lauzen			X
McQueen			X
O'Neil + Ducker	X		
4 Reynolds			X
3 Reynolds + Miller			X
Sommers + Koc			X
Thompson			X
Tyebjee + Bruno	X		
Vesper	?		
Wight	?		
Wood			X
TOTAL	8 / 44%	0 / 0%	10 / 56%

1-4 Order of significance of study

? Author did not list variable as being a factor but did discuss a related issue.

Education as a Contributing Factor

Cooper, Dunkelberg, Woo, and Dennis (1990) found that fifty-eight percent of their sample of 2,994 reported some exposure to a college education. In addition, three of five took course work in business subjects such as accounting, management, marketing, or finance. Ten percent reported 13 or more business courses. Fifty-seven percent received some vocational or professional training. The owner's education did not end once the firm was established. Sixty-one percent continued their education or training while operating their business. The most common types were trade or professional association meetings or conventions. Owners seek industry-specific information/skills rather than general business information/skills. However, all factors being equal, neither education nor training was related to survival or growth.

Cooper, Gascon, and Woo (1991) hypothesized that the level of education contributes favorably to venture performance. These authors presume education is related to knowledge, skills, problem-solving ability, discipline, motivation, and self-confidence. Education may enable the entrepreneur to cope with problems. The test of the hypothesis revealed that having a higher level of education contributes significantly to survival but not to the growth of the firm.

Crawford (1974) reported that successful retailers had a significantly higher level of formal education than the unsuccessful retailers. He concludes that formal education is a contributing factor to success or failure.

Dunkelberg and Cooper (1982) did not specifically state that education was a contributing factor to success or failure. However, of their sample of 1,805 successful entrepreneurs, only 36 percent reported having no college education.

Hoad and Rosco (1964) looked at the relationship between education and experience. In their study of low-technology startups, they found that the highest correlation with success occurred with the possession of both experience and education (taken to mean one or more years of college). The most likely combination that leads to failure turns out to be experience without education while the second most likely combination is education without experience. The most likely combination that leads to success is experience plus education, and the second most likely combination is a tie between having one of these two ingredients but not the other.

Kent, Sexton, Van Auken, and Young (1982) found that entrepreneurs had a greater percentage of four years of college than employed managers.

Reynolds and Miller (1989) found that education of the principal had no statistically significant relationship to survival.

Vesper (1990) stated that both education and prior working experience in the industry have been found to correlate with business success. He concludes that of the two, education seems to have been a somewhat stronger success factor.

Wood (1989) listed nine reasons for business failure. He ends by stating that in reviewing the list of reasons for business failure, lack

of education, training, and knowledge may be probable causes for most of these problems.

See Table 12, Lack of Education as a Contributing Factor to Failure for a summary of the authors who agree and disagree concerning education as a cause of failure.

Table 12. LACK OF EDUCATION AS A CONTRIBUTING FACTOR TO FAILURE

	Stated as being a Factor	Stated as NOT being a Factor	Not Mentioned as a Factor
Bruno, Leidecker, + Harder			X
2 Cooper/Dunkelberg/Woo/Dennis		X	
1 Cooper, Gason, + Woo	X		
Crawford	X		
Dun + Bradstreet			X
Dunkelberg + Cooper	?		
Flahvin			X
Hoad + Rosco	?		
Kennedy			X
Kent/Sexton/Van Auken/Young	?		
Lauzen			X
McQueen			X
O'Neil + Ducker		X	
4 Reynolds			X
3 Reynolds + Miller			X
Sommers + Koc			X
Thompson			X
Vesper	X		
Wight			X
Wood	?		
TOTAL	7 / 37%	2 / 10%	10 / 53%

1-4 Order of significance of study

? Author did not list variable as being a factor but did discuss a related issue.

Staffing as a Contributing Factor

Bruno, Leidecker, and Harder (1987) identified several causes of failure in high-technology startups. One of these areas was the problem of new and inexperienced employees failing to produce adequate quality products.

Flahvin (1985) states that most would-be entrepreneurs fail within two years of starting their new business because they lack the ability to either perform many different jobs or to employ people with the skills necessary to run a successful business.

Lauzen (1985) did not specifically identify staffing problems as a factor of success or failure. However, he did suggest that one of the steps the owner can take to ensure the success of the business is to hire the right people.

Reynolds (1987) compared startup personnel problems for survival and nonsurvival businesses and found no significant differences between the two groups. He concludes that startup personnel problems are not correlated with survival.

Reynolds and Miller (1989), based on the same data again, concluded that startup personnel problems reflect absolutely no relationship to survival.

Sommers and Koc (1987) did not specifically state that staffing problems are a contributing factor to failure. However, they did state that key personnel turnover was one of the early warning signals of possible failure in the future.

Steck (1985) did not specifically state that staffing problems are a contributing factor to failure. However, he did state that failure to put a competent management team into place in time is perhaps the most severe and avoidable of the common entrepreneurial problems.

Stockton (1989) did not specifically state that staffing problems are a contributing factor to failure. However, he did state that employee discontent, absenteeism, and high turnover are typical symptoms of possible failure in the future.

Thompson (1988) stated that the failure to get the right people with the right skills and attitudes, rather than a lack of capital, is what causes businesses to fail.

See Table 13, Staffing Problems as a Contributing Factor to Failure, for a summary of the authors who agree and disagree concerning staffing as a cause of failure.

Table 13. STAFFING PROBLEMS AS A CONTRIBUTING FACTOR TO FAILURE

	Stated as being a Factor	Stated as NOT being a Factor	Not Mentioned as a Factor
Bruno, Leidecker, + Harder	X		
2 Cooper/Dunkelberg/Woo/Dennis			X
1 Cooper, Gason, + Woo			X
Crawford			X
Dun + Bradstreet			X
Flahvin	X		
Hoad + Rosco			X
Kennedy			X
Lauzen	?		
McQueen			X
4 Reynolds		X	
3 Reynolds + Miller		X	
Sommers + Koc	?		X
Steck	?		
Stockton	?		
Thompson	X		
Vesper	X		
Wight	X		
Wood			X
TOTAL	7 / 37%	2 / 10%	10 / 53%

1-4 Order of significance of study

? Author did not list variable as being a factor but did discuss a related issue.

Product/Industry Selection as a Contributing Factor

The Cooper, Dunkelberg, Woo, and Dennis (1990) sample of 2,294 included forty-six percent from retailing and nineteen percent from nonprofessional services for a total of 65 percent. They were also the least likely to survive and grow, all factors being equal. Only seventy-three percent in retail and seventy-five percent in the services survived compared to eighty-five percent in the professional services, eighty-three percent in financial services, and eighty-two percent in manufacturing.

Cooper, Gascon, and Woo (1991) hypothesized that major business activity in retail or personal services had a greater probability of failure than did all other industries. They did not reject the null hypothesis, concluding that industry selection is not significantly associated (at the .10 level) with survival. However, avoiding retail and personal services businesses makes it more likely for the venture to achieve substantial growth.

Reynolds (1987) concludes that the only industry that is consistently more hazardous across all years is retail (including restaurants). Retail firms are more likely to fail than other industry businesses.

Reynolds and Miller (1989) reported that in general there is little impact of industry on survival, with two exceptions. Failures are somewhat higher for construction, but it is not a statistically significant difference. The nonsurvival rates are substantially and

significantly higher ($p=0.001$) for retail firms, twice that of other industries.

Vesper (1990) stated that being in the right line of business at the right place and time is probably the most important single determinant of success. Probably the most important variable affecting the survival and success of a new venture is the choice of product or service to be offered. In two surveys the conclusion remained the same. The entrepreneur who chose the promising field did better than the one who elected to slug it out in one already crowded.

Product/Service Life Cycle

Rather than to simply look at the industry, the researcher will change the variable to product or service timing in the model. The ability to offer products or services when they are in their growth stages of the product life cycle (rather than introduction, maturity, or decline) is the contributing factor to success or failure. The ability to select the right products and services may make the difference between success and failure of two businesses in the same industry. In telephone conversations, both Dr. Baeder (1991) and Mr. John Stiska (1991) identified timing as the most important variable. Bruno, Leidecker, and Harder (1987), Roure (1987), and Sommers and Koc (1987) identified product as a factor but not specifically by life cycle.

See Table 14, for a summary of the authors who agree and disagree concerning product/industry timing as a cause of failure.

Table 14. PRODUCT/SERVICE TIMING AS A CONTRIBUTING FACTOR TO FAILURE

	Stated as being a Factor	Stated as NOT being a Factor	Not Mentioned as a Factor
Baeder	X		
Bruno, Leidecker, + Harder	X		
2 Cooper/Dunkelberg/Woo/Dennis	X		
1 Cooper, Gason, + Woo		X	
Crawford			X
Dun + Bradstreet			X
Flahvin			X
Hoad + Rosco			X
Kennedy			X
Lauzen			X
McQueen			X
4 Reynolds	X		
3 Reynolds + Miller	X		
Sommers + Koc	X		X
Stiska	X		
Thompson			X
Vesper	X		
Wight	X		
Wood			X
TOTAL	8 / 42%	1 / 5%	10 / 53%

1-4 Order of significance of study

? Author did not list variable as being a factor but did discuss a related issue.

Economic Timing as a Contributing Factor

Economic factors are listed as contributing to business failure. However, none of the developed models include economic factors as contributing factors to startup failure; in fact, the major study says it is not a factor.

The following list of studies support economic factors as contributing to failure: Bruno, Leidecker, and Harder 1987); Cooper, Dunkelberg, Woo, and Dennis (1990); Dun + Bradstreet (1991); Kennedy (1985); and Vesper (1990). Dr. Baeder (1919) also stated economic factors as a variable.

The following list of studies do not support economic factors as contributing to failure: Cooper, Gascon, and Woo (1991) and Crawford (1974).

The studies cited focus on when a business fails, which is often during a recession period. The researcher will look at economic timing rather than economic factors. Economic timing refers to the economic conditions at the time the business starts rather than at the time it fails.

Age of the Owner as a Contributing Factor

The age of the owner was identified by Cooper, Dunkelberg, Woo, and Dennis (1990) as a significant factor at the .10 level. Their study revealed that the failed firms were owned by younger people. However, Cooper, Gascon, and Woo (1991) failed to list the variable as a factor;

Crawford (1974) and Reynolds and Miller (1989) stated that age was not a factor.

Partners as a Contributing Factor

Partners were identified as a significant contributing factor at the .10 level by Cooper, Dunkelberg, Woo, and Dennis (1990). However, Cooper, Gascon, and Woo (1991) failed to list the variable as a factor because the level of significance was below .10. Reynolds and Miller (1989) found that firms initiated as sole proprietorship have a higher failure rate ($p=.025$) than partnerships and corporations. Vesper (1990) reported mixed results.

Parents that Owned a Business as a Contributing Factor

Parents owning a business was identified as being significant to survival by the most relevant study--Cooper, Gascon, and Woo (1991). Startup owners who had parents that owned a business had a higher survival rate.

Being a Minority as a Contributing Factor

The study by Cooper, Dunkelberg, Woo, and Dennis (1990) and that by Cooper, Gascon, and Woo (1991) identified minorities as having a greater chance of failing than whites.

Marketing as a Contributing Factor

Marketing was identified as being a contributor to failure by Bruno, Leidecker, and Harder (1987); Goslin and Barge (1986); McQueen (1989); and Thompson (1988). The marketing factor was not identified as being a contributor to failure by Reynolds (1987).

Age of the firm as a factor

Age of the firm is identified as being a contributor to failure by Alves (1978), Reynolds (1987), and Reynolds and Miller (1989). Age of the firm is not identified as being a contributor to failure by Crawford (1974). According to Reynolds, generally the older the firm the greater the chances of survival. However, age of the firm is not relevant to the startup firm. Therefore, it will not be included in the success vs. failure prediction model.

VARIABLES RELATED TO BUSINESS SUCCESS VS. FAILURE

Consistency Across Studies

Despite some lack of consistency across studies, overall, there is evidence that the following fifteen factors are associated with success or failure in business.

The following abbreviations will be used in Table 15 to identify the fifteen independent variables in the model:

capt	capital
rkfc	record keeping and financial control
inex	industry experience
maex	management experience
plan	planning
prad	professional advisors
educ	education
staf	staffing
psti	product/service timing
ecti	economic timing
age	age of owner
part	partners
pent	parents owned a business
mior	minority
mrkt	marketing skills

See Table 15, Variables Identified in the Literature as Contributing Factors to Business Success vs. Failure, for a summary list of the studies that support or do not support the list of variables. Only the seventeen studies that identified three or more variables are listed. To keep the model on one page, only the senior author is identified. Notice that very few studies support age of owner, partners, parents owning a business, race, and marketing skills. These five

variables have been identified in the literature and will be included in the original model. However, if they do not prove to be significant they will be dropped from the model, along with any other variable that is not significant. The summary table illustrates the discrepancy between the studies, indicating the need for this study.

Table 15. VARIABLES IDENTIFIED IN THE LITERATURE AS CONTRIBUTING FACTORS TO BUSINESS SUCCESS VS. FAILURE

Senior	Independent Variables														
Author	capt	rkfc	inex	max	plan	prod	educ	staf	ptti	ecti	age	part	pent	mior	mrkt
Bruno	F	F	-	F?	F?	-	-	F	F	F	-	-	-	-	F
Cooper	F	-	N?	N	F	F	N	-	F	F	F	F	-	F	-
Cooper	F	-	F	N	-	F	F	-	N	N	N	N	F	F	-
Crawford	-	-	F	-	-	F	F	-	-	N	N	-	-	-	-
D+B St.	F	F	F	F	-	-	-	-	-	F	-	-	-	-	-
Flahvin	F	F	F	F	-	F?	-	F	-	-	-	-	-	-	-
Hoad	-	-	F?	N?	N?	F	F?	-	-	-	-	-	-	-	-
Kennedy	F	-	-	F?	F?	-	-	-	-	F	-	-	-	-	-
Laufen	F	F	-	F?	F?	-	-	F?	-	-	-	-	-	-	-
McQueen	F	-	F?	F?	-	-	-	-	-	-	-	-	-	-	F
Reynolds	F?	F	-	-	F?	-	-	N	F	-	-	-	-	-	N
Reynolds	F?	F	-	-	F?	-	N	N	F	-	N	F	-	-	-
Sommers	-	-	-	F?	F?	-	-	F?	-	-	-	-	-	-	-
Thompson	N	-	-	F?	F?	-	-	F	F	-	-	-	-	-	F
Vesper	F	F	F	F?	N?	F?	F	-	F	F	-	F?	-	-	F
Wight	F	F?	-	F?	-	F?	-	-	-	-	-	-	-	-	-
Wood	-	F	F?	F?	F	-	F?	-	-	-	-	-	-	-	-
Total															
F + F?	12	9	8	11	9	7	5	5	6	5	1	3	1	2	3
Total															
N + N?	1	0	1	3	2	0	2	2	1	2	3	1	0	0	1
Total															
-	4	8	8	3	6	10	10	10	10	10	13	13	16	15	13

F contributing factor

F? supports contributing factor

N NOT supported as a contributing factor

N? support for noncontributing factor

- Not mentioned

Contributing Factors to Startup Business Failure

Based on the review of the literature, listed below are fifteen reasons for business failure :

1. Capital

Lack of capital is a contributing factor to business failure. Organizations that start undercapitalized have a greater chance of failure than businesses that start with adequate capital.

2. Record Keeping and Financial Control

Poor record keeping and lack of financial control are contributing factors to business failure. Firms that do not keep updated accurate records and do not use adequate financial controls (cash flow, accounts receivables and payables, inventory, etc.) have a greater chance of failure than businesses that do.

3. Industry Experience

Lack of industry experience is a contributing factor to business failure. Startup organizations that are managed by people without prior industry experience have a greater chance of failure than businesses that are managed by people with prior industry experience.

4. Management Experience

Lack of management experience is a contributing factor to business failure. Startup organizations that are managed by people without prior management experience have a greater chance of failure than businesses that are managed by people with prior management experience. Management experience is defined as a job with a management title which involves decision making authority in the areas of planning, organizing, staffing, leading, and controlling.

5. Planning

Lack of planning is a contributing factor to business failure. Startup organizations that do not develop specific business plans have a greater chance of failure than organizations that develop specific business plans. Planning defined: a specific plan states the purpose of the business and objectives; it specifies strategic moves necessary to accomplish the objectives. The plan includes a cost-profit projection. The plan is based on a comparison to competition and a determination of how the firm will compete--low prices; superior- quality, service, location, selection; new product-service, etc.

6. Professional Advisors

Not using professional advisors is a contributing factor to business failure. Startup organizations that do not use professional advisors (accountants, lawyers, bankers, consultants, etc.) have a

greater chance of failure than businesses that use professional advisors.

7. Education

Lack of education is a contributing factor to business failure. People without any college education who start a business have a greater chance of failing than people with one or more years of college education.

8. Staffing

Poor staffing is a contributing factor to business failure. Organizations that cannot attract and retained quality employees have a greater chance of failure than firms that can attract and retain quality employees.

9. Product/Service Timing

Poor timing of product/service is a contributing factor to business failure. Firms that select products/services that are too new (low sales) or too old (product is in the decline stage of sales volume) have a greater chance of failure than firms that select products/services that are in the growth stage.

10. Economic Timing

Poor economic timing is a contributing factor to failure. Firms that startup during a recession have a greater chance to fail than businesses that start during expansion periods.

11. Age

Age is a contributing factor to failure. People who start a business at a younger age have a greater chance to fail than older people.

12. Partners

Lack of partners is a contributing factor to failure. A business started by one person has a greater chance of failure than a business started by partners.

13. Parents

Having parents who did not own their own business is a contributing factor to failure. Startup owners whose parents did not own a business have a greater chance of failure than owners whose parents did own a business.

14. Minority

Being from a racial or ethical minority is a contributing factor to failure. Minorities have a greater chance of failure than nonminorities.

15. Marketing

Lack of marketing skills is a contributing factor to failure. Startup owners without marketing skills (sales, advertising, pricing, etc.) have a greater chance of failure than owners with marketing skills.

STARTUP BUSINESS SUCCESS VS. FAILURE PREDICTION MODEL

Based on the review of the literature, the startup business success vs. failure prediction model was developed and tested. The model appears on the following page in figure 1. The independent variables will be used to predict if a business will succeed or fail.

Figure 1. STARTUP BUSINESS SUCCESS VS. FAILURE PREDICTION MODEL

$$S/F = f(\text{capt}, \text{rkfc}, \text{inex}, \text{maex}, \text{plan}, \text{prad}, \text{educ}, \text{staf}, \\ \text{psti}, \text{ecti}, \text{age}, \text{part}, \text{pent}, \text{mior}, \text{mrkt})$$

Dependent Variable:

S/F Success vs. Failure

Independent Variables:

capt capital
rkfc record keeping and financial control
inex industry experience
maex management experience
plan planning
prad professional advisors
educ education
staf staffing
psti product/service timing
ecti economic timing
age age of owner
part partners
pent parents owned a business
mior minority
mrkt marketing skills

Comparison to the Resource-Based Prediction of New Venture Survival and Growth Model

The most similar model to figure 1. is the Resource-Based Prediction of New Venture Survival and Growth Model developed by Cooper, Gascon, and Woo (1991). Their full model includes- Dependent Variables: failure, survived no growth, and growth. Independent Variables: education, non-profit, management experience, sex, minority, parents had owned business, industry experience, use of professional advisors, partners, capital, and industry selection.

The dependent variable of the research model in figure 1. includes success/failure; it does not include no growth and growth. Independent variables used in the model by Cooper, Gascon, and Woo (1991) but are not included in the researcher's model are non-profit and sex. They were excluded because they were not commonly identified in the literature, and they lacked statistical significance.

The independent variables used in both models include capital, education, management experience, industry experience, professional advisors, minority, parents owned business, industry selection, age, and partners.

Independent variables used in this study's model, based on the literature and not included in Cooper, Gascon, and Woo (1991), are record keeping and financial control, planning, staffing, product/service timing, economic timing, and marketing. This study will also use a different research design, sample, and questionnaire than those used by Cooper, Gascon, and Woo (1991) and other studies as well.

The differences will be stated in Chapter 3, Methodology. Below is a comparison of business failure prediction models.

Reynolds

S/F = age of business + industry selection + first years sales +
organization before sales

Cooper, Gascon, and Woo

F/S/G = capt + inex + maex + prad + educ + non-profit, sex + minority +
parents owned business + industry selection + age

Lussier

S/F = capt + rkfc + inex + maex + plan + prad + educ + staf + psti +
ecti + age + part + pent + mior + mrkt

The research model will empirically support or not support
variables identified in the literature.

CHAPTER 3

METHODOLOGY

This chapter on methodology is divided into seven sections: research design, sample, sample representation, questionnaire design, validity and reliability, data collection, and data analysis,

RESEARCH DESIGN

Causal Research

The purpose of this study is to develop and test a generic startup business success vs. failure prediction model. The study utilizes the causal research design. It is a formal study designed to identify the relationship between the variables identified through the literature search. The independent variables, contributing factors to startup business success vs. failure, are used to predict success vs. failure. The study is ex post facto; therefore, the independent variables are inferred to be the cause of business failure vs. success, through statistical testing. To aid in determining causation, contrasted groups are used. The contrasted groups are matched pairs of successful vs. failed businesses within the same industry. Details on matched pairs are presented later in this chapter.

Survey Research

Data was collected cross-sectionally by mail questionnaires. The questionnaire was mailed to a cross-industry sample of failed and successful businesses. Data was analyzed statistically. Details concerning the questionnaire, mailing, and statistical testing are presented throughout this chapter.

SAMPLE

Population and Sample Unit

The population from which the sample was selected for this study has been limited to the six New England states- Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont. The population of failed businesses, as defined by Dun + Bradstreet (1991), "companies involved in court proceedings or voluntary action involving losses to creditors," includes both Chapter 7 and Chapter 11 companies. Discontinued businesses are not failures; therefore, they are not part of the population. The population of the study includes Chapter 7 and Chapter 11 startup companies in New England. The sample unit is a business.

Sample Frame

The population includes all Chapter 7 and Chapter 11 companies. A list of failed companies is obtainable through the bankruptcy courts in

each state. Court records, open to the public, include the name and address, but not telephone number, of all Chapter 7 and 11 companies. The records do not state how many years the firm has been conducting business. Therefore, from a generated list of failures taken from the court records, it is not possible to tell startup firms from older businesses.

Once a business has liquidated under Chapter 7, it is very difficult to locate its owner to answer the questionnaire. Based on a cost-benefit analysis, the sample frame is limited to Chapter 11 companies in New England.

Validity of Chapter 11 Company Sample

To determine the validity of Chapter 11 firms representing business failures, an attempt was made to find out the number of Chapter 11 companies that ended up going out of business by converting to Chapter 7. The review of the literature did not include any figures on the number of Chapter 11 firms that go out of business. The next approach was to contact the American Bankrupt Institute, Turnaround and Workouts, New Generations, Survey Turnaround Managers, the National Association of Credit Managers, the Beard Group, the Small Business Administration, the Bankruptcy Court of Massachusetts, and the Administrative Office of the United States Courts. None of these organizations keeps records on the number of Chapter 11 companies that end up going out of business, and with companies filing multiple Chapter 11 cases, the data would be questionable even if it were available.

The Administrative Office of the United States Courts did conduct the *Statistical Analysis of Chapter 11* (Flynn, 1989) in cooperation with Earnst + Young. The results show that only about one out of 15, less than seven percent, of Chapter 11 cases which have been closed so far, were closed after confirmation of repayment of debt to creditors. It was estimated that 20-30 percent of cases contain liquidating plans rather than reorganization plans. It is estimated that only 10-12 percent of Chapter 11 cases result in a successful reorganization of the debtor's business. Although the claim that 90 percent of Chapter 11 companies go out of business cannot be made, this study supports the validity of using Chapter 11 company owners as a representative sample of business failures. Through the review of the literature, there were no other authors who surveyed Chapter 7 or Chapter 11 firms. The two major studies surveyed new businesses while they were successful: 1. the studies by Cooper, Dunkelberg, Woo, and Dennis (1990) and Cooper, Gascon, and Woo [same sample] (1991); 2. the studies by Reynolds (1987) and Reynolds and Miller [same sample] (1989). These studies never surveyed the firms after they failed and did not ask the owners why they failed. They compare the answers the owners gave while their businesses existed to the surviving firms. While these studies are using one sample, this study surveyed two matched samples: success and failure.

Statistical Test of Validity

Most Chapter 11 companies eventually end up going out of business. In a New England survey sample of 38 Chapter 11 companies, Corman and Lussier (1991) found that 24 percent of the respondents had converted to

Chapter 7. In this study 14 percent of the respondents were actually in Chapter 7 proceedings. The responses of the Chapter 7 companies were compared to the Chapter 11 companies using the Chi-square test for nominal data frequencies (questions 29, 30, 31) and the Mann-Whitney U to test for differences in means of the other questions. Of the 30 questions compared, only one question response was significantly different at the .05 level. The Chapter 7 CEOs felt more strongly that firms starting undercapitalized have a greater chance of failure than businesses that start with adequate capital. Therefore, it can be inferred that the dominantly Chapter 11 sample is a valid representation of failures.

Sample Unit Selection Method

The questionnaire was mailed to each New England company filing Chapter 11 during the most recent year, 1991, including startups and older businesses and to each Chapter 11 respondent's successful company match.

Matched Pairs

Each Chapter 11 startup company respondent is matched with a successful company of similar size (number of employees), age (ten years or less), and industry to ensure adequate representation in comparisons. Matching was based on the questionnaire returns. Each Chapter 11 company was asked to identify its major competitors. One competitor was selected and surveyed as the Chapter 11's match. Chapter 11 questionnaires,

returned without an identified competitor were match by using the *Yellow Pages*.

The only study found using matched pairs was Alves (1978). His dissertation matched forty-one healthy firms with failed firms in the manufacturing sector. However, like most of the studies, Alves did not survey the failed firms. O'Neill and Duker (1986) did survey unsuccessful firms, but the unmatched sample size was only 11 unsuccessful firms, and the unsuccessful firms were not failed as defined by Dun + Bradstreet, compared to 32 successful firms.

Validity of Matched Pairs

To ensure that valid matching was conducted, matching is based on four major categories: industry, location, size, and age.

Industry and Location: All failed firms were matched with successful companies in the same industry from the same state and the same or close by city.

Size: To ensure that small failed businesses were not compared to large successful companies, the failure questionnaire data on employee size was used as the bases for the match. Successful companies were told that to qualify for the study, they had to meet a specified employee size limitation. The failure firms were actually larger, but not significantly larger, than the successful firms. The mean number of employees for the failures is 25.333 employees compared to 22.224 employees for the successful businesses. See Appendix B, question 35, for a more detailed descriptive comparison of number of employees. There is a fairly equal distribution of the number of employees within the

group ranges of 0-5, 6-15, 16-25, and 26-50, with smaller representation of the 51-99, and 100-300 groups. This distribution supports validity because the number of failed small businesses is greater than that of large business failures.

Age: To ensure that older firms were not compared to startup firms, the questionnaire stated that a startup business is zero to ten years old. The successful businesses have been conducting business longer than the failures, 5.815 vs. 5.491, but this difference is not significant. See Appendix B, question 34, for a more detailed descriptive comparison of number of years firms have been conducting business. The matched pairs support the validity of the sample.

Sample Size

The target number of completed questionnaires for this study was 50 to 75 pairs of successful and failed businesses from all major industry sectors, for a total of 100-150 total respondents. Data collection difficulty from Chapter 11 companies was anticipated. Because of the relatively small number of Chapter 11 companies compared to that of successful companies, to receive the target response rate, all active Chapter 11 companies were mailed a questionnaire. The sample target size is based on the exploratory study of 38 failed firms. Ideally, the researcher wanted to have 100 - 150 matched pairs. The actual number of paired returns was 108, for a total of 216 questionnaires. The sample size is considerably smaller than that of studies that do not survey failed businesses, but it is believed to be one of the larger sample

sizes of failed businesses, and it is the first study that surveys Chapter 11 companies and compares them to successful companies.

The gap in present research undertaken by the sample is surveying failed businesses. Surveying failed businesses cuts down the sample size but may increase the knowledge of why businesses fail. To determine why businesses fail, asking failures directly can lead to a better understanding and predictability of business success vs. failure.

SAMPLE REPRESENTATION

To ensure that the sample represents the population, the sample failures were compared to the population by state and industry. The population figures include both Chapter 7 and Chapter 11 failures. The figures were calculated in 1992 by Dun + Bradstreet for the year 1991. Among the six New England states and eight industry groupings, the sample represents the population. There is no difference between the sample and the population for any of the fourteen categories at the .05 level of significance. The demographic comparison is presented below, followed by a discussion of how nonresponse bias was minimized in the study. See Appendix B, Questionnaire Data -Descriptive Statistics, for a complete question-by-question presentation of failure responses and successful responses.

Demographic Comparison of the Sample to the Population

Geographical Statistical Test

To determine if the failure sample represents the population, representation by each New England state was compared using the McNemar test. There is no difference between the sample and the population at the .05 level of significance for any state. See Table 16 for the comparison of the sample to the population.

Table 16. COMPARISON OF THE SAMPLE TO THE POPULATION BY NEW ENGLAND STATE

State	Failure sample frequency and percentage		Failure population* frequency and percentage	
1 Connecticut	22	20%	26	24%
2 Maine	5	5%	2	2%
3 Massachusetts	47	44%	49	45%
4 New Hampshire	21	19%	18	17%
5 Rhode Island	10	9%	10	9%
6 Vermont	3	3%	2	2%
Total	108	100%	107	99%

*Population percentage from Dun + Bradstreet (1992), population frequency converted based on sample size.

The greatest difference between the sample and the population occurs from Maine. Failures from Maine represent 2 percent of the population and 5 percent of the sample. Converting the population to frequency distributions results in 2 vs. 5. The Chi-square is $1.285 < 3.84$ (table value at .05 level of significance - 1 degree of freedom), with a significance level of about .25. The second largest variance comes from Connecticut. Failures from Connecticut represent 24 percent of the population and 20 percent of the sample. Converting the population to frequency distributions results in 26 vs. 22. The Chi-square is $.3333 < 3.84$, with a significance level of about .60. The sample from New Hampshire included 21 respondents or 19 percent, compared to 17 percent of the population. The sample from Vermont included 3 respondents or 3 percent, compared to 2 percent of the population. The sample from Massachusetts included 47 respondents or 44 percent, compared to 45 percent of the population. The sample from Rhode Island included 10 respondents or 9 percent, compared to 9 percent of the population. These findings support the sample as being a good representation of the population for all six New England states.

Industry Statistical Test

To determine if the failure sample represents the population, representation by each industry group was compared using the McNemar test. There is no difference between the sample and the population at the .05 significance level. See Table 17 for a comparison of the sample to the population.

Table 17. COMPARISON OF THE SAMPLE TO THE POPULATION BY INDUSTRY

Industry	Failure frequency percentage	sample and percentage	Failure population* frequency and percentage
1 Agriculture	2	2%	1 1%
2 Construction	16	15%	18 17%
3 Finance	19	17%	10 9%
4 Manufacturing	11	10%	9 8%
5 Retail	24	22%	24 22%
6 Wholesale	3	3%	6 6%
7 Transportation	6	6%	3 3%
8 Service	27	25%	33 31%
Total	108	100.0%	104 97%**

*Population percentage from Dun + Bradstreet (1992), population frequency converted based on sample size.

** 3 percent of cases were listed as unclassified.

The greatest variance between the sample and the population is in the finance-insurance-real estate industry group. Failures represent 9 percent of the population and 17 percent of the sample. Converting the population to frequency distributions results in 10 vs. 19. The Chi-square is $2.793 < 3.84$ (table value at .05 level of significance - 1 degree of freedom), with a significance level of about .10. The second

largest variance was in both the wholesale and transportation industry groupings. Failures in wholesale represent 3 percent of the population and 6 percent of the sample. Failures in transportation represent 6 percent of the population and 2 percent of the sample. Converting the population frequency distributions results in 6 vs. 3. The Chi-square is $1.0 < 3.84$, with a significance level of about .30. The service industry had the fourth largest variance. Failures represent 31 percent of the population and 25 percent of the sample. Converting the population to frequency distributions results in 33 vs. 27. The Chi-square is $.6 < 3.84$, with a significance level of about .40. The sample from agriculture included 2 respondents or 2 percent, compared to 1 percent of the population. The sample from manufacturing included 11 respondents or 10 percent, compared to 8 percent of the population. The sample from construction included 16 respondents or 15 percent, compared to 17 percent of the population. The sample from retailing included 26 respondents or 22 percent, compared to 22 percent of the population. These findings support the sample as being a good representation of the population for all eight industries.

Nonresponse Bias

In mail survey research, the most pervasive error is the nonresponse error. Nonresponse bias is minimized in the study by including initial nonrespondents in the sample and by comparing statistically the initial nonrespondents' data to that of the initial respondents to ensure that there was no significant difference in responses between these two groups.

The percentage of failure responses returned is not calculated because the sample frame included both startups and older businesses. Chapter 11 records do not state how long the business has been operating. Therefore, all Chapter 11 companies were sent the questionnaire. The questionnaire indicated that a startup business is zero to ten years old. Five blank questionnaires were returned stating that the company was too old. However, the number of CEOs from failure businesses who simply threw the questionnaire away because the company was too old can not be determined economically. Nonresponse was not a problems with the successful companies because of extensive follow-up. A 76 percent response rate was received from accurate successful company matches.

Initial Nonrespondents Included in the Sample

To ensure that nonrespondents were included in the sample, four weeks after the failure mailing, questionnaire interviews on the telephone were conducted with eleven initial failure nonrespondents and ten successful initial nonrespondents. Through this effort the sample includes 21 questionnaires, approximately 10 percent, from initial nonrespondents.

Statistical Test Comparing Initial Nonrespondents to Respondents

The questionnaire answers of the initial nonrespondents, both failures and successes, were compared to respondents using the Chi-square test for nominal data frequencies (questions 29, 30, 31) and the Mann-Whitney U to test for differences in means of the other questions.

Of the 30 questions compared for failures, only two question responses, numbers 18 and 35, were significantly different at the .05 level. The initial failed nonrespondents believed they started with a smaller amount of capital (4.757 vs. 5.727). Their firms were larger in size than those of the respondents (27.182 employees vs. 25.333). For the successful comparison, one question response, number 10, was significantly different at the .05 level. The initial nonrespondents believe that economic timing is a greater contributing factor to failure than respondents (2.20 vs. 3.704). The test results infer that the sample is not significantly biased due to nonresponse error.

QUESTIONNAIRE DESIGN

Based on the exploratory study, collecting data from failed businesses was anticipated to be difficult. To increase the response rate, brevity was a factor in questionnaire design. Pilot testing revealed that the questionnaire takes about 10 minutes to complete. See Appendix A for a copy of the questionnaire.

Question 1 of the Study

Questions 1-15 were designed to answer question 1 of the study: "Do successful and failed CEOs agree on the contributing factors to business failure?" The CEOs were asked if they agree or disagree that each of the fifteen independent variables in the model is a contributing factor to businesses failure. The data is measured on an ordinal scale (1-7); and the two groups are matched pairs. Therefore, data from

questions 1-15 were statistically tested to determine if the answers of the failed and successful groups were significantly different. The Wilcoxon matched-pair test was used because the two samples are related, and the data measurement is ordinal. In Chapter 5, Results: Question 1 / Hypotheses 1-15, the results are presented.

Question 2 of the Study

Questions 18-32 relate to question 2 of the study: "Did successful and failure businesses start with equal resources?" Based on the fifteen independent variables in the model, the CEOs were asked to identify the firm's starting resources. The data is measured on three levels: 1. Nominal: questions 29, 30, and 31. Because of the matched pairs the McNemar test was used rather than Chi-square to determine if there is a significant difference between the two groups. 2. Ordinal: questions 18, 19, 22, 23, 25, 26, 27, and 32. Wilcoxon matched-pairs was used to test if there is a significant difference between the two dependent samples. 3. Ratio: questions 20, 21, 24, and 28. The paired t-test was used to test if there is a significant difference between the matched pairs. Test results are presented in Chapter 6, Results: Question 2 / Hypotheses 16-30.

The Purpose of the Study

Questions 18-32 also relate to the purpose of the study: "to develop and test a generic model that will predict startup business success vs. failure." To test the model, discriminant analysis was used.

In addition, to aid in the development and testing of the model, factor analysis was used. Factor analysis was used to check for multicollinearity and to group the fifteen variables into a smaller number. These methods will be explained later in this chapter, and the results are presented in Chapter 4, Results - Testing and Developing the Startup Business Success vs. Failure Prediction Model.

Additional Data

Question 16 is an open-ended question which asks the CEO to list any other contributing factors to business success vs. failure not listed in questions 1-15. If a significant number of CEOs identified the same variable, it would be added to the model. However, based on the responses, no addition variables were added to the model. The decision not to include additional variables in the model will be explained later in this chapter.

Question 17 is also an open ended question and is different for the successful firms and the failed firms. Two separate questionnaires were developed. The failed businesses were asked, "What would you say is the major factor in your firm's filing for Chapter 11?" The successful firms were asked, "What would you say is the major factor in your firm's success?" Reliability of questions 1-15 was checked and additional data obtained through question 17. The findings of question 17 are discussed later in this chapter.

Questions 33-36 ask the CEOs for descriptive information regarding their firms. This data was used to check the validity of the sample matches. If there was a significant difference between the failed and

successful firms, a new match was created. The data are measured on two levels: 1. Nominal: questions 33 and 36; 2. Ratio: questions 34 and 35.

Question 37 is different on both questionnaires: it asks failures to list their businesses status, and for the profit level of successful firms.

Questions 38 and 39 are open-ended asking CEOs for their advise for young people considering starting their own business and for owners of new businesses. This data will be used to write articles of recommendations to readers interested in starting their own business. The data from question 37 was used to determine the number of Chapter 7 and Chapter 11 firms in the sample and also to test for differences between the two groups to test the validity of the Chapter 11 sample mailing.

Questions 40 asks failures to identify a couple of their firm's major competitors-- similar size and age. This information was used for matching a failed firm to a successful firm.

VALIDITY AND RELIABILITY

The research results infer content validity, empirical validity, construct validity, and reliability.

Content Validity

To ensure that the questionnaire measured what it was intended to measure, all questions were based on prior research. The model includes fifteen variables stated in the literature as being contributing factors

to success vs. failure. When reviewing the relevant research, Chapter 2, economic timing, age, partners, parents, minority, and marketing were not supported as contributing factors by many studies. However, these variables were included in the model to help ensure content validity by providing adequate coverage of the topic.

Some of the questions were copied from questionnaires used in prior studies while others were based on a prior question but revised to fit the study. Questions 1 - 15 specifically asked respondents what their level of agreement is with each variable in the model. Question 16 was open ended to allow write-in factors not included in the model to check content validity. Additional failure CEO write-in responses included attitude and hard work (12%), location (3%), family problems and owner operated (2%), expansion, costs, government, contracts, and people skills (each 1%). Seventy-two percent left the question blank, and five percent repeated variables in the model. Additional successful CEO write-in responses included attitude and hard work (13%), government (3%), location (2%), delegation, communications, use of information, family problems, and values (each 1%). Seventy-three percent left the question blank, and five percent repeated variables in the model. A thirteen percent write-in for attitude and hard work indicates the need for entrepreneurial studies, which is beyond the scope of this study. To simply ask the question, "Do people that work harder have a greater chance of success than those who do not?" would result in obvious responses. A 72 percent nonwrite-in, with 5 percent repeated variables, infers the validity of the model variables. Questions 18 - 32 were direct questions about starting resources to compare failure to success

when testing the model. See empirical validity below for the discussion. In addition, all ordinal measures used a scale of 1-7 to help identify valid differences.

The questionnaire was developed through three pilot tests. The first test took place in the Spring of 1990. Thirty-eight Chapter 11 company owners completed the first version of the questionnaire. Based on the first version of the questionnaire, improvements were made. The second pilot test was conducted in the Fall and Winter of 1991. Ten Chapter 11 company owners completed the second version of the questionnaire. The final version of the questionnaire was tested for content validity by a group of experts which included academics (Dr. Morris, Dr. Baeder, Dr. Mottola, Dr. Jensen, and Dr. Mahar) and successful business owners (Mr. King, Mr. Broadhurst, Mrs. Broadhurst, Mr. Normand, and Mr. Clark). Based on the two pilot tests and the panel of experts' input, the questionnaire was improved again. The third pilot test questionnaire was completed by four Chapter 11 owners and six successful company owners. After minor changes, the questionnaire was mailed to the full sample.

Empirical Validity

Empirical/criterion validity has been established in the study. The purpose of the study is to develop and test a startup business success vs. failure prediction model. To have empirical validity, the model must accurately predict success or failure. As discussed in Chapter 2, there is no generally accepted list of variables/factors contributing to success or failure. Because of this lack of prior established criterion,

a criterion was established concurrently with the model. Based on the original model, four generic models, five industry models, and three company size models were developed and tested. These twelve models predicted the known success and failure companies from the sample, with an accuracy rate of 62 to 65 percent, 80 to 95 percent, and 60 to 81 percent respectively. The four generic models, five industry models, two of the three company size models are significant at the .05 level. Full details of model development and testing are presented in Chapter 4. These findings infer the empirical validity of the model.

Construct Validity

During statistical testing, it was determined that the theoretical model is consistent with empirical results. In order to determine how well the model, through the questionnaire, measured the intended construct of success vs. failure, three steps were followed: 1. The researcher theorized that the model would predict success vs. failure; 2. The model acceptance significance level was established at .05; 3. twelve startup success vs. failure prediction models were developed and tested on the known sample of success vs. failure companies. Eleven models are significant at the .05 level. Therefore, construct validity is inferred. Full details of model development and testing are presented in Chapter 4.

Reliability

Reliability of the Questionnaire

A major cause of error variance, which can be controlled, is the questionnaire itself. Poorly phrased and ambiguous questions result in greater error. To increase reliability of the measurement instrument, the questionnaire was carefully developed. As previously stated in more detail, all questions were based on prior research. Some of the questions were copied from questionnaires used in prior studies, while others were based on a prior question but revised to fit the study. The questionnaire was thoroughly developed with the input of both academic and business experts. The questionnaire went through three pilot developmental stages before the final mailing.

One of the major concerns of the study was response rate. To increase response rates, the questionnaire length was limited; therefore, a trade-off was made. Rather than have several repeat questions, one-open ended question, number 17, was used to check reliability. The question asked of the failures: "What would you say was the major factor in your filing for Chapter 11?" If the respondents said that for example, lack of capital was the cause of filing for Chapter 11 but stated on question 1 that they disagreed that capital was a contributing factor to success vs. failure, then the response indicates unreliability. On the other hand, if respondents said lack of management experience was the cause of filing for Chapter 11 and stated on question 4 that they strongly agreed or agreed (1 or 2 on a scale of 7) that management experience was a contributing factor to success or

failure, then the response indicates reliability. Results revealed that only one failed response selected a variable from the list, industry experience, and rated it as slightly disagree (5 on a scale of 7). Thirty-six percent of failed respondents selected a variable from the list and strongly agreed or agreed. Twenty-five percent selected the economic recession as the cause. Thirteen percent left the question blank. Eight percent stated bank problems. Six percent selected tax problems. Five percent stated loss of large customers. Five percent stated accounts receivables problems. Four percent stated legal problems. Two percent stated- expansion, theft, partner problems, and high overhead. One percent stated- strike, fire, family problems, and President Bush. Percentages exceed 100 due to a few multiple responses and rounding.

The successful CEOs were asked, "What would you say is the major factor in your firm's success?" None of the respondents gave an unreliable response. Twenty-five percent gave reliable responses. Forty-three percent left the question blank. Fourteen percent stated hard work. Twelve percent stated their superior product/service. Four percent stated that they were owner-operated, two percent stated values, one percent stated- adaptability, repeat business, and common sense. With only one nonreliable response, the researcher infers support for reliability.

Reliability of the Model

The reliability of the model is dependent upon the questionnaire with which it is tested. The above steps to ensure reliability apply to

the model. In addition, to ensure reliability of the model, stepwise discriminant analysis was used to eliminate those variables with little discriminatory power. Elimination of less reliable variables took place through the development of twelve models. Chapter 4 presents the procedures and results of model development and testing.

DATA COLLECTION

The data collection had two separate parts: First the mail questionnaire was collected from the failed businesses so that the data could be used as the source for matching them with successful businesses. The second part involved collecting questionnaires from the successful company matches.

Data Collection: Failed Businesses

As a result of the exploratory survey, it was anticipated that a low percent of questionnaires mailed to Chapter 11 companies would be returned. To increase the response rate, follow-up techniques were used. Five steps were followed:

1. Obtain names and addresses of Chapter 11 companies on a state-by-state bases. The order was by size of business failures as reported with percentages by Dun + Bradstreet: Massachusetts 45%, Connecticut 24%, New Hampshire 17%, Rhode Island 9% Maine 2%, and Vermont 2%, To increase the chances of the Chapter 11 company still being in business and answering the questionnaire, all active Chapter 11 companies filing during the most recent year, 1991, were collected in each of the New

England states. An unsuccessful attempt was made to get the bankruptcy courts to mail the names and addresses.

2. Mail the questionnaire and cover letter to all Chapter 11 companies. (See Appendix A for a copy of the cover letter) A self-addressed return postage paid envelope was also included. Many Chapter 11 company cases remain open even though the business has actually closed. It is assumed that a business without a mailing address is closed. The company names were eliminated from the sample frame for all firms for which the envelope was returned stating that it is not deliverable.

3. Obtain the telephone number for nonrespondents. The court records do not contain telephone numbers. Therefore, telephone numbers were obtained through telephone information operators. Because most businesses cannot operate without a telephone, it was assumed that any firm with a disconnected phone number and with no new or replacement phone number available, went out of business. Reynolds (1987) and Shapero and Giglierano (1982) also assumed that this lack of a telephone number indicated failure. These companies were dropped from the sample frame.

4. Telephone interview some of the CEOs of nonresponding Chapter 11 companies to compare responses to the original respondents to test for differences. CEOs were asked if the questionnaire was received and mailed back. If they responded that they did not, they were asked to complete a questionnaire over the telephone. If the CEO was reluctant to complete the questionnaire over the telephone, a request was made for a mail response. A second questionnaire was mailed when needed.

Telephone interviews served two purposes: to increase the response rate and to address nonresponse bias in the sample. Ten percent of the sample included initial nonrespondents. Steps 3 and 4 were an ongoing process.

5. Follow-up. CEOs agreeing to complete a mail questionnaire were called on the sixth day to determine if the questionnaire was returned. If not, a follow-up request for a telephone response was made.

Data Collection Successful Company Matches

The following four steps were followed to collect the data from successful company matches. These steps actually took place as the Chapter 11 company questionnaires were returned.

1. Match failures to successes. For each failed company respondent a successful company was matched. Matching was based on question 30, which requested the names and addresses of a couple of the firm's closest competitors by size and age. If question 30 was left blank, the *Yellow Pages* were used as the source of a match based on industry, city and state.

2. Mail the questionnaires and cover letters. (See Appendix A for a copy of the cover letter) To ensure accurate matching, the cover letter stated that the firm must be less than ten years old and be of comparable size (within 25-75 depending upon failed company size). If the successful firm did not qualify, a new match was selected until a match was completed.

3. Telephone the CEO of nonresponding successful companies and ask if the questionnaire was received and mailed back. If they responded

that they did not, they were asked to complete a questionnaire over the telephone. If the CEO was reluctant to complete the questionnaire over the telephone, a request was made for a mail response.

4. Follow-up. CEOs agreeing to complete a mail questionnaire were called on the sixth day to determine if the questionnaire was returned. If not, a follow-up request for a telephone response was made.

This four step process continued until all failed questionnaires were matched with successful questionnaires. Ten percent of the sample included initial nonrespondents.

DATA ANALYSIS

Data from the 216 usable questionnaires were entered into the SPSS-X mainframe computer. The major statistical tests used were discriminant analysis, factor analysis, paired t-test, Wilcoxon matched-pair test, Mann-Whitney U test, McNemar test, and descriptive statistics.

Statistical Test of the Model

The purpose of this study is to develop and test a model that will predict startup business success or failure. The following model was developed (abbreviations given in the frontmatter List of Abbreviations and in Chapter 2)

$$S/F = f(\text{capt, rkfc, inex, maex, plan, prad, educ, staf,} \\ \text{pstl, ectl, age, part, pent, mior, mrkt})$$

The original model was tested and twelve models developed, using discriminant analysis and factor analysis. Multiple regression cannot be used because the dependent variable is success or failure, a nominal classification.

Discriminant Analysis

Discriminant analysis uses a linear combination of variables to distinguish between two or more categories of cases. The variables "discriminate" between groups of cases and predict into which category each case falls, based upon the values of these variables. The stepwise method of discriminant analysis was used to find a set of variables that maximizes discriminant power. It was anticipated that several of the variables would be low in discriminant power, thus, would to be dropped from the original model as reduced models were developed. Discriminant analysis revealed the models' predictive power by determining what percentage of the sample was accurately predicted as success and failures. Discriminant analysis was also used to determine the significance of developed models.

The significance level for testing and accepting the model was .05. Eleven models were developed that are significant at the .05 level. The models are superior to predicting success vs. failure based on random assignment of businesses to these categories. Chapter 4, Results: Testing and Developing the Startup Business Success vs. Failure Prediction Model, presents the process of testing and developing models.

Factor Analysis

Factor analysis was used to test the model for multicollinearity and to classify the fifteen independent variables into a limited number of dimensions. If the fifteen independent variables were highly correlated and four or more grouped together as a factor, these variables were combined into a composite scale using the factor score coefficients. Each variable was included as a factor, based on its highest factor score coefficient. The reduced models using factor analysis with composite scales, were tested using discriminant analysis to determine its ability to predict each case as a successful or failed company.

In addition to developing a startup business success vs. failure prediction model, the study answers two questions.

Statistical Test Question 1

Do successful and failed business CEOs agree on
the contributing factors to startup business failure?

To determine if there is agreement on the contributing factors to business failure, fifteen hypotheses were developed and tested based on the independent variables in the model. The answers of the CEOs of successful and failed businesses were compared statistically using the Wilcoxon matched-pair test.

Hypotheses 1-15

The following null hypotheses were developed based on questions 1-15 of the questionnaire. Each question test one hypothesis of corresponding number. Question 1 was used to test hypothesis 1, an so on through 15. (See appendix A for a copy of the questionnaire)

Ho₁: The capital agreement-disagreement mean ranking of failure and successful business CEOs are equal.

Ho₂: The record keeping and financial control agreement-disagreement mean ranking of failure and successful business CEOs are equal.

Ho₃: The industry experience agreement-disagreement mean ranking of failure and successful business CEOs are equal.

Ho₄: The management experience agreement-disagreement mean ranking of failure and successful business CEOs are equal.

Ho₅: The planning agreement-disagreement mean ranking of failure and successful business CEOs are equal.

Ho₆: The professional advisors agreement-disagreement mean ranking of failure and successful business CEOs are equal.

Ho₇: The education agreement-disagreement mean ranking of failure and successful business CEOs are equal.

Ho₈: The staffing agreement-disagreement mean ranking of failure and successful business CEOs are equal.

Ho₉: The product/service timing agreement-disagreement mean ranking of failure and successful business CEOs are equal.

Ho₁₀: The economic timing agreement-disagreement mean ranking of failure and successful business CEOs are equal.

Ho₁₁: The age agreement-disagreement mean ranking of failure and successful business CEOs are equal.

Ho₁₂: The partner agreement-disagreement mean ranking of failure and successful business CEOs are equal.

Ho₁₃: The parent agreement-disagreement mean ranking of failure and successful business CEOs are equal.

Ho₁₄: The minority agreement-disagreement mean ranking of failure and successful business CEOs are equal.

Ho₁₅: The marketing agreement-disagreement ranking of failure and successful business CEOs are equal.

Ha₁₋₁₅: The means are not equal.

Test and Significance Level

All 15 hypotheses are measured on ordinal scales (agree 1-7 disagree); and the two groups are matched pairs. Therefore, they were tested using the Wilcoxon matched-pair test at the .05 significance level. Chapter 5, Results: Question 1 / Hypotheses 1 - 15, presents the test results. If successful and failed CEOs disagree on the reasons businesses fail, then the present studies that do not survey failed business may be of limited value.

Statistical Test Question 2

Do successful and failed businesses start with equal resources?

To determine if there is a significant difference in the startup resources between the successful and failed firms, hypotheses were developed and tested based on the questionnaire. The answers of the two groups were compared statistically to determine if there is a significant difference.

Hypotheses 16-30

The following hypotheses were developed based on questions 18-32 of the questionnaire. Data from question 18 was used to test hypothesis 16, data from question 19 to test hypothesis 17, and so on for each

question and hypothesis. (See Appendix A for a copy of the questionnaire).

Ho₁₆: Failed and successful businesses started with equal operating capital.

Ha: Failures started with less capital than successful firms.

Ho₁₇: Failed and successful businesses have equal record keeping and financial controls.

Ha: Failed have poorer record keeping and financial controls than successful firms.

Ho₁₈: Failed and successful business CEOs have an equal number of years of industry experience prior to managing the firm.

Ha: Failures have fewer number of years of industry experience than successful CEOs.

Ho₁₉: Failed and successful business CEOs have an equal number of years of management experience prior to managing the firm.

Ha: Failures have fewer number of years of management experience than successful CEOs.

Ho₂₀: Failed and successful businesses started with plans of equal details.

Ha: Failures started with plans of lesser detail than successful firms.

Ho₂₁: Failed and successful businesses started with equal use of professional advice.

Ha: Failures started with less use of professional advice than successful firms.

Ho₂₂: Failed and successful business CEOs have an equal number of years of education.

Ha: Failures have fewer years of education than successful CEOs.

Ho₂₃: Failed and successful businesses have equal staffing difficulties.

Ha: Failures have more staffing difficulties than successful firms.

Ho₂₄: There is no difference in the product/service timing of failed and successful businesses.

Ha: Failures started with poor product/service timing while successful firms had good timing.

Ho₂₅: There is no difference in economic timing of failed and successful firms.

Ha: Failures were started during recession while successful firms were started during expansion periods.

Ho₂₆: There is no difference in the age of failed and successful CEOs.

Ha: Failed CEOs are younger than successful CEOs.

Ho₂₇: There is no difference in the number of partners in failed and successful firms.

Ha: Failures do not have partners while successful firms do.

Ho₂₈: There is no difference in parents of failed and successful CEOs.

Ha: Failures' parents did not own their own business while successful CEOs parents did.

Ho₂₉: There is no difference in minority status of failed and successful CEOs.

Ha: Failures are more frequent among minority CEOs.

Ho₃₀: There is no difference in the level of marketing skills of failed and successful CEOs.

Ha: Failures have a lower level of marketing skills than successful CEOs.

Test and Significance Level

The data is measured on three levels. 1. Nominal: hypotheses 27, 28, and 29. They were tested using the McNemar test, at the .05 significance level. 2. Ordinal: hypotheses 16, 17, 20, 21, 23, 24, 25,

and 32. Wilcoxon matched-pairs was used to test if there is a significant difference between the two dependent samples, at the .05 significance level. 3. Ratio: hypotheses 18, 19, 22, and 26. The paired t-test was used to test if there is a significant difference between the matched pairs, at the .05 significance level. Chapter 6, Results: Question 2 / Hypotheses 16 - 30, presents the test results. The more significant the differences are between the two groups, the more accurate the model. If there are no differences, the model will not be a good predictor of success or failed businesses.

Summary

In this chapter the methodology of research design, sample, sample representation, questionnaire design, validity and reliability, data collection, and data analysis were presented. Statistical tests support the validity and reliability of the sample, questionnaire, and model. Chapters 4 - 6 presents the results, and Chapter 7 the conclusions and recommendations.

CHAPTER 4

RESULTS:

TESTING AND DEVELOPING THE STARTUP BUSINESS SUCCESS VERSUS FAILURE PREDICTION MODEL

To test the original model with fifteen variables, stepwise discriminant analysis was run for questions 18 to 32, which compared the 108 matched pairs of successful companies to the failed companies for all variables. Some of the variables were not significant and were dropped from the original model to form Generic Model 1. Four generic models are presented in this chapter, five industry models, and three size models. The three types of models are defined as follows: **generic models** which apply to firms of all industries employing 0-300 employees; **industry models** which apply to firms in a specific industry group (manufacturing, finance, construction, service, and retail) employing 0-300 employees; and **size models** which apply to firms of all industries employing a set number of employees (0-10, 11-25, 26-50)

GENERIC MODELS

Generic Model 1

See Figure 2, Generic Model 1, for a list of the variables that were retained and those that were excluded from the original model after step 8 of stepwise discriminant analysis. The variables in Generic Model

1 are in rank order by ability to discriminate between success and failure.

Figure 2. GENERIC MODEL 1

Generic Model 1
$S/F = f(\text{prad, plan, staf, educ, pent, mior, inex, rkfc})$
Variables Excluded From Generic Model 1
capt, maex, psti, ecti, age, part, mrkt

As shown in Figure 2, Generic Model 1, eight variables were kept in the model (use of professional advisors, developing specific plans, easy staffing, level of education, having parents who owned a business, not being a minority, having industry experience, and good record keeping and financial controls), and seven were dropped from the model (having adequate starting capital, having management experience, product/service timing, age, having partners, and having marketing skills). For the standardized canonical discriminant function coefficients, see Table 18. Variables are ranked by discriminant ability. The higher the coefficient, the greater the discriminant power.

Table 18. STANDARDIZED CANONICAL DISCRIMINANT FUNCTION
COEFFICIENTS OF GENERIC MODEL 1

prad	-.63164
plan	.58556
staf	.49338
educ	.46750
pent	.39484
mior	-.34299
inex	.24037
kfc	-.22609

Discriminant Analysis Classification Results

The percent of the "grouped" businesses that were correctly predicted as success and failure by Generic Model 1 is 64.39. For the details see Table 19, Classification Results of Generic Model 1.

Table 19. CLASSIFICATION RESULTS OF GENERIC MODEL 1

Actual Group	No. of Cases	Predicted Failure	Predicted Success
Failure	106 2 missing	69 65.1%	37 34.9%
Success	99 9 missing	36 36.4%	63 63.39%
Percentage of "Grouped" Cases Correctly Classified			64.39%

Canonical Discriminant Functions

Generic Model 1 is significant at the .05 level. See Table 20 for the details of the canonical discriminant functions results.

Table 20. CANONICAL DISCRIMINANT FUNCTIONS OF GENERIC MODEL 1

Eigenvalue	% of Variance	Canonical Correlation	Wilks' Lambda	Chi-Square	Significance
.20880	100.00	.4156136	.8272653	35.840	.0000

Random classification will predict about half of the success vs. failed companies while Generic Model 1 predicted about two-thirds correctly. Based on the sample, one can be over 99 percent confident that Generic Model 1 is a more accurate startup business success vs. failure predictor than random classification. Approximately 42 percent of the variance in success vs. failure is explained by the independent variables in the model.

Factor Analysis

In order to determine if the fifteen variables have multicollinearity and to group the variables into fewer categories, factor analysis was run on all fifteen variables of the original model. Based on the correlation matrix, multicollinearity does not exist between the model variables. Of the 105 correlations only six had correlations greater than .4, and none exceeded .5. They were:

age and economic timing = .46712

product/service timing and record keeping and financial control =
.46598

economic timing and professional advisors = .46976

product/service timing and education = .48241

age and product/service timing = .42656

product/service timing and marketing = .40477

In Generic Model 1, none of these two correlated variable combinations are included in the model as significant predictors of

success or failure. Only the three underlined variables are part of Generic Model 1. Factor analysis reduced the variables to six factors. See table 21 for a summary of the rotated factor matrix. To accentuate the important findings, factor loading scores are only shown for factor scores greater than .4 throughout the chapter.

Table 21. ROTATED FACTOR MATRIX OF GENERIC MODEL 1

X	F-1	F-2	F-3	F-4	F-5	F-6
capt		.464				
rkfc		-.65				
inex	.683					
maex	.869					
plan		.714				
prad		.702				
educ			-.78			
staf				.692		
psti						.777
ecti				-.63		
age	.742					
part					.594	
pent			.509			-.55
mior					.812	
mrkt	.612					

Factor 1 - Experience: Four of the variables group together as factor 1. Industry experience, management experience, age, and marketing skills are all related. This grouping is logical. As people gets older, they have time to gain industry and management experience and to develop marketing skills. These combined variables are now called experience. Having experience increases the chances of successs. Professional advisors and industry experience were kept in Generic Model 1 while management experience and marketing skills were dropped from Generic Model 1. This indicates that industry experience and marketing skills are not significant factors in distinguishing success and failure. Management experience was dropped from Generic Model 1, but it had a higher factor loading score than industry experience.

Factor 2 - Preparation: Four of the variables grouped together as factor 2. Capital, record keeping and financial controls, planning, and professional advisors are all related. This grouping is logical. If people seek professional advise from a banker, accountant, or others, they may be told to develop detailed plans which include enough capital and to develop accurate record keeping and financial controls. These combined variables are now called preparation. Preparation before starting the business increases the chances of successs. Having adequate starting capital was the only variable from the preparation group to be dropped from Generic Model 1.

Factor 3 - Education and Parents: Factor 3 has two variables grouping together. There is no apparent logical relationship between education and having parents who owned a business. There are only two variables grouping together, and parents owning a business had almost

equal factor loading scores for two factors, with this one being the lower of the two. Therefore, these two variables will not be combined. In addition, both education and parents were kept as part of Generic Model 1. Education and parents are basically stand alone factors.

Factor 4 - Staffing: Staffing and economic timing grouped together as factor 4. This grouping is logical. In economic expansions, it is more difficult to attract and retain quality employees, and vice versa. Because there are only two factors grouped together and economic timing is not a significant predictor of success vs. failure, these two variables will not be combined.

Factor 5 - Minority: Being a minority and having partners grouped together as factor 5. This may not be a logical grouping. It could be that minorities without partners have a greater chance to fail, but not necessarily. Recall that being a minority is a variable in Generic Model 1 but having partners was not. Therefore, these two factors will not be combined.

Factor 6 - Parents: Product/Service timing and parents owning a business group together as factor 6. This may not be a logical grouping. One might say that parents who own their own business are more apt to advise their children to start businesses with products/services that are in their growth stages, but not necessarily. Recall that having parents that owned their own business is a variable in Generic Model 1 but that product/service timing is not. Therefore, these two variables will not be combined.

Generic Model 2

Based on the original model factor analysis results, industry experience, management experience, age, and marketing were combined into one new variable called experience. The variables of capital, record keeping and financial control, planning, and professional advisors were combined into one new variable called preparation. The variables of education, staffing, product/service timing, economic timing, partners, parents, and minority were kept separate. The combined factor variables were weighted by using their factor score coefficients with the compute command. Generic Model 2 was developed in hopes of increasing the accuracy of the predictability power of the startup success vs. failure model. See Figure 3, Generic Model 2, for a list of the variables that were retained, and excluded from the model after step 5 of stepwise discriminant analysis. The variables in Generic Model 2 are in rank order by ability to discriminate between success and failure.

Figure 3. GENERIC MODEL 2

Generic Model 2
S/F = f (staf, educ, pent, Experience[inex, maex, age, mrkt], mior)
Variables Excluded From Generic Model 2
Preparation[capt, rkfc, plan, prad], psti, ecti, part

The combined experience variable stayed in the model, but the combined preparation variable did not. Through the combined variable experience, management experience and marketing skill, which were not

include in Generic Model 1, are now a significant part of this variable. At the same time under the new preparation variable, record keeping and financial control, planning, and professional advisors, which were part of Generic Model 1, were excluded from the model. Capital, product/service timing, economic timing, and partners still remain out of both models.

For the standardized canonical discriminant function coefficients, see Table 22. Variables are ranked by discriminant ability. The higher the coefficient the greater the discriminant power.

Table 22. STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS OF GENERIC MODEL 2

staf	.58311
educ	.52413
pent	.48681
experience [inex + maex + age + mrkt]	.32681
mior	-.30447

Discriminant Analysis Classification Results

The percent of the "grouped" businesses that were correctly predicted as success and failure by Generic Model 2 is 61.58. For the details, see Table 23, Classification Results of Generic Model 2.

Table 23. CLASSIFICATION RESULTS OF GENERIC MODEL 2

Actual Group	No. of Cases	Predicted Failure	Predicted Success
Failure	105 3 missing	67 63.8%	38 36.2%
Success	98 10 missing	40 40.8%	58 59.2%
Percentage of "Grouped" Cases Correctly Classified			61.58%

Canonical Discriminant Functions

Generic Model 2 is significant at the .05 level. See Table 24, for the details of the canonical discriminant functions results.

Table 24. CANONICAL DISCRIMINANT FUNCTIONS OF GENERIC MODEL 2

Eigenvalue	% of Variance	Canonical Correlation	Wilks' Lambda	Chi-Square	Significance
.11175	100.00	.3170437	.8994833	20.181	.0012

Random classification will predict about half of the success vs. failure companies while Generic Model 2 predicted about two-thirds correctly. Based on the sample, one can be over 99 percent confident that Generic Model 2 is a more accurate startup business success vs. failure predictor than random classification. Approximately 32 percent of the variance in success vs. failure is explained by the independent variables in the model.

Factor Analysis

In order to determine if the nine variables have multicollinearity and to group the variables into fewer categories, factor analysis was run on all variables of Generic Model 2. Based on the correlation matrix, multicollinearity does not exist. None of the paired correlations was equal to or greater than .2; Factor analysis reduced the variables to four factors. See Table 25 for a summary of the rotated factor matrix. Note that the combined variables are labeled experience factors = Expe and preparation factors = Prep.

Table 25. ROTATED FACTOR MATRIX OF GENERIC MODEL 2

X	F-1	F-2	F-3	F-4
Expe	.656			
Prep	-.717			
educ			-.617	
staf		.605		
psti		.711		
ecti		-.589		
part	.409			.669
pent			.836	
mior				.737

Factor 1 - Experience: Three variables are now grouped as factor one. Notice that the two combined variables, experience and preparation, are closely related. Partners is also related to these variables. Because preparation and partners were dropped from Generic Model 2, these variables will not be combined.

Factor 2 - Staffing: Staffing, product/service timing, and economic timing are now grouped together. Staffing and economic timing were also related without combining variables. However, product/service timing is now added to the grouping. Because product/service timing and economic timing were dropped from Generic Model 2, these variables will not be combined.

Factor 3 - Education and Parents: Education and parents owning a business are still grouped together as a factor. Because they have no logical relationship, these variables are kept separate. In addition, both education and parents were kept as part of Generic Model 2. Education and parents are basically stand-alone factors.

Factor 4 - Minority: Partners and minority are still grouped together as a factor. However, partners was dropped from Generic Model 2, so these variables are not combined. Due to the limited number of variables grouped, less than four in any factor, no further variables were combined.

Comparing Generic Models 1 and 2

Generic Model 1 is more accurate and significant at predicting startup success vs. failure than Generic Model 2. See Table 26 for a summary of comparisons of Generic Models 1 and 2 results.

Table 26. COMPARISON OF GENERIC MODEL 1 AND 2 RESULTS

Model	Classif- ication	Canonical Correlat- ion	Signifi- cance
1	64.39%	.42	.0000
2	61.58%	.32	.0012

The preparation factor variable dropped from the model even though three of the four variables-professional advisors, planning, and record

keeping and financial control were all significant as separate independent variables. In fact, professional advisors and planning were ranked 1 and 2 for discriminant power by standardized canonical discriminant function coefficients. To double check for reliability, discriminant analysis using only the two factor combined variables, experience and preparation, were run. Again, the preparation variable was dropped from the model. The cases correctly classified dropped to 55.45 percent: the canonical correlation dropped to only .13; and the significance level dropped to .0661. The model was not significant at the .05 level. Due to the superior performance of Generic Models 1 and 2, this new model was not recorded as a new generic model.

Generic Model 3

In a further attempt to develop the most accurate startup business success vs. failure prediction model, the highest factor loading score variable for each of the six factors from the original model rotated factor matrix was used to create Generic Model 3; see Table 21. For a list of the variables retained in Generic Model 3, see Figure 4. The variables in Generic Model 3 are in rank order by ability to discriminate between success and failure.

Figure 4. GENERIC MODEL 3

Generic Model 3

S/F = f (staf, educ, pent, plan, maex, mior)

Variables Excluded From Generic Model 3

psti, capt

When comparing Generic Models 1 and 3, management experience was substituted for industry experience because it had a higher factor loading score for factor 1. The factor 2 variable selected was planning. Record keeping and financial controls and professional advisors were not included in Generic Model 3 because they had lower factor scores than their related variable planning. In other words, because planning, professional advisors, and record keeping and financial control are related, planning is used to replace both variables. Factor 4 variable is staffing. Factor 5 variable is minority. Factor 6 variable is product/service timing. Note that product/service timing was not part of Generic Model 1. Parents owning a business was included as a variable because it had almost equal factor loading scores for two variables (education and staffing), and the relationship between these variables was not clearly logical. Capital was also added as a variable because it had similar factor loading scores on four of the six factors, with the highest being .464. In addition, lack of adequate starting capital is listed as a discriminating factor between success and failure in fifteen

articles. Capital was given another chance to be a significant discriminating factor between success and failure. However, both product/service timing and capital were not included in Generic Model 3 after stepwise discriminant analysis was run.

For the standardized canonical discriminant function coefficients, see Table 27: Variables are ranked by discriminant ability. The higher the coefficient the greater the discriminant power.

Table 27. STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS OF GENERIC MODEL 3

staf	.57927
educ	.55505
pent	.45383
plan	.43153
maex	.33212
mior	-.26006

Discriminant Analysis Classification Results

The percent of the "grouped" businesses that were correctly predicted as success and failure by Generic Model 3 is 65.05. For the details, see Table 28, Classification Results Generic Model 3. The failed firms were more accurately predicted than the successful ones, 69 vs. 61 percent.

Table 28. CLASSIFICATION RESULTS OF GENERIC MODEL 3

Actual Group	No. of Cases	Predicted Failure	Predicted Success
Failure	106 2 missing	73 68.9%	33 31.1%
Success	100 8 missing	39 39.0%	61 61.0%
Percentage of "Grouped" Cases Correctly Classified			65.05%

Canonical Discriminant Functions

Generic Model 3 is significant at the .05 level. See Table 29 for the details of the canonical discriminant functions results.

Table 29. CANONICAL DISCRIMINANT FUNCTIONS OF GENERIC MODEL 3

Eigenvalue	% of Variance	Canonical Correlation	Wilks' Lambda	Chi-Square	Significance
.14116	100.00	.3517044	.8763040	25.616	.0003

Random classification will predict about half of the success vs. failure companies while Generic Model 3 predicted about two-thirds correctly. Based on the sample, one can be over 99 percent confident that Generic Model 3 is a more accurate startup business success vs. failure predictor than random classification. Approximately 35 percent of the variance in success vs. failure is explained by the independent variables in the model.

Factor Analysis

In order to determine if the eight variables have multicollinearity and to group the variables into fewer categories, factor analysis was run on all eight variables of Generic Model 3. Based on the correlation matrix, multicollinearity does not exist. Only one of the paired correlations was greater than .2 (-.257). Factor analysis reduced the variables to four factors. See Table 30 for a summary of the rotated factor matrix.

Table 30. ROTATED FACTOR MATRIX OF GENERIC MODEL 3

X	F-1	F-2	F-3	F-4
capt	.6835	.4282		
maex	-.503			
plan	.6094			
educ	-.578			
staf		.4292	.5719	
psti		.8593		
pent			.8525	
mior				.9599

Factor 1 - Foundation: Four variables are now grouped as factor one: capital, management experience, planning, and education. Experience and preparation variables are now grouped together.

Factor 2 - Product/Service Timing: Product/service timing is grouped together with capital and staffing. However, both capital and staffing have higher values when grouped with other factors. Therefore, product/service timing continues to be a stand-alone variable and is dropped from Generic Model 3. These variables are not combined.

Factor 3 - Parents and Staffing: Education and parents owning a business are no longer grouped together as a factor. Parents is now grouped with staffing. However, there does not seem to be a logical relationship between these two variables, so they are not combined.

Factor 4 - Minority: Now that partners has been dropped from the model, minority is now a stand-alone variable.

Comparing Generic Models 1 - 3

Generic Model 1 has the lowest significance level for startup success vs. failure prediction. When comparing models, one finds education, staffing, minority, and parents to be variables of all three models. See Table 31, Comparison of Generic Models 1 - 3 Results.

Table 31. COMPARISON OF GENERIC MODELS 1 - 3 RESULTS

Model	Classif- ication	Canonical Correla- tion	Signfi- cance
1	64.39%	.42	.0000
2	61.58%	.32	.0012
3	65.05%	.35	.0003

When comparing results of the three generic models, one finds no significant difference between them. Generic Model 3 has the highest classification, but its canonical correlation and significance are lower than Generic Model 1.

Generic Model 4

Once again factor loading was used to develop a model. From Generic Model 3, one factor was selected from each of the four factors, see Table 30, Rotated Factor Matrix Generic Model 3. For factor 1, capital had the highest factor loading score, however, because it was not significant for prior models, the second highest variable- planning- was selected. For factor 2, once again product/service timing had the highest score, but because it was not significant for prior models, the second highest variable was selected--staffing. Parents was the highest loading score for factors 3., and minority was a stand-alone variable for factor 4. For a list of the variables in Generic Model 4, see Figure 5. Minority was not included in any model for the first time. The variables in Generic Model 4 are in rank order by importance in discriminating between success and failure.

Figure 5. GENERIC MODEL 4

Generic Model 4
S/F = f (staf, pent, plan)
Variables Excluded From Generic Model 4
mior

For the standardized canonical discriminant function coefficients, see Table 32. Variables are ranked by discriminant ability. The higher the coefficient the greater the discriminant power.

Table 32. STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS OF GENERIC MODEL 4

staf	.82988
pent	.41443
plan	.36276

Discriminant Analysis Classification Results

The percent of the "grouped" businesses that were correctly predicted as success and failure by Generic Model 2 is 64.11. For the details, see Table 33, Classification Results of Generic Model 4.

Table 33. CLASSIFICATION RESULTS OF GENERIC MODEL 4

Actual Group	No. of Cases	Predicted Failure	Predicted Success
Failure	107 1 missing	68 63.6%	39 36.4%
Success	100 8 missing	36 35.3%	66 64.7%
Percentage of "Grouped" Cases Correctly Classified			64.11%

Canonical Discriminant Functions

Generic Model 4 is significant at the .05 level. See Table 34 for the details of the canonical discriminant functions results.

Table 34. CANONICAL DISCRIMINANT FUNCTIONS OF GENERIC MODEL 4

Eigenvalue	% of Variance	Canonical Correlation	Wilks' Lambda	Chi-Square	Significance
.07393	100.00	.2623750	.9311594	14.586	.0022

Random classification will predict about half of the success vs. failure companies, while Generic Model 4 predicted about two-thirds

correctly. Based on the sample, one can be over 99 percent confident that Generic Model 4 is a more accurate startup business success vs. failure predictor than random classification. Approximately 26 percent of the variance in success vs. failure is explained by the independent variables in the model.

Factor Analysis

In order to determine if the four variables have multicollinearity and to group the variables into fewer categories, factor analysis was run on the variables of Generic Model 4. Based on the correlation matrix, multicollinearity does not exist. No paired correlations were greater than .15. Factor analysis reduced the variables to two factors. See Table 35 for a summary of the rotated factor matrix.

Table 35. ROTATED FACTOR MATRIX OF GENERIC MODEL 4

X	F-1	F-2
plan		.7613
staf	.6878	
pent	.7998	
mior		.5452

Factor 1 - Staffing and Parents: Staffing and parents are now grouped as factor one.

Factor 2 - Planning and Minority: Planning and minority are now grouped as factor two.

Comparison of Generic Models 1 - 4

Generic Model 1 still has the lowest significance value for startup success vs. failure prediction. When comparing models, one finds that staffing and parents are the only two variables in all four models. Planning, education, and minority are on three of the four models; models that dropped them respectively are Generic Model 2, 4, 4. See Figure 6 for a comparison of the four Generic Models and Table 36 for a comparison of their results. The variables in Generic Models 1 - 4 are in rank order by importance in discriminating between success and failure.

Figure 6. COMPARISON OF GENERIC MODELS 1 - 4

Generic Model 1

$$S/F = f(\text{prad, plan, staf, educ, pent, mior, inex, rkfc})$$

Generic Model 2

$$S/F = f(\text{staf, educ, pent, Expe[inex,maex,age,mrkt], mior})$$

Generic Model 3

$$S/F = f(\text{staf, educ, pent, plan, maex, mior})$$

Generic Model 4

$$S/F = f(\text{staf, pent, plan})$$

Nine Variables Retained In One Or More Generic Models

rkfc, inex, maex, plan, prad, educ, staf, pent, mior

Six Variables Excluded From All Generic Models

capt, psti, ecti, age, part, mrkt

Table 36. COMPARISON OF GENERIC MODELS 1 - 4 RESULTS

Generic Model	Classification	Canonical Correlation	Significance
1	64.39%	.42	.0000
2	61.58%	.32	.0012
3	65.05%	.35	.0003
4	64.11%	.26	.0022

Generic Model 5

In a last attempt to reduce the model to its lowest number of variables while still being significant, Generic Model 5 was developed by taking the two highest factor loading variables from Generic Model 4 - planning and parents; see Table 35. Generic Model 5 correctly classified 54.46 percent of the cases, and its canonical correlation is .15. Generic Model 5 was not significant at the .05 level; it was .1044. Generic Model 5 is not significant; therefore, it is not compared with the other models. However, Generic Model 5 is more accurate at classifying success or failure than random classification almost 90 percent of the time.

Discussion of Generic Models

There is no significant difference between the four generic models. Generic Model 3 has the highest classification, but its canonical correlation and significance are lower than Generic Model 1. Generic

Model 1 has the highest significance level. However, when dropping the variables from eight (model 1) to three (model 4), one finds that the results are not significantly different.

An analysis of the specific business classification was conducted to determine if the same firms were consistently classified in error. Results of the two groups are close. Approximately 40 percent of the businesses were correctly classified on all four models. Of the 60 percent in error, approximately 34 percent were in error with only one model, 20 percent were misclassified on two models, 20 percent were in error on three models, and 27 percent were misclassified on all four models. See Table 37 for a detailed comparison by frequency and percentage of error.

Table 37. GENERIC MODELS CLASSIFICATION ERRORS

	Error 1 Model		Error 2 Models		Error 3 Models		Error 4 Models	
Failure	18	30%	13	21%	13	21%	17	28%
Success	24	39%	11	18%	11	18%	16	26%
Total	42	34%	24	20%	24	20%	33	27%

An analysis of the misclassified businesses shows a distribution among industries. No one industry dominated in classification error.

INDUSTRY MODELS

The purpose of the study was to develop a generic model to predict business success vs. failure. This purpose was achieved as presented in the first section of this chapter. To determine if industry specific models would be more accurate predictors of success vs. failure, discriminant analysis using all fifteen variables from the original model was run on the separate data for five industry groupings. Industry data was originally classified into eight groupings. However, agriculture, wholesale, and transportation had a sample sizes of 4, 6, and 12 respectively. With such small samples, no analysis was attempted. The results of the industry findings are presented in order by success vs. failure predictability accuracy rate with the following sample size: manufacturing n=21, finance n=35, construction n=31, service n=51, and retail n=44. Samples include firms employing 0-300 people. Because industry model development is beyond the scope of the study, attempts to refine industry models is left for future research.

Manufacturing Model

See Figure 7, Manufacturing Model, for a list of the variables that were retained in, and those that were excluded from the original model after step 5 of stepwise discriminant analysis. The variables in the Manufacturing Model are in rank order by ability to discriminate between success and failure.

Figure 7. MANUFACTURING MODEL

Manufacturing Model

$$S/F = f(\text{staf, maex, educ, part, age})$$

Variables Excluded From The Manufacturing Model

capt, rkfc, inex, plan, prad, psti, ecti, pent, mior, mrkt

As shown in Figure 7, Manufacturing Model, five variables were kept in the model (management experience, education, staffing, age, and partners), and ten were dropped from the model (capital, record keeping and financial control, industry experience, planning, professional advisors, product/service timing, economic timing, parents, minority, and marketing skills). For the standardized canonical discriminant function coefficients, see Table 38. Variables are ranked by discriminant ability.

Table 38. STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS
OF THE MANUFACTURING MODEL

staf	1.31102
maex	-.79014
educ	.78484
part	.49089
age	.40591

Discriminant Analysis Classification Results

The percent of the "grouped" businesses that were correctly predicted as success and failure by the Manufacturing Model is 95.24. For the details, see Table 39, Classification Results of the Manufacturing Model. The failed firms were more accurately predicted than the successful ones, 100 vs. 90 percent.

Table 39. CLASSIFICATION RESULTS OF THE MANUFACTURING MODEL

Actual Group	No. of Cases	Predicted Failure	Predicted Success
Failure	11 0 missing	11 100%	0 0%
Success	10 1 missing	1 10%	0 90%
Percent of "Grouped" Cases Correctly Classified			95.24%

Canonical Discriminant Functions

The Manufacturing Model is significant at the .05 level. See Table 40 for the details of the canonical discriminant functions results.

Table 40. CANONICAL DISCRIMINANT FUNCTIONS OF THE MANUFACTURING MODEL

Eigenvalue	% of Variance	Canonical Correlation	Wilks' Lambda	Chi-Square	Significance
2.44904	100.00	.8426530	.2899360	20.429	.0010

Random classification will predict about half of the success vs. failure companies while the Manufacturing Model predicted over 95 percent correctly. Based on the small sample of 21, one can be over 99 percent confident that the Manufacturing Model is a more accurate startup business success vs. failure predictor than random classification. Approximately 84 percent of the variance in success vs. failure is explained by the independent variables in the model.

Factor Analysis

Based on the correlation matrix, multicollinearity does not exist between the variables in the model. None of the correlations exceeded .41. The computer printout showed warning number 11281: "There are fewer than 2 cases, or at least one of the variables has zero variance. Factor is skipping to the next analysis subcommand." Due to the small sample size, the rotated factor matrix grouping variables can not be calculated.

Finance Model

On the questionnaire, the finance group option included finance, insurance, real estate, etc. See Figure 8, Finance Model, for a list of the variables that were retained in and those that were excluded from the original model after step 8 of stepwise discriminant analysis. The variables in the Finance Model are in rank order by ability to discriminate between success and failure.

Figure 8. FINANCE MODEL

Finance Model
$S/F = f(\text{inex, age, prad, plan, capt, educ, pent, psti})$
Variables Excluded From The Finance Model
rkft, maex, staf, ecti, part, mior, mrkt

As shown in Figure 8, Finance Model, eight variables were retained in the model (industry experience, age, professional advisors, planning, capital, education, parents, and product/service timing), and seven were excluded from the model (record keeping and financial control, management experience, staffing, planning, economic timing, parents, minority, and marketing skills). For the standardized canonical discriminant function coefficients, see Table 41. Variables are ranked by discriminant ability.

Table 41. STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS
OF THE FINANCE MODEL

inex	.85997
age	-.79226
prad	-.62903
plan	.59658
capt	-.48861
educ	.38105
pent	.37779
psti	.30037

Discriminant Analysis Classification Results

The percent of the "grouped" businesses that were correctly predicted as success and failure by the Finance Model is 85.71. For the details, see Table 42, Classification Results of the Finance Model. The failed firms were more accurately predicted than the successful ones, 90 vs. 81 percent.

Table 42. CLASSIFICATION RESULTS OF THE FINANCE MODEL

Actual Group	No. of Cases	Predicted Failure	Predicted Success
Failure	19 0 missing	17 89.5%	2 10.5%
Success	16 3 missing	3 18.8%	13 81.3%
Percent of "Grouped" Cases Correctly Classified			85.71%

Canonical Discriminant Functions

The Finance Model is significant at the .05 level. See Table 43 for the details of the canonical discriminant functions results.

Table 43. CANONICAL DISCRIMINANT FUNCTIONS OF THE FINANCE MODEL

	% of	Canonical	Wilks'	Chi-	
Eigenvalue	Variance	Correlation	Lambda	Square	Significance
1.01966	100.00	.7105403	.4951325	19.682	.0116

Random classification will predict about half of the success vs. failure companies while the Finance Model predicted over 85 percent correctly. Based on the sample of 35, one can be over 98 percent confident that the Finance Model is a more accurate startup business success vs. failure predictor than random classification. Approximately 71 percent of the variance in success vs. failure is explained by the independent variables in the model.

Factor Analysis

Based on the correlation matrix, multicollinearity does exist between professional advisors and capital (.61050), and industry experience and age (.60458). All four of these variables, plus management experience and marketing skills grouped together as factor 1. Factor 2 grouped planning and record keeping and financial control. Education, product/service timing, economic timing, partners, and parents grouped together as factor 3. Parents (two groupings due to equal scores) and minority grouped together as factor 4. Staffing and economic timing (two grouping) created factor 5.

Construction Model

See Figure 9, Construction Model, for a list of the variables that were retained in and those that were excluded from the original model after step 6 of stepwise discriminant analysis. The variables in the Construction Model are in rank order by ability to discriminate between success and failure.

Figure 9. CONSTRUCTION MODEL

Construction Model

$$S/F = f(\text{prad, pent, mior, inex, rkfc, ecti})$$

Variables Excluded From The Construction Model

capt, maex, plan, educ, staf, psti, age, part, mrkt

As shown in Figure 9, Construction Model, six variables were kept in the model (professional advisors parents, minority, industry experience, record keeping and financial control, and economic timing), and nine were dropped from the model (capital, management experience, planning, education, staffing, product/service timing, age, parents, and marketing skills). For the standardized canonical discriminant function coefficients, see Table 44. Variables are ranked by discriminant ability.

Table 44. STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS OF THE CONSTRUCTION MODEL

prad	1.08024
pent	-.75048
mior	.61809
inex	-.57850
rkfc	.37327
ecti	-.30998

Discriminant Analysis Classification Results

The percent of the "grouped" businesses that were correctly predicted as success and failure by the Construction Model is 80.65. For the details, see Table 45, Classification Results of the Construction Model.

Table 45. CLASSIFICATION RESULTS OF THE CONSTRUCTION MODEL

Actual Group	No. of Cases	Predicted Failure	Predicted Success
Failure	16 0 missing	12 75%	4 25%
Success	15 1 missing	2 13.3%	13 86.7%
Percent of "Grouped" Cases Correctly Classified			80.65%

Canonical Discriminant Functions

The Construction Model is significant at the .05 level. See Table 46 for the details of the canonical discriminant functions results.

Table 46. CANONICAL DISCRIMINANT FUNCTIONS OF THE CONSTRUCTION MODEL

	% of	Canonical	Wilks'	Chi-	
Eigenvalue	Variance	Correlation	Lambda	Square	Significance
0.95357	100.00	.6986540	.5118826	16.742	.0103

Random classification will predict about half of the success vs. failure companies while the Construction Model predicted over 80 percent correctly. Based on the sample of 31, one can be over 98 percent confident that the Construction Model is a more accurate startup business success vs. failure predictor than random classification. Approximately 51 percent of the variance in success vs. failure is explained by the independent variables.

Factor Analysis

Based on the correlation matrix, multicollinearity does exist for professional advisors with planning (.42796), record keeping and financial control (-5.7099), and education (-.47409). However, professional advisors and only record keeping and financial control grouped together as factor 3. Planning groups with staffing, partners, and marketing as factor 2. Education groups with capital and economic timing as factor 4. Management experience, product/service timing, age, and parents group together as factor 1. Factor 5 includes industry experience and minority.

Service Model

On the questionnaire, the service group option included repair, business, professional and personal with examples of each type of service. See Figure 10, Service Model, for a list of the variables that were retained and those that were excluded from the original model after step 9 of stepwise discriminant analysis. The variables in the Service Model are in rank order by ability to discriminate between success and failure.

Figure 10. SERVICE MODEL

Service Model
S/F = f (rkfc, pent, maex, ecti, staf, prad, mrkt, part, plan)
Variables Excluded From The Service Model
capt, inex, educ, psti, age, mior

As shown in Figure 10, Service Model, nine variables were kept in the model (record keeping and financial control, parents, management experience, economic timing, staffing, professional advisors, marketing, partners, and planning), and six were dropped from the model (capital, industry experience, education, product/service timing, age, and minority). For the standardized canonical discriminant function

coefficients, see Table 47. Variables are ranked by discriminant ability.

Table 47. STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS OF THE SERVICE MODEL

rkfc	-.92865
pent	.75383
maex	-.67801
ecti	.61016
staf	.58505
prad	-.57860
mrkt	.52216
part	.43303
plan	.30399

Discriminant Analysis Classification Results

The percent of the "grouped" businesses that were correctly predicted as success and failure by the Service Model is 80.39. For the details, see Table 48, Classification Results of the Service Model. Classification prediction was about the same for both groups.

Table 48. CLASSIFICATION RESULTS OF THE SERVICE MODEL

Actual Group	No. of Cases	Predicted Failure	Predicted Success
Failure	25 2 missing	20 80%	5 20%
Success	26 1 missing	5 19.2%	21 80.8%
Percent of "Grouped" Cases Correctly Classified			80.39%

Canonical Discriminant Functions

The Service Model is significant at the .05 level. See Table 49 for the details of the canonical discriminant functions results.

Table 49. CANONICAL DISCRIMINANT FUNCTIONS OF THE SERVICE MODEL

	% of	Canonical	Wilks'	Chi-	
Eigenvalue	Variance	Correlation	Lambda	Square	Significance
0.85818	100.00	.6795880	.5381601	25.713	.0023

Random classification will predict about half of the success vs. failure companies while the Service Model predicted over 80 percent

correctly. Based on the sample of 35, one can be over 99 percent confident that the Service Model is a more accurate startup business success vs. failure predictor than random classification. Approximately 54 percent of the variance in success vs. failure is explained by the independent variables in the model.

Factor Analysis

Based on the correlation matrix, multicollinearity does exist between management experience and marketing skills (.41450). Both of these variables plus capital, record keeping and financial control, planning (two factors with equal scores), professional advisors (two factors with equal scores), age, and marketing skills grouped together as factor 1. Factor 2 grouped staffing, product/service timing, and economic timing. Industry experience and education (two factors with equal scores) grouped to create factor 3. Planning, professional advisors, and parents grouped together as factor 4. Factor 5 consists of education and minority. Partners is a stand-alone variable, factor 6.

Retail Model

On the questionnaire, the retail group option included retail store, eating and drinking, service station, drug store, florist, apparel, etc. See Figure 12, Retail Model, for a list of the variables that were retained in and those that were excluded from the original model after step 6 of stepwise discriminant analysis. The variables in the Retail Model are in rank order by importance in discriminating between success and failure.

Figure 11. RETAIL MODEL

 Retail Model

$$S/F = f(\text{plan, prad, ecti, age, rkfc, psti})$$

Variables Excluded From The Retail Model

 capt, inex, maex, educ, staf, part, pent, mior, mrkt

As shown in Figure 11, Retail Model, six variables were kept in the model (planning, professional advisors, economic timing, age, record keeping and financial control, and product/service timing), and nine were dropped from the model (capt, industry experience, management experience, education, staffing, partners, parents, minority, and marketing skills). For the standardized canonical discriminant function coefficients, see Table 50. Variables are ranked by discriminant ability.

 Table 50. STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS
OF THE RETAIL MODEL

plan	.74250
prad	-.64828
ecti	-.62684
age	.58052
rkfc	-.44981
psti	.41517

Discriminant Analysis Classification Results

The percent of the "grouped" businesses that were correctly predicted as success and failure by the Retail Model is 79.55. For the details, see Table 51, Classification Results of the Retail Model. The successful firms were more accurately predicted than the failed ones, 86 vs. 73 percent.

Table 51. CLASSIFICATION RESULTS OF THE RETAIL MODEL

Actual Group	No. of Cases	Predicted Failure	Predicted Success
Failure	22 2 missing	16 72.7%	6 27.3%
Success	22 2 missing	3 13.6%	19 86.4%
Percent of "Grouped" Cases Correctly Classified			79.55%

Canonical Discriminant Functions

The Retail Model is significant at the .05 level. See Table 52 for the details of the canonical discriminant functions results.

Table 52. CANONICAL DISCRIMINANT FUNCTIONS OF THE RETAIL MODEL

	% of	Canonical	Wilks'	Chi-	
Eigenvalue	Variance	Correlation	Lambda	Square	Significance
0.81903	100.00	.6710124	.5497424	22.137	.0011

Random classification will predict about half of the success vs. failure companies while the Retail Model predicted over 79 percent correctly. Based on the sample of 44, one can be over 99 percent confident that the Retail Model is a more accurate startup business success vs. failure predictor than random classification. Approximately 67 percent of the variance in success vs. failure is explained by the independent variables in the model.

Factor Analysis

Based on the correlation matrix, multicollinearity does exist between professional advisors and planning (.44265). These two variables plus age grouped together as factor 2. Factor 1 grouped capital, industry experience, management experience, education, and marketing together. Product/service timing and parents grouped together as factor 3. Factor 4 grouped record keeping and financial control, staffing, and minority (two factors with equal scores). Factor 5 grouped together minority and economic timing. Factor 6 grouped professional advisors and product/service timing, but both had higher scores for other factors. Partners was a stand-alone variable, factor 7.

Comparison of Industry Models

The ranking of industry models by prediction accuracy is as follows: manufacturing 95%, finance 86%, construction 81%, service 80%, and retail 80%. The ranking by significance level is as follows: manufacturing .0010, retail .0011, service .0023, construction .0103, and finance .0116. However, all five significance levels are less than .02. When comparing industry models, no variable appears on all five models, and all fifteen variables appear on at least one model. Professional advisors is part of four of the five models; manufacturing excluded it. The variables retained in three of the models are: record keeping and financial control, planning, economic timing, age, and parents. The variables included in two of the five models are: industry experience, management experience, education, staffing, product/service timing, and partners. The variables included in one model are: capital, minority, and marketing. See Figure 12 for a comparison of the five industry models and Table 53 for a comparison of their results. The variables are in rank order by discriminant ability.

Figure 12. COMPARISON OF INDUSTRY MODELS

Manufacturing Model

$$S/F = f(\text{staf}, \text{maex}, \text{educ}, \text{part}, \text{age})$$

Finance Model

$$S/F = f(\text{inex}, \text{age}, \text{prad}, \text{plan}, \text{capt}, \text{educ}, \text{pent}, \text{psti})$$

Construction Model

$$S/F = f(\text{prad}, \text{pent}, \text{mior}, \text{inex}, \text{rkfc}, \text{ecti})$$

Service Model

$$S/F = f(\text{rkfc}, \text{pent}, \text{maex}, \text{ecti}, \text{staf}, \text{prad}, \text{mrkt}, \text{part}, \text{plan})$$

Retail Model

$$S/F = f(\text{plan}, \text{prad}, \text{ecti}, \text{age}, \text{rkfc}, \text{psti})$$

Table 53. COMPARISON OF INDUSTRY MODEL RESULTS

Industry Model	Classification	Canonical Correlation	Significance
Manufacture	95.24%	.8426530	.0010
Finance	85.71%	.7105403	.0116
Construction	80.65%	.6986540	.0103
Service	80.39	.6795880	.0023
Retail	79.55	.6710124	.0011

SIZE MODELS

To determine if cross-industry size specific models would be more accurate predictors of success vs. failure, discriminant analysis using all fifteen variables from the original model was run on the separate data for three employee size groupings. Based on the data, three size samples were developed: sample 0-10 employees--96 firms; sample 11-25 employees--52 firms; and sample 26-50 employees--35 firms. The total sample included 19 firms with 51-300 employees. With the small sample and large variance in size, no analysis was attempted for larger businesses. Unlike the generic and industry models, size models lose the matched pairs when subdividing the total sample because a finance firm with 24 employees will not be in the same subsample as its finance firm match with 27 employees. The results of the industry findings are presented by employee size. Because size specific model development is

beyond the scope of the study, attempts to refine size models is left for future research.

0 - 10 Employee Model

See Figure 13, 0 - 10 Employees Model, for a list of the variables that were retained in and those that were excluded from the original model after step 10 of stepwise discriminant analysis. The variables in the Model are in rank order by discriminat ability

Figure 13. 0 - 10 EMPLOYEE MODEL

0 - 10 Employee Model
S/F = f (prad, plan, educ, mior, staf, pent, rkfc, capt, inex, ecti)
Variables Excluded From The 0 - 10 Employee Model
maex, psti, age, part, mrkt

As shown in Figure 13, 0 - 10 Employee Model, ten variables were kept in the model (professional advisors, planning, education, minority, staffing, parents, record keeping and financial control, capital, industry experience, and economic timing), and five were dropped from the model (management experience, product/service timing, age, partners, and marketing skills). For the standardized canonical discriminant

function coefficients, see Table 54. Variables are ranked by discriminant ability.

Table 54. STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS OF THE 0 - 10 EMPLOYEE MODEL

prad	-.74943
plan	.64607
educ	.45885
mior	-.36545
staf	.30861
pent	.28909
rkfc	-.28612
capt	-.28155
inex	.27155
ecti	-.22228

Discriminant Analysis Classification Results

The percent of "grouped" companies that were correctly predicted as success and failure by the 0 - 10 Employee Model is 75.00. For the details, see Table 55, Classification Results of the 0 - 10 Employee Model. The successful firms were more accurately predicted than the failed ones, 82 vs. 67 percent.

Table 55. CLASSIFICATION RESULTS OF THE 0 - 10 EMPLOYEE MODEL

Actual Group	No. of Cases	Predicted Failure	Predicted Success
Failure	45	30 66.7%	15 33.3%
Success	51	9 17.6%	42 82.4%
Percentage of "Grouped" Cases Correctly Classified			75.00%

Canonical Discriminant Functions

The 0 - 10 Employee Model is significant at the .05 level. See Table 56 for the details of the canonical discriminant functions results.

Table 56. CANONICAL DISCRIMINANT FUNCTIONS OF THE 0 - 10 EMPLOYEE MODEL

Eigenvalue	% of Variance	Canonical Correlation	Wilks' Lambda	Chi-Square	Significance
0.42050	100.00	.5440794	.7039776	30.889	.0006

Random classification will predict about half of the success vs. failure companies while the 0 - 10 Employee Model predicted three-fourths correctly. Based on the sample of 96, one can be over 99 percent confident that the 0 - 10 Employee Model is a more accurate startup business success vs. failure predictor than random classification. Approximately 54 percent of the variance in success vs. failure is explained by the independent variables in the model.

Factor Analysis

Based on the correlation matrix, multicollinearity does exist between professional advisors and planning (.47202). Factor 1 grouped capital, management experience, planning (two factors with equal scores), professional advisors, age, and marketing together. Record keeping and financial control, planning, and economic timing (two factors with equal scores) grouped together as factor 2. Factor 3 grouped industry experience, education, and minority. Product/service timing and partners grouped as factor 4. Parents and staffing were stand-alone variables, factor 5 and 6.

11 - 25 Employee Model

See Figure 14, 11 - 25 Employee Model, for a list of the variables that were retained and those that were excluded from the original model after step 7 of stepwise discriminant analysis. The variables in the Model are in rank order by discriminant ability.

Figure 14. 11 - 25 EMPLOYEE MODEL

11 - 25 Employee Model

$S/F = f(\text{staf, capt, mrkt, plan, ecti, age, prad})$

Variables Excluded From The 11 - 25 Employee Model

rkfc, inex, maex, educ, psti, part, pent, mior

As shown in Figure 14, 11 - 10 Employee Model, seven variables were kept in the model (staffing, capital, marketing, planning, economic timing, age, and professional advisors), and eight were dropped from the model (record keeping and financial control, industry experience, management experience, education, product/service timing, partners, parents, and minority). For the standardized canonical discriminant function coefficients, see Table 57. Variables are ranked by discriminant ability.

Table 57. STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS
OF THE 11 - 25 EMPLOYEE MODEL

staf	.93426
rkfc	.71895
mrkt	.69773
plan	.49898
ecti	.43210
age	.38945
prad	-.38616

Discriminant Analysis Classification Results

The percent of "grouped" companies that were correctly predicted as success and failure by the 11 - 25 Employee Model is 80.77. For the details, see Table 58, Classification Results of the 11 - 25 Employee Model. The failed firms were more accurately predicted than the successful ones, 87 vs. 71 percent.

Table 58. CLASSIFICATION RESULTS OF THE 11 - 25 EMPLOYEE MODEL

Actual Group	No. of Cases	Predicted Failure	Predicted Success
Failure	31	27 87.1%	4 12.9%
Success	21	6 28.6%	15 71.4%
Percentage of "Grouped" Cases Correctly Classified			80.77%

Canonical Discriminant Functions

The 11 - 25 Employee Model is significant at the .05 level. See Table 59 for the details of the canonical discriminant functions results.

Table 59. CANONICAL DISCRIMINANT FUNCTIONS OF THE 11 - 25 EMPLOYEE MODEL

Eigenvalue	% of Variance	Canonical Correlation	Wilks' Lambda	Chi-Square	Significance
0.39066	100.00	.5300173	.7190816	14.675	.0404

Random classification will predict about half of the success vs. failure companies while the 11 - 25 Employee Model predicted over three-fourths correctly. Based on the sample of 52, one can be over 95 percent confident that the 11 - 25 Employee Model is a more accurate startup business success vs. failure predictor than random classification. Approximately 53 percent of the variance in success vs. failure is explained by the independent variables in the model.

Factor Analysis

Based on the correlation matrix, multicollinearity does exist between professional advisors and marketing (-.44317). However, marketing grouped with two factors due to equal factor scores. Factor 1 groups industry experience, management experience, economic timing, age, partners, and marketing. Marketing, professional advisors, and capital, grouped together as factor 2. Staffing, parents, and minority were stand-alone variables: factors 3, 6, and 5. Factor 4 grouped record keeping and financial control and product/service timing.

26 - 50 Employee Model

See Figure 15, 26 - 50 Employee Model, for a list of the variables that were retained in and those that were excluded from the original model after step 3 of stepwise discriminant analysis. The variables in the model are in rank order by discriminant ability.

Figure 15. 26 - 50 EMPLOYEE MODEL

 26 - 50 Employee Model

$$S/F = f(\text{inex, mrkt, prad})$$

Variables Excluded From The 26 - 50 Employee Model

 capt, rkfc, maex, plan, educ, staf,
 psti, ecti, age, part, pent, mior

As shown in Figure 15, 26 - 50 Employee Model, three variables were kept in the model (industry experience, marketing, and professional advisors), and twelve were dropped from the model (capital, record keeping and financial control, management experience, planning, education, staffing, product/service timing, economic timing, age, partners, parents, and minority). For the standardized canonical discriminant function coefficients see, Table 60. Variables are ranked by discriminant ability.

 Table 60. STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS
 OF THE 26 - 50 EMPLOYEE MODEL

inex	.97625
mrkt	-.78979
prad	.61734

Discriminant Analysis Classification Results

The percent of "grouped" companies that were correctly predicted as success and failure by the 26 - 50 Employee Model is 60.00. For the details, see Table 61, Classification Results of the 26 - 50 Employee Model.

Table 61. CLASSIFICATION RESULTS OF THE 26 - 50 EMPLOYEE MODEL

Actual Group	No. of Cases	Predicted Failure	Predicted Success
Failure	20	12 60.0%	8 40.0%
Success	15	6 40.0%	9 60.0%
Percentage of "Grouped" Cases Correctly Classified			60.00%

Canonical Discriminant Functions

The 26 - 50 Employee Model is not significant at the .05 acceptable test level. However, it is significant at the .10 level. Even though the model does not meet the test criteria, results will be reported because the model will outperform random classification over 90 percent of the time. See Table 62 for the details of the canonical discriminant functions results.

Table 62. CANONICAL DISCRIMINANT FUNCTIONS OF THE 26 - 50
EMPLOYEE MODEL

	% of	Canonical	Wilks' Chi-		
Eigenvalue	Variance	Correlation	Lambda	Square	Significance
0.25135	100.00	.4481799	.7991348	6.3904	.0941

Random classification will predict about half of the success vs. failure companies while the 26 - 50 Employee Model predicted 60 percent correctly. Based on the sample of 35, one can be over 90 percent confident that the 26 - 50 Employee Model is a more accurate startup business success vs. failure predictor than random classification. Approximately 45 percent of the variance in success vs. failure is explained by the independent variables in the model.

Factor Analysis

Based on the correlation matrix, multicollinearity does exist between marketing and industry experience (.49954). These two variables and management experience grouped as factor 1. Capital, product/service timing, and parents grouped as factor 2. Factor 3 grouped education with partners. Factor 4 grouped planning, economic timing, age, and minority together. Record keeping and financial control, professional advisors, and staffing grouped as factor 5.

Comparison of Size Models

The ranking of size models by prediction accuracy is as follows: 11 - 25 Employee Model 81%, 0 - 10 Employee Model 75%, and 26 - 50 Employee Model 60%. The Ranking by significance level is as follows: 0 - 10 Employee Model .0006; 11 - 25 Employee Model .0404; and 26 - 50 Employee Model .0941. Sample size declines as the number of employees increases. However, only the two smaller size models are significant at the acceptable .05 level. When comparing size models, professional advisors appears on all three models. Capital, industry experience, planning, staffing, economic timing, and marketing are part of two of the three models. Record keeping and financial control, education, age, parents, and minority are part of one model. Management experience, product/service timing, and partners are not part of any of the three size models. See Figure 16 for a comparison of the three size models and Table 63 for a comparison of their results. The variables are in rank order by discriminant ability.

Figure 16. COMPARISON OF SIZE MODELS

0 - 10 Employee Model

$S/F = f(\text{prad, plan, educ, mior, staf, pent, rkfc, capt, inex, ecti})$

11 - 25 Employee Model

$S/F = f(\text{staf, capt, mrkt, plan, ecti, age, prad})$

26 - 50 Employee Model

$S/F = f(\text{inex, mrkt, prad})$

Variables Retained on One or More Size Models

capt, rkfc, inex, plan, prad, educ, staf, ecti, age,
pent, mior, mrkt

Variables Excluded From All Size Models

maex, psti, part

Table 63. COMPARISON OF SIZE MODEL RESULTS

Number of Employees Model	Classif- ication	Canonical Correla- tion	Signfi- cance
0 - 10	75.00%	.5440794	.0006
11 - 25	80.77%	.5300173	.0404
26 - 50	60.00%	.4481799	.0941

COMPARISON AND DISCUSSION OF GENERIC, INDUSTRY AND SIZE MODELS

The purpose of this study is to develop and test a model that will predict startup business success vs. failure. In order to be acceptable, the model had to be significant at the .05 level. As has been discussed in this chapter, four generic models, five industry models, and two size models, all significant at the .05 level, have been developed. For a comparison of all twelve models, see Figure 17, Comparison Generic, Industry and Size Models, and Table 47 for a comparison of their results. Variables in all models are in rank order by discriminant ability.

Figure 17. COMPARISON GENERIC, INDUSTRY AND SIZE MODELS

GENERIC MODELS

Generic Model 1
 $S/F = f(\text{prad, plan, staf, educ, pent, mior, inex, rkfc})$
 Generic Model 2
 $S/F = f(\text{staf, educ, pent, Expe[inex,maex,age,mrkt]}, \text{mior})$
 Generic Model 3
 $S/F = f(\text{staf, educ, pent, plan, maex, mior})$
 Generic Model 4
 $S/F = f(\text{staf, pent, plan})$

INDUSTRY MODELS

Manufacturing Model
 $S/F = f(\text{staf, maex, educ, part, age})$
 Finance Model
 $S/F = f(\text{inex, age, prad, plan, capt, educ, pent, psti})$
 Construction Model
 $S/F = f(\text{prad, pent, mior, inex, rkfc, ecti})$
 Service Model
 $S/F = f(\text{rkfc, pent, maex, ecti, staf, prad, mrkt, part, plan})$
 Retail Model
 $S/F = f(\text{plan, prad, ecti, age, rkfc, psti})$

SIZE MODELS

0 - 10 Employee Model
 $S/F = f(\text{prad, plan, educ, mior, staf, pent, rkfc, capt, inex, ecti})$
 11 - 25 Employee Model
 $S/F = f(\text{staf, capt, mrkt, plan, ecti, age, prad})$
 26 - 50 Employee Model
 $S/F = f(\text{inex, mrkt, prad})$

COMPARISON GENERIC, INDUSTRY AND SIZE MODELS- continued

	G-1	G-2	G-3	G-4	Man	Fin	Con	Ser	Ret	<11	<26	<51
cap						5				8	2	
rkf	8						5	1	5	7		
ine	7					1	4			9		1
mae			5		2			3				
pla	2		4	3		4		9	1	2	4	
pra	1					3	1	6	2	1	7	3
edu	4	2	2		3	6				3		
sta	3	1	1	1	1			5		5	1	
pst						8			6			
ect							6	4	3	10	5	
age					5	2			4		6	
par					4			8				
pen	5	3	3	2		7	2	2		6		
mio	6	5	6				3			4		
mrk								7			3	2
Exp		4										

Numbers identify the rank order of predictability power of each variable of the models

Table 64. COMPARISON GENERIC, INDUSTRY AND SIZE MODEL RESULTS

Model	Classification	Canonical Correlation	Significance
Gen. 1	64.39%	.42	.0000
Gen. 2	61.58%	.32	.0012
Gen. 3	65.05%	.35	.0003
Gen. 4	64.11%	.26	.0022
Manufact.	95.24%	.84	.0010
Finance	85.71%	.71	.0116
Construc.	80.65%	.70	.0103
Service	80.39%	.68	.0023
Retail	79.55%	.67	.0011
0 - 10	75.00%	.54	.0006
11 - 25	80.77%	.53	.0404
26 - 50	60.00%	.45	.0941

All four generic models were tested using the largest sample size--216, followed by size models--96/52/35, then industry models--21/35/31/51/44. Sample sizes are given in order of model appearances in Figure 17 and Table 64. The model containing the most variables is the Industry Service Model with nine variables. The models containing the least variables are Generic Model 1 and 26 - 50 Employee Size Model, with three each. Industry models contain all fifteen variables while the generic models exclude capital, product/service timing, economic timing, age, partners, and marketing. The size models exclude management experience, product/service timing, and partners. The industry models are the most accurate predictors of success and failure, followed by the size and generic models; and they have the highest canonical correlations. However, the generic models had the highest level of significance at .01, followed by that of industry .02, than that of size at .10.

Conclusions about the models will be discussed in Chapter 7 after questions 1 (Do successful and failed business CEOs agree on the contributing factors to startup business failure?) and question 2 (Did successful and failed businesses start with equal resources?) are answered through testing 30 hypotheses, in Chapters 5 and 6.

CHAPTER 5

RESULTS:

QUESTION 1 / HYPOTHESES 1 - 15

QUESTION 1

**Do successful and failed business CEOs agree on
the contributing factors to startup business failure?**

To determine if there is agreement on the contributing factors to business failure, 15 hypotheses were developed and tested based on causes for failure identified as independent variables in the original model. The null hypotheses were developed based on questions 1-15 of the questionnaire. (See appendix A for a copy of the questionnaire.) The responses of the CEOs of successful and failed businesses were compared statistically to determine if there is a significant difference. To present the finding, descriptive statistics are used to compare the successful and failed responses. To test for significant differences between the successes and failures, the Wilcoxon matched-pairs signed-ranks test was used for hypotheses 1 - 15. The Wilcoxon matched-pairs signed-ranks test was used for hypotheses testing because all 15 hypotheses are measured on ordinal scales (1 agree-disagree 7); and the two groups were carefully matched pairs. The Wilcoxon computes the difference between the pair of variables, ranks the absolute

differences, sums the positive and negative ranks, and computes the test statistic Z from rank sums. Under the H_0 , Z is approximately normally distributed with mean 0 and variance 1 for large samples sizes.

Significance Level

To be 95 percent confident that the differences between success and failure responses were not due to chance, the .05 level of significance was selected.

HYPOTHESES TESTING

Hypothesis 1 Test

H_0 : The capital agreement-disagreement mean ranking of failed and successful business CEOs are equal.

H_a : The means are not equal.

Do not reject H_0 the p -value is $.1069 > .05$. See Table 65.

Table 65. HYPOTHESIS 1 TEST

Group	Mean	Mode	Median	Standard Deviation
Failure	1.639	1.0	1.0	1.027
Success	1.852	1.0	2.0	1.118

Ranks	Cases	Mean Rank	Z Score	p-value
- Ranks (Fail < Success)	36	31.50	-1.6122	.1069
+ Ranks (Fail > Success)	24	29.00		
Ties (Fail = Success)	48			

The CEOs of failed businesses more strongly agreed that firms that start undercapitalized have a greater chance of failure than businesses that start with adequate capital. The CEOs' of failed businesses response mean was less than that of successful CEOs, but the means are not significantly different. Both failed and successful business CEOs ranked mean indicates that capital is the second most important contributor to failure or success.

Hypothesis 2 Test

H₀: The record keeping and financial control agreement-disagreement mean ranking of failed and successful business CEOs are equal.

H_a: The means are not equal.

Do not reject H₀ the p-value is .3923 > .05. See Table 66.

Table 66. HYPOTHESIS 2 TEST.

Group	Mean	Mode	Median	Standard Deviation
Failure	1.565	1.0	1.0	.998
Success	1.626	1.0	1.0	.841

Ranks	Cases	Mean Rank	Z Score	p-value
- Ranks (Fail < Success)	36	26.83	-.8555	.3923
+ Rank (Fail > Success)	22	33.86		
Ties (Fail = Success)	50			

The CEOs of failed businesses more strongly agreed that firms that do not keep updated accurate records and use adequate financial controls have a greater chance of failure than firms that do. The CEOs' of failed businesses response mean was less than that of successful CEOs, but the

means are not significantly different. Both failed and successful business CEOs' ranked mean indicates that record keeping and financial control is the most important contributor to failure or success.

Hypothesis 3 Test

H₀: The industry experience agreement-disagreement mean ranking of failed and successful business CEOs are equal.

H_a: The means are not equal.

Do not reject H₀ the p-value is .7474 > .05. See Table 67.

Table 67. HYPOTHESIS 3 TEST

Group	Mean	Mode	Median	Standard Deviation
Failure	2.380	2.0	2.0	1.345
Success	2.287	2.0	2.0	1.283

Ranks	Cases	Mean Rank	Z Score	p-value
- Ranks (Fail < Success)	40	43.85	-3.221	.7474
+ Ranks (Fail > Success)	45	42.24		
Ties (Fail = Success)	23			

The CEOs of successful businesses more strongly agreed that firms that are managed by people without prior industry experience have a greater chance of failure than businesses that are managed by people with prior industry experience. The CEOs' of successful businesses response mean was less than that of failed CEOs, but the means are not significantly different. The CEOs' of failed businesses ranked mean indicates that industry experience is the fifth most important contributor to failure or success, but the CEOs' of successful firms ranked mean was fourth in importance.

Hypothesis 4 Test

Ho₄: The management experience agreement-disagreement mean ranking of failed and successful business CEOs are equal.

Ha: The means are not equal.

Do not reject Ho the p-value is .0626 > .05. See Table 68.

Table 68. HYPOTHESIS 4 TEST

Group	Mean	Mode	Median	Standard Deviation
Failure	2.463	2.0	2.0	1.397
Success	2.843	2.0	2.0	1.554

Ranks	Cases	Mean Rank	Z Score	p=value
- Ranks (Fail < Success)	47	49.00	-1.8623	.0626
+ Ranks (Fail > Success)	39	36.86		
Ties (Fail = Success)	22			

The CEOs of failed businesses more strongly agreed that firms that are managed by people without prior management experience have a greater chance of failure than businesses that are managed by people with prior management experience. The CEOs' of failed businesses response mean was less than that of successful CEOs, but the means are not significantly different. The CEOs' of failed businesses ranked mean indicates that management experience is the sixth most important contributor to failure or success, but the successful CEOs' ranked mean was seventh in importance.

Hypothesis 5 Test

H_0 : The planning agreement-disagreement mean ranking of failed and successful business CEOs are equal.

H_a : The means are not equal.

Do not reject H_0 the p-value is $.4444 > .05$. See Table 69.

Table 69. HYPOTHESIS 5 TEST

Group	Mean	Mode	Median	Standard Deviation
Failure	2.296	2.0	2.0	1.138
Success	2.402	2.0	2.0	1.3172

Ranks	Cases	Mean Rank	Z Score	p-value
- Ranks (Fail < Success)	41	42.35	-.7648	.4444
+ Ranks (Fail > Success)	38	37.46		
Ties (Fail = Success)	28			

The CEOs of failed businesses more strongly agreed that firms that do not develop specific business plans have a greater chance of failure than businesses that do develop specific plans. The CEOs' of failed firms response mean was less than that of successful CEOs, but the means

are not significantly different. The CEOs' of failed firms ranked mean indicates that planning is the third most important contributor to failure vs. success, but the successful CEOs' ranked mean was fifth in importance.

Hypothesis 6 Test

H₀: The professional advisor agreement-disagreement mean ranking of failed and successful business CEOs are equal.

H_a: The means are not equal.

Do not reject H₀ the p-value is .7163 > .05. See Table 70.

Table 70. HYPOTHESIS 6 TEST

Group	Mean	Mode	Median	Standard Deviation
Failure	3.185	2.0	3.0	1.542
Success	3.139	3.0	3.0	1.603

Ranks	Cases	Mean Rank	Z Score	p-value
- Ranks (Fail < Success)	38	44.83	-.3635	.7163
+ Ranks (Fail > Success)	46	40.58		
Ties (Fail = Success)	24			

The CEOs of successful businesses more strongly agreed that firms that do not use professional advisors have a greater chance of failure than businesses that use professional advisors. The successful CEOs' response mean was less than that of failed businesses CEOs, but the means are not significantly different. Both failed and successful CEOs' ranked mean indicates that professional advisors are the ninth most important contributor to failure or success,

Hypothesis 7 Test

H₀: The education agreement-disagreement mean ranking of failed and successful business CEOs are equal.

H_a: The means are not equal.

Do not reject H₀ the p-value is .4226 > .05. See Table 71.

Table 71. HYPOTHESIS 7 TEST

Group	Mean	Mode	Median	Standard Deviation
Failure	4.509	6.0	5.0	1.683
Success	4.324	4.0	4.0	1.546

Ranks	Cases	Mean Rank	Z Score	p=value
- Ranks (Fail < Success)	41	40.11	-.8019	.4226
+ Ranks (Fail > Success)	44	45.69		
Ties (Fail = Success)	23			

The CEOs of successful businesses more strongly agreed that people without any college education have a greater chance of failing than people with one or more years of college education. The successful CEOs' response mean was less than that of failed business CEOs, but the means are not significantly different. The failed business CEOs' ranked mean indicates that education is the eleventh most important contributor to failure or success, but the successful firm CEOs' ranked mean was twelfth in importance.

Hypothesis 8 Test

H₀: The staffing agreement-disagreement mean ranking of failed and successful business CEOs are equal.

H_a: The means are not equal.

Do not reject H₀ the p-value is .4939 > .05. See Table 72.

Table 72. HYPOTHESIS 8 TEST

Group	Mean	Mode	Median	Standard Deviation
Failure	2.343	2.0	2.0	1.239
Success	2.250	2.0	2.0	1.193

Ranks	Cases	Mean Rank	Z Score	p-value
- Ranks (Fail < Success)	36	35.01	-.6842	.4939
+ Ranks (Fail > Success)	38	39.86		
Ties (Fail = Success)	34			

The CEOs of successful businesses more strongly agreed that firms that cannot attract and retain quality employees have a greater chance of failure than firms that can attract and retain quality employees. The successful CEOs' response mean was less than that of failed business

CEOs, but the means are not significantly different. The CEOs' of failed businesses ranked mean indicates that staffing is the fourth most important contributor to failure or success, but the successful CEOs' ranked mean was third in importance.

Hypothesis 9 Test

H₀: The product/service timing agreement-disagreement mean ranking of failed and successful business CEOs are equal.

H_a: The means are not equal.

Reject H₀ the p-value is .0069 < .05. See Table 73.

Table 73. HYPOTHESIS 9 TEST

Group	Mean	Mode	Median	Standard Deviation
Failure	3.159	2.0	3.0	1.172
Success	2.264	2.0	2.0	1.249

Ranks	Cases	Mean Rank	Z Score	p-value
- Ranks (Fail < Success)	30	42.53	-2.7003	.0069
+ Ranks (Fail > Success)	57	44.77		
Ties (Fail = Success)	21			

The CEOs of successful businesses more strongly agreed that firms that select products/services that are too new or too old have a greater chance of failure than businesses that select products/services that are in their growth stage. The successful CEOs' response mean was less than that of failed business CEOs; the difference is significant at the .05 level. The failed business CEOs' ranked mean indicates that products/services timing is the eight most important contributor to failure or success, but the successful business CEOs' ranked mean was sixth in importance.

Hypothesis 10 Test

H_{010} : The economic timing agreement-disagreement mean ranking of failed and successful business CEOs are equal.

H_a : The means are not equal.

Do not reject H_0 the p -value is $.0866 > .05$. See Table 74.

Table 74. HYPOTHESIS 10 TEST

Group	Mean	Mode	Median	Standard Deviation
Failure	3.704	4.0	4.0	1.619
Success	3.324	2.0	3.0	1.657

Ranks	Cases	Mean Rank	Z Score	p=
- Ranks (Fail < Success)	38	38.75	-1.7138	.0866
+ Ranks (Fail > Success)	48	47.26		
Ties (Fail = Success)	22			

The CEOs of successful businesses more strongly agreed that firms that startup during a recession have a greater chance of failure than businesses that are started during expansion periods. The successful CEOs' response mean was less than that of failed businesses CEOs, but the difference is not significant. Both failed and successful business CEOs' ranked mean indicates that economic timing is the tenth most important contributor to failure or success.

Hypothesis 11 Test

H_{011} : The age agreement-disagreement mean ranking of failed and successful business CEOs are equal.

H_a : The means are not equal.

Do not reject H_0 the p -value is $.1872 > .05$. See Table 75.

Table 75. HYPOTHESIS 11 TEST

Group	Mean	Mode	Median	Standard Deviation
Failure	4.639	4.0	5.0	1.463
Success	4.407	4.0	4.0	1.447

Ranks	Cases	Mean Rank	Z Score	p-value
- Ranks (Fail < Success)	37	36.35	-1.3193	.1872
+ Ranks (Fail > Success)	43	44.07		
Ties (Fail = Success)	28			

The CEOs of successful businesses more strongly agreed that younger people starting a firm have a greater chance of failure than older people. The successful response mean was less than that of failed business CEOs, but the means are not significantly different. The CEOs'

of failed businesses ranked mean indicates that age is the twelfth most important contributor to failure or success, but the successful business CEOs' ranked mean was thirteenth in importance.

Hypothesis 12 Test

Ho₁₂: The partner agreement-disagreement ranking of failed and successful business CEOs are equal.

Ha: The means are not equal.

Do not reject Ho the p-value is .8460 > .05. See Table 76.

Table 76. HYPOTHESIS 12 TEST

Group	Mean	Mode	Median	Standard Deviation
Failure	5.009	6.0	5.0	1.562
Success	4.944	6.0	5.0	1.582

Ranks	Cases	Mean Rank	Z Score	p-value
- Ranks (Fail < Success)	45	48.47	-.1942	.8460
+ Ranks (Fail > Success)	49	46.61		
Ties (Fail = Success)	14			

The CEOs of successful businesses more strongly agreed that a firm started by one person has a greater chance of failure than a business started by partners. The successful CEOs' response mean was less than that of failed business CEOs, but the means are not significantly different. Both the successful and failed businesses CEOs agreed that partners were the least important variable causing failure.

Hypothesis 13 Test

H_{013} : The mean parent agreement-disagreement mean ranking of failed and successful business CEOs are equal.

H_a : The means are not equal.

Reject H_0 the p -value is $.0182 < .05$. See Table 77.

Table 77. HYPOTHESIS 13 TEST

Group	Mean	Mode	Median	Standard Deviation
Failure	4.822	6.0	5.0	1.647
Success	4.296	4.0	4.0	1.619

Ranks	Cases	Mean Rank	Z Score	p=value
- Ranks (Fail < Success)	38	36.59	-2.3613	.0182
+ Ranks (Fail > Success)	50	50.51		
Ties (Fail = Success)	19			

The CEOs of successful businesses more strongly agreed that startup owners whose parents did not own a business have a greater chance of failure than people whose parents did own a business. The successful CEOs' response mean was less than that of failed business CEOs; the difference is significant at the .05 level. The failed business CEOs' ranked mean indicates that parents owning a business is the thirteenth most important contributor to failure or success, but the successful business CEOs' ranked mean was eleventh in importance.

Hypothesis 14 Test

Ho₁₄: The minority agreement-disagreement mean ranking of failed and successful business CEOs are equal.

Ha: The means are not equal.

Reject Ho the p=value is .0060 < .05. See Table 78.

Table 78. HYPOTHESIS 14 TEST

Group	Mean	Mode	Median	Standard Deviation
Failure	4.963	4.0	5.0	1.353
Success	4.407	4.0	4.0	1.571

Ranks	Cases	Mean Rank	Z Score	p=value
- Ranks (Fail < Success)	33	33.55	-2.7483	.0060
+ Ranks (Fail > Success)	49	46.86		
Ties (Fail = Success)	26			

The CEOs of successful businesses more strongly agreed that minority business owners have a greater chance of failure than nonminorities. The successful CEOs' response mean was less than that of failed business CEOs; the difference is significant at the .05 level.

The failed business CEOs' ranked mean indicates that being a minority is the fourteenth most important contributor to failure or success, but the successful business CEOs' ranked mean was thirteenth in importance.

Hypothesis 15 Test

H_{015} : The marketing agreement-disagreement mean ranking of failed and successful business CEOs are equal.

H_a : The means are not equal.

Do not reject H_0 the p -value is $.7735 > .05$. See Table 79.

Table 79. HYPOTHESIS 15 TEST

Group	Mean	Mode	Median	Standard Deviation
Failure	2.963	2.0	3.0	1.325
Success	3.019	2.0	3.0	1.394

Ranks	Cases	Mean Rank	Z Score	p-value
- Ranks (Fail < Success)	43	39.07	-.2878	.7735
+ Ranks (Fail > Success)	37	42.16		
Ties (Fail = Success)	28			

The CEOs of failed businesses more strongly agreed that startup owners without marketing skills have a greater chance of failure than owners with marketing skills. The CEOs' of failed businesses response mean was less than that of successful business CEOs, but the means are not significantly different. The failed business CEOs' ranked mean indicates that marketing skills are the seventh most important contributor to success or failure, while the successful business CEOs' ranked mean was eight in importance.

CONCLUSIONS

Ranked Order of Contributing Factors to Success or Failure

To determine which variables are the most important contributing factors to failure or success, in the opinion of CEOs, the fifteen variable means were ranked from lowest to highest. The lower the mean the more important the variable. See Table 80 for the ranking.

Table 80. RANKED ORDER OF CONTRIBUTING FACTORS TO SUCCESS OR FAILURE

Mean Rank	Failure	Success	Combined
1	rkfc / 1.565	rkfc / 1.626	rkfc / 1.595
2	capt / 1.639	capt / 1.852	capt / 1.745
3	plan / 2.296	staf / 2.250	staf / 2.296
4	staf / 2.343	inex / 2.287	inex / 2.333
5	inex / 2.380	plan / 2.402	plan / 2.349
6	maex / 2.463	psti / 2.694	maex / 2.653
7	mrkt / 2.963	maex / 2.843	psti / 2.917
8	psti / 3.139	mrkt / 3.019	mrkt / 2.991
9	prad / 3.185	prad / 3.139	prad / 3.162
10	ecti / 3.704	ecti / 3.324	ecti / 3.514
11	educ / 4.509	pent / 4.296	educ / 4.417
12	age / 4.639	educ / 4.324	age / 4.523
13	pent / 4.822	age / 4.407*	pent / 4.558
14	mior / 4.963	mior / 4.407	mior / 4.685
15	part / 5.009	part / 4.944	part / 4.977

*Success age and mior means, mode, and median were the same, but age had the lower standard deviation, so it was ranked 13.

The greatest difference in rankings of success and failure is two places for planning, product/service timing, and parents own a business. Planning was ranked higher by failures (third) than by successes (fifth). Product/service timing and parents own a business was ranked

higher by successes (sixth and eleventh) than failures (eighth and thirteenth). Staffing and industry experience were ranked one number higher by successes than failures (third and fourth and fourth and fifth). Management experience, marketing skills, education, and age were ranked one number higher by failure than success (sixth and seventh, seventh and eighth, eleventh and twelfth, and twelfth and thirteenth). Record keeping and financial control, capital, professional advisors, economic timing, minorities, and partners all had the same rankings (first, second, ninth, tenth, fourteenth, and fifteenth). There seems to be closer agreement on the most and least important variables to distinguish between success and failure. In the combined ranking, planning is fifth: failures ranked it third and successes fifth.

Significant Differences between Successful and Failed CEO Responses

When comparing the means of successful and failed CEOs for each of the fifteen hypotheses, results showed that the CEOs of successful businesses had lower means than those of failed ones for ten out of the fifteen hypotheses (inex, prad, educ, staf, psti, ecti, age, part, pent, and mior). Overall the CEOs of successful businesses more strongly agreed that the variables are important factors distinguishing between success and failure. When comparing the successful and failed CEO responses, results showed that three out of the fifteen (psti, pent, mior) that were significantly different at the .05 level. Successful business CEOs means were lower, indicating the importance of the variable, for all three variables. See Table 81 for a summary of significant differences.

Table 81. SIGNIFICANT DIFFERENCES BETWEEN SUCCESSFUL AND FAILED BUSINESS CEO RESPONSES

Hypotheses / Variable	Lower CEO Mean	p=value
1 capt	Failed .639 < 1.852	.1069
2 rkfc	Failed 1.565 < 1.626	.3923
3 inex	Successful 2.287 < 2.380	.7474
4 maex	Failed 2.463 < 2.843	.0626
5 plan	Failed 2.296 < 2.402	.4444
6 prad	Successful 3.139 < 3.185	.7163
7 educ	Successful 4.324 < 4.509	.4226
8 staf	Successful 2.250 < 2.343	.4939
9 psti	Successful 2.264 < 3.159	.0069
10 ecti	Successful 3.324 < 3.704	.0866
11 age	Successful 4.407 < 4.639	.1872
12 part	Successful 4.944 < 5.009	.8460
13 pent	Successful 4.296 < 4.822	.0182
14 mior	Successful 4.407 < 4.963	.0060
15 mrkt	Failure 2.963 < 3.019	.7735

CEOs of successful and failed businesses do have some disagreement over the importance of some of the factors distinguishing between success or failure; therefore, present studies that do not survey failed businesses may be of limited value.

In Chapter 4 the models determined which variables are significant distinguishing factors between success and failure. This chapter presented the CEOs' opinion of which factors are significant. Chapter 6 will present the actual differences between the starting resources of successful and failed businesses. Chapter 7 compares these findings presenting conclusions and recommendations.

CHAPTER 6

RESULTS:

QUESTION 2 / HYPOTHESES 16 - 30

QUESTION 2

Do successful and failed businesses start with equal resources?

To determine if there is a significant difference in the startup resources between the successful and failed businesses, fifteen hypotheses were developed and tested based on questions 16-32 of the questionnaire. (See Appendix A for a copy of the questionnaire.) The responses of the successful and failed business CEOs were compared statistically to determine if there is a significant difference. To present the findings, descriptive statistics are used to compare the two group responses. To test for significant differences, three tests were used based on the measurement level/scale of the data. The data is measured on three levels. 1. Nominal: hypotheses 27, 28, and 29. They were tested using the McNemar test. 2. Ordinal: hypotheses 16, 17, 20, 21, 23, 24, 25, and 32. The Wilcoxon matched-pairs test was used. 3. Ratio: hypotheses 18, 19, 22, and 26. The paired t-test was used.

Significance Level

Hypotheses 16 - 30 were tested at the .05 level of significance. The more significant the differences are between the two groups, the

more accurate the model. If there were no differences, the model would not be a good predictor of business success vs. failure.

HYPOTHESES TESTING

Hypothesis 16 Test

H_{016} : Failed and successful businesses started with equal operating capital.

H_a : Failed firms started with less capital than successful ones.

Do not reject H_0 the p -value is $.4513 > .05$. See Table 82.

Table 82. HYPOTHESIS 16 TEST

Group	Mean	Mode	Median	Standard Deviation
Failure	4.757	4.0	5.0	1.613
Success	4.604	4.0	4.5	1.547

Ranks	Cases	Mean Rank	Z Score	p-value
- Ranks (Fail < Success)	34	44.13	-.7533	.4513
+ Ranks (Fail > Success)	47	38.73		
Ties (Fail = Success)	24			

The CEOs of failed businesses more strongly agreed that their businesses were started without adequate operating capital than successful firm CEOs. The failed business CEOs' response mean was greater than that of the successful CEOs (1 more than needed - 7 less than needed), but the means are not significantly different. Both failed and successful business CEOs started with slightly less operating capital than needed. Starting with equal capital infers that this variable is not a distinguishing factor between success and failure.

Hypothesis 17 Test

Ho₁₇: Failed and successful businesses have equal record keeping and financial controls.

Ha: Failed firms have poorer record keeping and financial controls than successful ones.

Do not reject Ho the p-value is .6949 > .05. See Table 83.

Table 83. HYPOTHESIS 17 TEST

Group	Mean	Mode	Median	Standard Deviation
Failure	4.694	6.0	5.0	1.721
Success	4.778	6.0	5.0	1.549

Ranks	Cases	Mean Rank	Z Score	p=
- Ranks (Fail < Success)	52	47.81	-.3922	.6949
+ Ranks (Fail > Success)	45	50.39		
Ties (Fail = Success)	11			

The CEOs of successful firms more strongly agreed that their businesses were started with adequate record keeping and financial control than CEOs of failed firms. The successful CEOs' response mean was greater than that of failed business CEOs (1 inadequate/poor - 7 adequate/good), but the means are not significantly different. Both failed and successful CEOs started with slightly adequate record keeping and financial control. Starting equally infers that this variable is not a distinguishing factor between success and failure.

Hypothesis 18 Test

Ho₁₈: Failed and successful business CEOs have an equal number of years of industry experience prior to managing the firm.

Ha: Failed CEOs have fewer numbers of years of industry experience than successful CEOs.

Do not reject Ho the p-value is .130 > .05. See Table 84.

Table 84. HYPOTHESIS 18 TEST

Group	Mean	Mode	Median	Standard Deviation
Failure	10.0	.000	10.0	8.339
Success	8.4486	.000	6.0	8.000

Mean Difference	Stand. Error	T Value	Deg. Free.	p-value
-1.5514	1.016	-1.53	106	.130

The CEOs of failed businesses had more years of industry experience prior to running their firms than successful CEOs. The failed business CEOs' response mean was greater than that of successful CEOs (number of years), but the means are not significantly different. Both failed and successful CEOs starting with equal industry experience infers that this variable is not a distinguishing factor between success and failure.

Hypothesis 19 Test

H₀₁₉: Failed and successful business CEOs have an equal number of years of management experience prior to managing the firm.

H_a: Failed business CEOs have fewer number of years of management experience than successful CEOs.

Do not reject H₀ the p-value is .133 > .05. See Table 85.

Table 85. HYPOTHESIS 19 TEST

Group	Mean	Mode	Median	Standard Deviation
Failure	9.2991	.000	8.0	7.744
Success	7.6916	.000	5.0	8.224

Mean Difference	Stand. Error	T Value	Deg. Free.	p-value
-1.6075	1.062	-1.51	106	.133

The CEOs of failed businesses had more years of management experience prior to running their businesses than successful business CEOs. The failed business CEOs' response mean was greater than that of successful CEOs (number of years), but the means are not significantly different. Both failed and successful CEOs starting with equal management experience infers that this variable is not a distinguishing factor between success and failure.

Hypothesis 20 Test

Ho₂₀: Failed and successful businesses started with plans of equal details.

Ha: Failed firms started with plans of lesser detail than successful firms.

Do not reject Ho the p-value is .2418 > .05. See Table 86.

Table 86. HYPOTHESIS 20 TEST

Group	Mean	Mode	Median	Standard Deviation
Failure	4.093	5.0	5.0	1.705
Success	3.843	5.0	4.0	1.517

Ranks	Cases	Mean Rank	Z Score	p=value
- Ranks (Fail < Success)	36	37.24	-1.1705	.2418
+ Ranks (Fail > Success)	43	42.31		
Ties (Fail = Success)	29			

The CEOs of successful firms started with more specific business plans than failed business CEOs. The successful business CEOs' response mean was less than that of failed CEOs (1 very specific - 7 no plans),

but the means are not significantly different. Both failed and successful businesss CEOs started with equal business plans. Equal plans infer that this variable is not a distinguishing factor between success and failed businesses.

Hypothesis 21 Test

Ho₂₁: Failed and successful businesses started with equal use of professional advice.

Ha: Failed firms started with less use of professional advice than successful firms.

Reject Ho the p=value is .0074 < .05. See Table 87.

Table 87. HYPOTHESIS 21 TEST

Group	Mean	Mode	Median	Standard Deviation
Failure	3.963	6.0	4.0	1.718
Success	4.636	6.0	5.0	1.639

Ranks	Cases	Mean Rank	Z Score	p=value
- Ranks (Fail < Success)	55	44.35	-2.6794	.0074
+ Ranks (Fail > Success)	30	40.53		
Ties (Fail = Success)	22			

The CEOs of failed businesses started with greater use of professional advice than successful business CEOs. The failed business CEOs' response mean was less than that of successful CEOs (1 great use - 7 not used); the means are significantly different at the .05 level. Failed and successful business CEOs used different amounts of professional advice. Unequal use of professional advice infers that this variable is a distinguishing factor between successful and failed businesses.

Hypothesis 22 Test

Ho₂₂: Failed and successful business CEOs have an equal number of years of education.

Ha: Failed business CEOs have fewer years of education than successful CEOs.

Reject Ho the p-value is $.024 < .05$. See Table 88.

Table 88. HYPOTHESIS 22 TEST

Group	Mean	Mode	Median	Standard Deviation
Failure	15.3302	16.0	16.0	2.991
Success	14.5189	16.0	15.0	2.601

Mean Difference	Stand. Error	T Value	Deg. Free.	p-value
-0.8113	.353	-2.30	105	.024

The CEOs of failed businesses started their businesses with a higher level of education than successful CEOs. The failed business CEOs' response mean was greater than that of successful CEOs (number of years), and the means are significantly different at the .05 level. Failed and successful business CEOs had different levels of education. Unequal education levels infers that this variable is a distinguishing factor between successful and failed businesses.

Hypothesis 23 Test

Ho₂₃: Failed and successful businesses have equal staffing difficulties.

Ha: Failed firms have more staffing difficulties than successful ones.

Reject Ho the p-value is $.0005 < .05$. See Table 89.

Table 89. HYPOTHESIS 23 TEST

Group	Mean	Mode	Median	Standard Deviation
Failure	5.037	6.0	6.0	1.596
Success	4.286	4.0	4.0	1.719

Ranks	Cases	Mean Rank	Z Score	p-value
- Ranks (Fail < Success)	28	34.96	-3.4687	.0005
+ Ranks (Fail > Success)	55	45.58		
Ties (Fail = Success)	21			

The CEOs of failed businesses stated that they had less difficulty recruiting and retaining quality employees than successful CEOs. The failed business CEOs' response mean was greater than that of successful CEOs (1 much difficulty - 7 little difficulty), and the means are significantly different at the .05 level. Failed and successful business CEOs had different levels of difficulty staffing. Unequal difficulty staffing infers that this variable is a distinguishing factor between successful and failed businesses.

Hypothesis 24 Test

Ho₂₄: There is no difference in the product/service timing of failed and successful businesses.

Ha: Failed firms started with poor product/service timing while successful firms had good timing.

Do not reject Ho the p-value is .8385 > .05. See Table 90.

Table 90. HYPOTHESIS 24 TEST

Group	Mean	Mode	Median	Standard Deviation
Failure	3.944	4.0	4.0	1.446
Success	3.952	5.0	4.0	1.311

Ranks	Cases	Mean Rank	Z Score	p-value
- Ranks (Fail < Success)	42	39.58	-.2038	.8385
+ Ranks (Fail > Success)	38	41.51		
Ties (Fail = Success)	24			

The CEOs of failed businesses more strongly agreed that their products/services were in a growth stage when they started than did successful business CEOs. The failed business CEOs' response mean was

less than that of successful CEOs (1-2 introduction, 3-4 growth, 5-6 mature, 7 decline), but the means are not significantly different. Both failed and successful CEOs started with growth products/services. Starting equally infers that product/service timing is not a distinguishing factor between success and failure.

Hypothesis 25 Test

Ho₂₅: There is no difference in economic timing of failed and successful firms.

Ha: Failed firms were started during a recession while successful firms were started during expansion periods.

Do not reject Ho the p-value is .8343 > .05. See Table 91.

Table 91. HYPOTHESIS 25 TEST

Group	Mean	Mode	Median	Standard Deviation
Failure	4.111	4.0	4.0	1.851
Success	4.204	6.0	4.0	1.755

Ranks	Cases	Mean Rank	Z Score	p=value
- Ranks (Fail < Success)	45	46.66	-.2092	.8343
+ Ranks (Fail > Success)	45	44.34		
Ties (Fail = Success)	18			

The CEOs of failed businesses more strongly agreed that their businesses were started during slower economic expansion than successful CEOs. The failed CEOs' response mean was less than that of successful CEOs (1 recession - 7 expansion), but the means are not significantly different. Both failed and successful CEOs started their businesses during moderate economic expansions. Starting during the same level of expansion infers that economic timing is not a distinguishing factor between success and failure.

Hypothesis 26 Test

Ho₂₆: There is no difference in the age of failed and successful CEOs.

Ha: Failed business CEOs are younger than successful CEOs.

Do not reject Ho the p-value is .374 > .05. See Table 92.

Table 92. HYPOTHESIS 26 TEST

Group	Mean	Mode	Median	Standard Deviation
Failure	37.0096	40.0	36.0	8.790
Success	35.8942	38.0	36	8.883

Mean Difference	Stand. Error	T Value	Deg. Free.	p-value
-1.1154	1.250	-0.89	103	.374

The CEOs of failed businesses were slightly older than the successful CEOs when they first started their firms. The failed business CEOs' response mean was greater than that of successful CEOs (number of years), but the means are not significantly different. Both failed and successful CEOs started their business at similar ages. Starting a business at similar ages infers that this variable is not a distinguishing factor between success and failure.

Hypothesis 27 Test

Ho₂₇: There is no difference in the number of partners in failed and successful firms.

Ha: Failed firms do not have partners while successful firms do.

Do not reject Ho the p-value is .5423 > .05. See Table 93.

Table 93. HYPOTHESIS 27 TEST

Group	One Owner Frequency	> One Owner Frequency	One Owner Percentage	> One Owner Percentage
Failure	62	46	57.4	42.6
Success	70	37	64.8	34.3

Chi-square	p-value
.3712	.5423

More successful businesses were started by one owner than failed businesses. The frequency of successful of one-owner businesses is greater than that of failed one-owner businesses, but the frequency is not significantly different. Similar frequency distributions of form of ownership infers that this variable is not a distinguishing factor between success and failure. In other words, partners who own a business do not have a greater chance of success than one owner.

Hypothesis 28 Test

Ho₂₈: There is no difference in parents of failed and successful CEOs.

Ha: The parents of failed CEOs did not own their own business while those of successful CEOs did.

Do not reject Ho the p-value is .2129 > .05. See Table 94.

Table 94. HYPOTHESIS 28 TEST

Group	Parents Owned a Business Frequency	Did Not Own Business Frequency	Parents Owned a Business Percentage	Did Not Own Business Percentage
Failure	33	75	30.6	69.4
Success	45	60	41.7	55.6

Chi-square	p-value
1.5513	.2129

More parents of successful businesses CEOs' owned their own business than those of failed CEOs. The frequency of successful CEOs with parents owning their own business is greater than that of failed CEOs whose parents did not own a business, but the frequency is not significantly different. Similar frequency distributions of parents owning a businesses infers that this variable is not a distinguishing

factor between success and failure. In other words, people whose parents owned their own business do not have a greater chance of success than people whose parents did not own their own business.

Hypothesis 29 Test

Ho₂₉: There is no difference in minority status of failed and successful CEOs.

Ha: Failures are more common among minority CEOs.

Do not reject Ho the p-value is .7905 > .05. See Table 95.

Table 95. HYPOTHESIS 29 TEST

Group	Minority Owner Frequency	Non Minority Owner Frequency	Minority Owner Percentage	Non Minority Owner Percentage
Failure	8	100	7.4	92.6
Success	6	101	5.6	94.4

Chi-square	p-value
.130	.7905

More failed businesses were owned by minorities than successful firms. The frequency of failures of minorities is greater than that of successes, but the frequency is not significantly different. Similar frequency distributions of minority vs. nonminority ownership infer that

this variable is not a distinguishing factor between success and failure. In other words, minority owned businesses do not have a greater chance of failing than nonminority owned businesses.

Hypothesis 30 Test

H₀₃₀: There is no difference in the level of marketing skills of failed and successful CEOs.

H_a: Failed business CEOs have a lower level of marketing skills than successful CEOs.

Do not reject H₀ the p-value is .0802 > .05. See Table 96.

Table 96. HYPOTHESIS 30 TEST

Group	Mean	Mode	Median	Standard Deviation
Failure	4.463	6.0	5.0	1.769
Success	3.935	2.0	4.0	1.763

Ranks	Cases	Mean Rank	Z Score	p-value
- Ranks (Fail < Success)	37	44.62	-1.7494	.0802
+ Ranks (Fail > Success)	54	46.94		
Ties (Fail = Success)	17			

More failed business CEOs had a higher level of marketing skills prior to starting their firms than successful CEOs. The failure mean (1 low skill - 7 high skill) is not significantly different from the success mean. Similar levels of marketing skills infer that this variable is not a distinguishing factor between success and failure.

CONCLUSIONS

Differences in Starting Resources of Successful and Failed Businesses

To determine whether successful or failed businesses started with more favorable resources, each resource was listed and the more favorable group was identified based on mean (ordinal and metric variables) or frequency (nominal variables). See Table 97 for the results. The review of the literature, Chapter 2, indicates that the successful companies should have the more favorable starting resource base for all 15 variables. However, failed businesses had the more favorable resources for eight of the variables (inex, maex, prad, educ, staf, age, part, mrkt), with three of the differences being significant at the .05 level (prad, educ, staf). The successful companies had the more favorable resources for five of the variables (capt, rkfc, plan, pent, mior); none of the differences were significant. Based on the responses, there was no difference between success and failure for two of the variables (psti, ecti).

According to the literature, successful company CEOs should have had more years of both industry and management experience, but the sample CEOs do not. However, the difference is not significant until the

.14 level. The successful CEOs should be older than the failures, but the sample CEOs are not older. However, the difference is not significant until the .38 level. It makes sense that the failures would seek more professional advice, but it is not clearly stated in the literature. Successful CEOs should have more education than failures, but they did not, and the difference is significant at the .05 level. Successful CEOs should have less difficulty recruiting and retaining quality employees, but they did not, and the difference is significant at the .05 level. More successful firms should be run by more than one owner, but they are not. However, the difference is not significant until .55. Finally, marketing skills should be higher for successful CEOs than failed business CEOs, but they were not, and the difference is not significant until the .08 level.

Table 97. DIFFERENCES BETWEEN SUCCESSFUL AND FAILED BUSINESS STARTING RESOURCES

Hypotheses / Variable	More Favorable	p=value
	Mean/Frequency	
16 capt	Success 4.604 < 4.757	.4513
17 rkfc	Success 4.778 > 4.694	.6949
18 inex	Failed 10.0 > 8.445	.1300
19 maex	Failed 9.299 > 7.692	.1330
20 plan	Success 3.843 < 4.093	.2418
21 prad	Failed 3.963 < 4.636	.0074
22 educ	Failed 15.330 > 14.519	.0240
23 staf	Failed 5.037 > 4.286	.0005
24 psti	Same 3.944 + 3.952	.8385
25 ecti	Same 4.111 + 4.204	.8343
26 age	Failed 37.010 > 35.894	.3740
27 part	Failed 62/46 + 70/37	.5423
28 pent	Success 45/60 + 33/75	.2129
29 mior	Success 6/101 + 8/100	.7905
30 mrkt	Failed 4.463 > 3.935	.0802

Rank Order of Significant Differences Between Successful and Failed Business Starting Resources

For a rank listing of the differences between successful and failed business starting resources see Table 98. The variables are

ranked by level of significance, and only the first three variables (staf, prad, ed) are significantly different at the .05 level.

Table 98. RANK ORDER OF SIGNIFICANT DIFFERENCES BETWEEN SUCCESSFUL AND FAILED BUSINESS STARTING RESOURCES

Significance Rank	Variable	Favorable Resource	Significance
1	Staffing	Failure	.0005
2	Prof. Advisors	Failure	.0074
3	Education Level	Failure	.0240
4	Marketing Skill	Failure	.0802
5	Industry Exper.	Failure	.1300
6	Management Exper	Failure	.1330
7	Parents Own Bus.	Success	.2129
8	Planning	Success	.2418
9	Age of Owner	Failure	.3740
10	Capital	Success	.4513
11	Partners	Failure	.5423
12	Rec Ke Fin Con.	Success	.6949
13	Not Being Minor.	Success	.7905
14	Economic Timing	Success	.8343
15	Prod/Ser. Tim.	Success	.8385

In Chapter 4 the models determined which variables are significant distinguishing factors between success and failure. Chapter 5 presented the CEOs opinion of which factors are significant. This chapter presented the actual differences between the starting resources of successful and failed businesses. In Chapter 7, a comparison of these findings will be presented as Conclusions and Recommendations.

CHAPTER 7

CONCLUSIONS AND RECOMMENDATIONS

Business failure is both frequent and potentially damaging yet central to the efficient operation of the market economy. Business failures are a key indicator of the strength of American business. There has been a high rate of business failure in the United States, with an acceleration of the problem over the past five years. The development of a startup business success vs. failure model can help to explain why businesses succeed and fail. A better understanding of business failure can help lead to fewer business failures in the future, resulting in better utilization of our limited resources. The social benefit of this success vs. failure study is that some individuals may be discouraged from starting nonviable businesses.

VALIDITY AND RELIABILITY OF THE STUDY

The results presented in prior chapters infer that this study is both valid and reliable. This is the only major business success vs. failure study using matched pairs. The measurement instrument was carefully developed through three pilot tests. The research sample consisted of 108 failed businesses and their match of 108 successful companies. Failed firms were carefully matched with successful ones of

similar size, location, age, and industry. The failure sample includes both Chapter 11 (86 percent) and Chapter 7 companies (14 percent). The Chapter 7 company owner responses were compared to the Chapter 11 company owner responses to determine if there was a significant differences between the two sample categories. Of the 30 questions compared, only one response was significantly different at the .05 level. Therefore, it can be inferred that the dominantly Chapter 11 sample is a valid representation of failures.

The sample represents the population for all six New England states and eight industry groupings. In other words, there is no significant difference, .05 level, between the percentage of the sample and the population. For a comparison of the sample to the population by state and industry see Tables 16 and 17 on pages 90 and 92.

Nonresponse bias has been minimized in the study by including initial nonrespondents in the sample (10 percent) and by comparing statistically the data of the initial nonrespondents' to data of the initial respondents' to ensure that there was no significant difference in responses between these two groups. Of the 30 questions compared for failures, only two question responses were significantly different at the .05 level. For the successful comparison only one question response was significantly different at the .05 level. The test results infer that the sample is not significantly biased due to nonresponse error.

Eleven startup business success vs. failure prediction models were developed with a significance level of .05. In other words, the models will reliably outperform random classification of success vs. failure 95 percent of the time. The accuracy rate of the eleven models' ability to

predict a specific business as being successful or failed varies from model to model between 62 to 95 percent; the five industry models accuracy rate was between 80 to 95 percent.

THE PURPOSE OF THE STUDY

The purpose of the study was to develop and test a generic startup business success vs. failure prediction model

Generic Models

The purpose of the study was achieved, and the results were presented in the first section of Chapter 4. Four generic models were developed and tested, all significant at the .05 level, using discriminant analysis and factor analysis. The four models will reliably outperform random classification of success vs. failure 95 percent of the time. The accuracy rate of the four models' ability to predict a specific business as being successful or failed varies from model to model between 62 to 65 percent.

After running stepwise discriminant analysis with the original fifteen variable model, six variables were excluded from all four generic models. The six variables that are not part of any generic model include capital, product/service timing, economic timing, age, partners, and marketing. The nine variables that are part of one or more generic models include record keeping and financial control, industry experience, management experience, planning, professional advisors, education, staffing, parents owned a business, and not being a minority.

There is no significant difference between the four generic models. Generic Model 3 has the highest classification, but its canonical correlation and significance level are lower than Generic Model 1. Generic Model 1 has the highest significance level. However, when the variables are reduced from eight (model 1) to three (model 4), the results are not significantly different. For a detailed comparison of the four generic models see Figure 6 and Table 36 on pages 143 and 144.

In selecting one generic model, Generic Model 1 is recommended, which includes professional advisors, planning, staffing, education, parents owned a business, not being a minority, industry experience, and record keeping and financial control:

$$S/F = f(\text{prad, plan, staf, educ, pent, mior, inex, rkfc})$$

Although there is very little difference in classification results (64.39% vs. 65.05%) and significance level (.0000 vs. .0022), Generic Model 1 is superior in ability to explain variance through canonical correlation (.42 vs. .35). Generic Model 1 explains 42 percent of the variance of contributing factors to success or failure, compared to 35 percent for Generic Model 3. Including eight variables, rather than six, increases explanatory power by seven percent. After the results were analyzed multicollinearity problems with the fifteen variables were found to be nonexistent, the eight variables in Generic Model 1 are all important to success or failure. No one variable, or two or three, is going to determine the sole difference between success and failure. Any model specification error occurs because of the missing variables from

the model rather than from including irrelevant variables. Irrelevant variables were excluded from the model by stepwise discriminant analysis and by using correlation to ensure that multicollinearity did not exist. Even though Generic Model 1 is significant (.0000), it does not explain 58 percent of the variance between the success and failure sample in this study. There is a need for further research to identify missing variables that have to be entered into the generic model to improve its predictive powers beyond the 65 percent accuracy rate.

The lack of one variable can be offset by the presence of another. For example, a business owner with a low level of education may be able to compensate for this by industry and/or management experience. A business owner with staffing problems may be very successful if the products/services are in high demand and the business has few competitors. Also a company owner, whose parents did not own a business, may compensate for this lack by developing specific plans, proper staffing, etc. Part of the variance in generic models may be due to the variety of industries (8 groupings) and business size differences (0-300 employees). The influences on the model of industry and size difference are discussed next.

Industry Models

Although the purpose of the study was achieved, additional analysis was undertaken to improve the accuracy rate of the startup business success vs. failure prediction model. To determine if industry specific models would be more accurate predictors of success vs. failure, discriminant analysis and factor analysis using all fifteen variables

from the original model were calculated with the separate data for five industry groupings. The five industries with their sample size are manufacturing n=21, finance n=35, construction n=31, service n=51, and retail n=44. Samples include firms employing 0-300 people.

All five industry models are significant at the .05 level, and all are more accurate at predicting businesses as successful and failed than the four generic models. The generic models' accuracy rate varied from 62 to 65 percent while the industry models' vary from 80 to 95 percent accuracy. A business within one of these five industry groupings should use the specific industry model rather than a generic model.

After running stepwise discriminant analysis with the original fifteen variable model, all fifteen variables remain as part of at least one of the five industry models. Part of the variance between the four generic models may be due to industry differences. Specific variables tend to be significant predictors of success vs. failure for one industry but not for others. When industry models are compared, no one variable appears on all five models. For a detailed comparison of industry models, see Figure 12 and Table 53 on pages 166 and 167, and Figure 17 on page 183.

Size Models

To determine if cross-industry size specific models would be more accurate predictors of success vs. failure, discriminant analysis using all fifteen variables from the original model was calculated with the separate data for three employee-size groupings. Based on the data, three size samples were developed: sample 0-10 employees--96 firms,

sample 11-25 employees--52 firms, and sample 26-50 employees--35 firms. The total sample included 19 firms with 51-300 employees. With the small sample and large variance in size, no analysis was attempted for larger businesses. Unlike the generic and industry models, size models lose the matched pairs when the total sample is subdivided.

Two of the three size models (0 - 10 and 11 - 25 employees) are significant at the test criteria .05 level. The 26 - 50 Employee Model is significant at the .10 level. The five industry models are superior to the three size models based on significance level and canonical correlations. However, the predictability accuracy is about equal for the 11 - 25 Employee Model and the Construction, Service, and Retail Models (80.77% vs. 80.65%, 80.39%, 79.55%). The Manufacturing and Finance models are more accurate predictors of success vs. failure than all three size models (95.24% and 85.71%).

A Comparison of Generic, Industry and Size Models

Part of the variance between the four generic models may be due to industry and size differences. Specific variables tend to be significant predictors of success vs. failure for one industry or size business but not for others. For a detailed comparison of generic, industry and size models, see Figure 17 and Table 64 on pages 182-184.

Eleven startup business success vs. failure prediction models were developed that will reliably outperform random classification of success vs. failure 95 percent of the time. The accuracy rate to predict a specific business as being successful or failed varies from model to model between 62 to 95 percent.

The study would be simplified if one model consistently predicted success vs. failure for all businesses regardless of industry and size. It would also simplify things if there were clear explanations of why the model components vary from industry to industry, and with size difference, when using the same contributing factors to success or failure. However, the real business world is more complex and calls for more specific models and possibly for other factors not discovered in this study in order to meet the unique business needs by industry and size. The explanation for the variance between models is not contained within this study. Further research, which is beyond the scope of this study, is needed to explain the variances between models.

USE, SELECTION, AND LIMITATIONS OF THE BUSINESS SUCCESS VS. FAILURE PREDICTION MODELS

Use of the Models

There are at least seven groups that can benefit from using the business success vs. failure prediction models developed in this study: entrepreneurs, investors, lenders, suppliers, educators, consultants, and public policy makers.

Entrepreneurs

Would-be entrepreneurs can use a model to better assess the possibility of success or failure. Some individuals may be discouraged from starting nonviable businesses or may be postponing starting a business until they can increase their chances of success. For example, people considering starting a retail store can use the retail model. To

increase their chance of success, they can subjectively compare their resources to the model and follow its recommendations. Based on the retail model, $[S/F = f(\text{plan, prad, ecti, age, rkfc, ,pstl})]$, age is a factor in their success or failure. If young, they may want to wait and gain more experience before starting a retail store. To increase their chances of success, when they do start their business, they should develop detailed plans with the aid of professional advisors. The plan should include specifications for products that are in their growth stages, and an accurate system of record keeping and financial control should be developed. It is advisable not to start the business during poor economic times unless the product remains in demand during economic downturns.

Investors

Investors such as limited partners, stockholders, and venture capitalist can use a model to aid in assessing the risk of their investments. Some individuals may be discouraged from investing in nonviable businesses.

Lenders

Lenders including financial institutions, relatives, and friends can use a model to aid in assessing the risk of lending to a business. Some individuals may be discouraged from lending to nonviable businesses.

Suppliers

Many businesses sell their goods and services to other businesses on credit. Suppliers can use a model to aid in assessing the risk of selling on credit to businesses. The models can also be used to aid in setting credit limits. Some businesses may be discouraged from giving credit, or may limit credit, to nonviable businesses.

Educators

There are many colleges offering entrepreneur and small business courses. Textbooks and educators that make the models available to would-be entrepreneurs can help them better assess the viability of their future businesses.

Consultants

Private and public consultants (small business administration, SCORE, small business institute directors, etc.) who advise entrepreneurs and would-be entrepreneurs can use the models when advising these clients.

Public policy makers

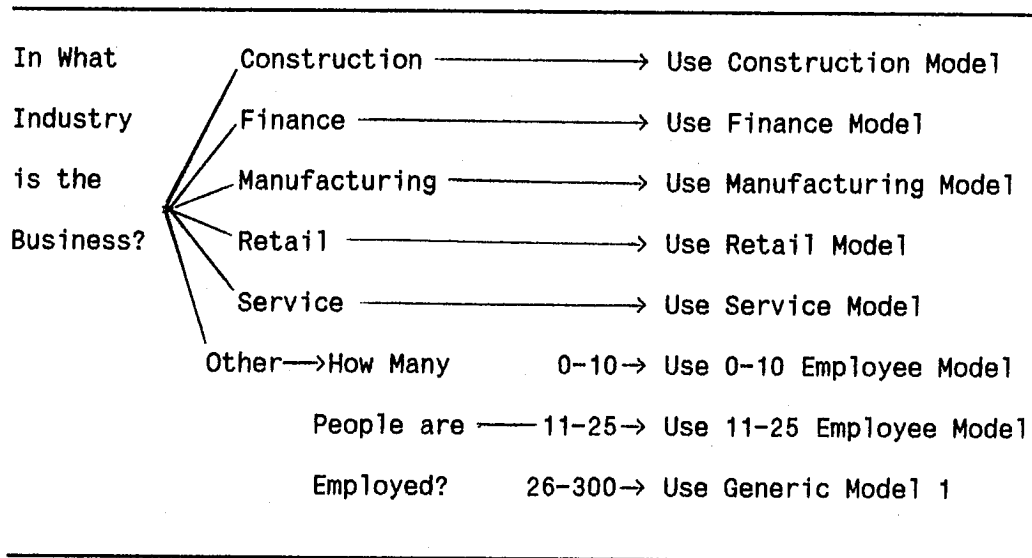
Public policy makers can use the models when selecting assistance either to prevent failure or to promote further growth.

When the above mentioned groups use the models, society can benefit because through direct and indirect ways we all pay when our limited resources are misallocated.

Selecting a Model

When selecting one of the eight recommended models, the user can follow the decision tree in Figure 18.

Figure 18. MODEL SECTION DECISION TREE



Model Limitations

When the above groups use the startup business success vs. failure prediction models, it is important to realize that the models are not meant to replace existing decision making techniques. The models are to be used in conjunction with exiting techniques to improve decision making.

The models do not provide numerical guidelines for variables distinguishing success from failure. Judgement must be used when the models are applied. For example, the variable industry experience states that people with prior industry experience have a greater chance of success than people without industry experience. However, the model does

not state a specific number of years of experience that are needed to be successful. The user must look at the list of variables in the relevant model and subjectively assess the strengths of the business for each variable. If the business is strong on some variables and weak on others, a judgement call is needed, and other decision criteria previously used become increasingly important.

The models have been tested on businesses employing 300 or fewer employees, and of the 216 businesses in the sample, only 19 employed greater than 50 employees.

The models have been tested on businesses in the six New England states; results may be different in other parts of the country.

QUESTION 1 / HYPOTHESES 1 - 15

Do successful and failed business CEOs agree on
the contributing factors to startup business failure?

To determine which variables are the most important factors contributing to failure or success, in the opinion of CEOs, the fifteen variable means were ranked from lowest to highest. The greatest difference in ranking of success and failure is two places for planning, product/service timing, and parents own a business. The combined variable ranking of importance is: record keeping and financial control, capital, staffing, industry experience, planning, management experience, product/service timing, marketing, professional advisors, economic timing, education, age, parents owned a business, minority, and

partners. For a detailed comparison of the rank order of factors contributing to success or failure, see Table 80, page 208.

A comparison means of the successful and failed CEOs for each of the fifteen hypotheses reveals that they significantly disagree, at the .05 level, on the importance of three variables: product/service timing, parents own a business, and minority. The CEOs of successful businesses had lower means for ten out of the fifteen hypotheses (67 percent): industry experience, professional advisors, education, staffing, product/service timing, economic timing, age, partners, parent owned a business, and minority. In other words, the CEOs of successful businesses more strongly agreed than failed CEOs that the variables are important factors in distinguishing between success or failure. For a detailed comparison of the differences between successful and failed CEO responses, see Table 81, page 210.

There is disagreement among CEOs of successful and failed businesses on three of the fifteen variables (20 percent) contributing to startup business failure. The significant differences, in rank order, are:

1. The CEOs of successful businesses more strongly agreed that minority business owners have a greater chance of failure than nonminorities. The failed business CEOs' ranked mean indicates that being a minority is the fourteenth most important contributor to failure or success, but the successful business CEOs ranked mean was thirteenth in importance.

2. The CEOs of successful businesses more strongly agreed that firms that select products/services that are too new or too old have a

greater chance of failure than businesses that select products/services that are in their growth stage. The failed business CEOs ranked mean indicates that products/services timing is the eight most important contributor to failure or success, but the successful business CEOs ranked mean was sixth in importance.

3. The CEOs of successful businesses more strongly agreed that startup owners whose parents did not own a business have a greater chance of failure than people whose parents did own a business. The failed business CEOs' ranked mean indicates that parents owning a business is the thirteenth most important contributor to failure or success, but the successful business CEOs' ranked mean was eleventh in importance.

Research studies that survey failed businesses may be of greater value than those that survey businesses while they are successful, then, compare their responses to surviving firms after they fail.

QUESTION 2 / HYPOTHESES 16 - 30

Do successful and failed businesses start with equal resources?

The review of the literature, Chapter 2, indicates that the successful companies should have the more favorable starting resource base for all fifteen variables. However, failed businesses had the more favorable resources for eight of the variables: industry experience, management experience, professional advisors, education, staffing, age, partners, and marketing. Three of the differences are significant at the .05 level (professional advisors, education, staffing). The successful

companies had the more favorable resources for five of the variables: capital, record keeping and financial control, planning, parents owned a business, and minority. However, none of the differences were significant at the .05 level. Based on the responses, there was no real difference between success and failure for two of the variables: product service timing and economic timing. For a detailed comparison of differences between successful and failed business starting resources see Tables 97 and 98, pages 233 and 234.

One can conclude that successful and failed businesses did not start with equal resources for three of the fifteen variables (20 percent). The significant differences, in rank order, are:

1. The failed business CEOs perceived that they had less difficulty attracting and retaining quality employees than successful CEOs.

2. The failed businesses made greater use of professional advisors. It makes sense that the failures would seek more professional advice. However, it is not clear whether the CEOs used the same amount of advise before or after they began to have problems leading to failure. Because there was a significant difference in use of professional advisors, and eight of the twelve models identified this variable as a distinguishing factor between success and failure, it is recommended that further research be conducted on the use of professional advisors.

3. The failed CEOs had a higher level of education than successful CEOs.

RECOMMENDATIONS FOR FURTHER RESEARCH

Although the purpose of the study has been met, there are questions left unanswered because further research is required in order to reach adequate answers.

Why are there inconsistencies in the literature and discrepancies between the literature and this study? For most of the major variables identified in the literature as being factors contributing to success or failure, one or more other existing studies state that the variable is not a contributing factor. The literature states that the successful businesses should have the more favorable resources. However, the failures in this study had the more favorable resources for eight of the fifteen variables, and three of these differences are significant at the .05 level. The two major areas of discrepancy between the literature and this study are:

1. There are twelve studies that identify capital as a factor contributing to success or failure, and one that says it is not a contributing factor. Of the twelve models developed in this study, only three identified capital as a factor distinguishing between success and failure. Part of this discrepancy may be due to the fact that several literature articles are not based on empirical research and that those that are do not use matched pairs. When testing differences, these studies tend to compare small failed firms to larger successful firms with more capital. Having capital will postpone failure, but it will not ensure success. There is no significant difference in the amount of starting capital of the successful and failed businesses in this study.

Further research is needed to support or refute the claim that starting capital is a factor contributing to success or failure.

2. Another discrepancy appears in the need for management experience. Eleven studies identify management experience as a factor distinguishing between success and failure while three studies say that it is not a factor. In this study, only three of twelve models included management experience as a variable distinguishing between success and failure. Management experience was not a variable in any of the size models. There is no significant difference in the number of years of management experience between successful and failed CEOs in this study. Further research is needed to support or refute the claim that management experience is a factor contributing to success or failure.

Will these models continue to predict success vs. failure over time and under different economic conditions? This study could be replicated at a later time and/or under different economic conditions. During the period of this study, the New England states were experiencing economic difficulties. Results may be different during a period of strong economic growth.

What other factors contribute to success or failure? The canonical correlations explaining the variance between the successful and failed businesses range from .88 to .26. In other words, between 22 to 74 percent of the factors contributing to success or failure are missing from the models. New variables need to be added to the models to increase their ability to explain the differences between successful and failed businesses.

Will the industry models be as reliable when applied to larger samples? The industry models are the most accurate predictors of success vs. failure. However, the industry sample sizes are small ranging from 21-51. The existing models should be tested on larger industry sample sizes.

Will the models predict business successes or failures outside the six New England states, or do different parts of the country require different models? The existing models should be tested on samples including other states or areas.

Will the models predict success vs. failure for large businesses? Further study with a sample larger than 35 may reveal that the prediction model is significant, at the .05 level, for businesses with 26 to 50 employees. No analysis was conducted for businesses with greater than 50 employees. Further research is also needed to determine if the prediction models are significant for businesses with greater than 50 employees.

Recommendations for Specific Studies

The purpose of this study was to develop and test a model to predict successful vs. failed businesses. Four generic models were developed. However, the industry specific models are more accurate predictors of success vs. failure. The size models also indicate that businesses of different sizes have different needs. For example, a business owner with several employees has a greater need for management skills than the owner of a business with no or few employees. Therefore,

further research should focus on developing models for specific industries with different size businesses.

Further studies should test the significance of the fifteen variables to specific industries. These industry models should also include other variables that would be industry specific. For example, store location may be significant for a retailers but not for a manufacturer. The sample should be expanded geographically to other states, preferably all 50. The sample should be large enough to be subgrouped by business size and state or area. The sample should also include large businesses. A comparison should be made for the industry based on success vs. failure respondent differences in size of business and geographic locations. A more complex study could compare the results of two or more industry studies. Comparisons could be made globally between businesses in the United States and those in other countries such as Europe and Asia.

Summary

The original purpose of this study was to develop a generic model to predict startup business success vs. failure. Four generic models were developed. However, further model development revealed that industry and business size specific models were more accurate at predicting specific businesses as successful or failed for the construction, finance, manufacturing, retailing, and service industries. Future research should focus on further development of industry models for specific size businesses.

APPENDIX A

QUESTIONNAIRE AND COVER LETTERS

Startup Business Questionnaire

This questionnaire is primarily designed to collect data relating to startup businesses. *A startup business is zero to ten years old.*

For all questions circle the number that best describes your answer, or place the number on the line provided. If more space is needed for write-in questions please use the back of the cover letter or add your own page.

Questions 1-15 identify variables from the literature as being distinguishing factors between successful businesses and less successful businesses. Circle the appropriate number on the scale of 1-7 based on your agreement with each statement.

Strongly		Slightly		Slightly		Strongly
Agree	Agree	Agree	Neutral	Disagree	Disagree	Disagree
1	2	3	4	5	6	7

1. Capital. Firms that start undercapitalized have a greater chance of failure than businesses that start with adequate capital.

1	2	3	4	5	6	7
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2. Record Keeping and Financial Control. Firms that do not keep updated accurate records and use adequate financial controls (cash flow, accounts receivables and payables, inventory, etc.) have a greater chance of failure than businesses that do.

1	2	3	4	5	6	7
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3. Industry Experience. Startup firms that are managed by people without prior industry experience have a greater chance of failure than businesses that are managed by people with prior industry experience.

1 2 3 4 5 6 7

4. Management Experience. Startup firms that are managed by people without prior management experience have a greater chance of failure than businesses that are managed by people with prior management experience. (Management experience refers to a job with a management title; and having decision making authority in the areas of planning, organizing, staffing, leading, and controlling)

1 2 3 4 5 6 7

5. Planning. Startup firms that do not develop specific business plans have a greater chance of failure than firms that develop specific business plans. (A specific plan states the purpose of the business and objectives; it specifies strategic moves necessary to accomplish the objectives. The plan includes a cost-profit projection. The plan is based on a comparison to competition and a determination of how the firm will compete--low prices; superior- quality, service, location, selection; new product-service, etc.)

1 2 3 4 5 6 7

6. Professional Advisors. Startup organizations that do not use professional advisors (accountants, lawyers, bankers, consultants, etc.) have a greater chance of failure than businesses that use professional advisors.

1 2 3 4 5 6 7

7. Education. People without any college education have a greater chance of failing than people with one or more years of college education.

1 2 3 4 5 6 7

8. Staffing. Startup firms that cannot attract and retain quality employees have a greater chance of failure than organizations that can attract and retain quality employees.

1 2 3 4 5 6 7

9. Product/Service Timing. Firms that select products/services that are too new (low sales) or too old (product is in the decline stage of sales volume) have a greater chance of failure than firms that select products-services that are in the growth stage.

1 2 3 4 5 6 7

10. Economic Timing. Firms that startup during a recession have a greater chance of failure than businesses that are started during expansion periods.

1 2 3 4 5 6 7

11. Age. Younger people starting a firm have a greater chance of failure than older people.

1 2 3 4 5 6 7

12. Partners. A business started by one person has a greater chance of failure than a business started by partners.

1 2 3 4 5 6 7

13. Parents. Startup owners whose parents did not own a business have a greater chance of failure than people whose parents did own a business.

1 2 3 4 5 6 7

14. Minority. Minority business owners have a greater chance of failure than nonminorities.

1 2 3 4 5 6 7

15. Marketing. Startup owners without marketing skills (sales, advertising, pricing, etc.) have a greater chance of failure than owners with marketing skills.

1 2 3 4 5 6 7

16. Other. Are there other major contributing factors to business success vs. failure not listed above? If yes, please write them here.

17. (Failure only) What would you say was the major factor in your filing for Chapter 11?

17. (Success only) What would you say is the major reason for your firms success?

18. This business was started with what amount of operating capital?

More than needed			About right	Less than needed		
1	2	3	4	5	6	7

19. This business started with what degree of record keeping and financial control?

Inadequate - Very poor				Adequate - Very good		
1	2	3	4	5	6	7

20. Years of experience the CEO had in this industry prior to running this firm. _____ years

21. Years of management experience the CEO had prior to running this business. _____ years

22. What type of startup plan was developed by the firm?

Very Specific		Specific		General		No plans
1	2	3	4	5	6	7

23. As a startup firm, what amount of professional advise did your business use?

Great use of advisors				Advisors not used		
1	2	3	4	5	6	7

24. CEO education level completed prior to managing this firm. Part-time college attendance requires 10 courses/30 credits to count as one year completed.

grade school	1	2	3	4	5	6	7	8
high school	9	10	11	12				
college (one year)	13	14	15	16	(four year)			
graduate school	17	18	19	20	21	22		

25. What level of difficulties did this firm have recruiting and retaining quality employees as a startup business?

Much difficulty			Some		Little difficulty	
1	2	3	4	5	6	7

26. In what stage were your products/services when the firm was started?

Introduction		Growth		Mature		Decline
1	2	3	4	5	6	7

27. In what stage was the economy when the firm was started?

Recession				Expansion		
1	2	3	4	5	6	7

28. Age of the CEO when first managing the firm. _____ years.

29. The firm was started by?

1 one owner

2 more than one owner/partners

30. Did the CEO's parents own their own business?

1 yes

2 no

31. The CEO is a: 1 minority 2 nonminority

32. The CEO's level of marketing skills prior to starting this firm was?

Low/unskilled

High/skilled

1

2

3

4

5

6

7

33. Primary state of business operations.

1 Connecticut 2 Maine 3 Massachusetts 4 New Hampshire 5 Rhode Island

6 Vermont

34. Number of years this firm has been conducting business. _____ years.

35. Greatest number of full-time workers ever employed. Two or more part-time employees can equal one full-time worker. _____ employees.

36. Identify the industry that best describes your firm's activities.

- 1 Agriculture, forestry, landscaping, fishing
- 2 Construction, building, painting, carpentry, heating,
electrical, etc.
- 3 Finance, insurance, real estate, etc.
- 4 Manufacturing, printer, publisher, etc.
- 5 Retail store, eating + drinking, service station, drug store,
florist, apparel, etc.
- 6 Wholesale durable and nondurable, manufacture's rep., etc.
- 7 Transportation, communication, trucking + warehousing, travel
agent, etc.
- 8 Services- repair (appliances) business (advertising,
computer), professional (lawyer, accounting, engineering,
doctor), personal (beauty, barber, laundry/cleaning)

37. (failure) What is the present status of this business?

- 1 Chapter 7 2 Chapter 11 3 Successfully out of Chapter

37. (success) Please identify your firms level of profit compared to
your industry averages.

Below average			Average	Above Average		
1	2	3	4	5	6	7

38. What advice would you give to a high school and/or recent college graduate without any full-time business experience who is considering starting their own business. (If additional space is needed please use the back of the cover letter or separate sheet.)

39. What advice would you give to the owner of a new business?

40. (Failure only) Please list the name, city, and state of a couple of your firm's closest competitors- (they employ about the same number of people and have been in business for a similar length of time- but not eleven years or older). Your best guesstimate of closest competitors will do.

Business Failure Cover Letter

(On Springfield College Letterhead)

Dear Owner/CEO:

I am a teacher at Springfield College, and a doctoral student at the University of New Haven doing my dissertation as my last requirement to earn my degree. I'm conducting a study to better understand why startup businesses run into problems. Your response is critical to the success of this study. Please fill-out the enclosed questionnaire and return it in the self-addressed stamped envelope. I plan to start processing the data in one week. The survey will not identify you or your organization in any way, complete confidentiality will be maintained. Only total numbers will be reported.

I realized that you are very busy, but please take about 10 minutes now to help a student finish his degree and get on with his life; and to contribute to a better understanding of business problems.

If you want a copy of the results of this study check I do below and return this letter with your completed questionnaire.

____ I do ____ do not want a copy of the results.

Name:

Address:

Thank you for helping me and the others that will benefit as a result of this study.

Sincerely;

Robert N. Lussier

Doctoral Student, University of New Haven, CT

Matched Successful Business Cover letter

(On Springfield College letter head)

Dear Owner/CEO:

I am a teacher at Springfield College, and doctoral student at the University of New Haven doing my dissertation as my last requirement to earn my degree. I'm conducting a study to better understand why startup businesses fail, while other like yours' succeed. Your response is critical to the success of this study because your company has been carefully matched with a company that has failed. I need your responses to compare them to the failure's questionnaire responses to determine success vs. failure characteristics.

To participate your firm must employ less than employees and have been conducting business for less than years. (these blanks will be filled in with numbers based on the failure match)

If your business is too large or old, please write in the name and address of one or two of your competitors who you think will qualify next to the name and address section below, and return this letter and blank questionnaire in the enclosed self-addressed stamped envelope.

If your firm does qualify please fill-out the questionnaire and return it. I plan to start processing the data in one week. The survey will not identify you or your organization in any way, complete confidentiality will be maintained. Only total numbers will be reported.

I realize that you are very busy, but please take about 10 minutes now to help a student finish his degree and get on with his life; and to contribute to a better understanding of why some businesses fail and others succeed.

If you want a copy of the results of this study check I do below and return this letter with your completed questionnaire.

_____ I do _____ do not _____ want a copy of the results.

Name:

Address:

Thank you for helping me and the others that will benefit as a result of this study.

Sincerely;

Robert N. Lussier Doctoral Student, University of New Haven, CT

APPENDIX B

QUESTIONNAIRE DATA - DESCRIPTIVE STATISTICS

Question 1

1. Capital. Firms that start undercapitalized have a greater chance of failure than businesses that start with adequate capital.

1 2 3 4 5 6 7

Value or Descriptive Statistic	Failure Business		Successful Business	
1 Strongly Agree	64	59.3%	53	49.1%
2 Agree	29	26.9%	35	32.4%
3 Slightly Agree	10	9.3%	8	7.4%
4 Neutral	3	2.8%	8	7.4%
5 Slightly Disagree	0	0.0%	3	2.8%
6 Disagree	1	.9%	1	.9%
7 Strongly Disagree	1	.9%	0	0.0%
Total	108	100.0%	108	100.0%
Mean	1.639		1.852	
Mode	1.000		1.000	
Median	1.000		2.000	
Standard Deviation	1.027		1.118	
Kurtosis	8.688		2.003	
Skewness	2.516		1.527	

Question 2

2. Record Keeping and Financial Control. Firms that do not keep updated accurate records and use adequate financial controls (cash flow, accounts receivables and payables, inventory, etc.) have a greater chance of failure than businesses that do.

1 2 3 4 5 6 7

Value or Descriptive Statistic	Failure Business		Successful Business	
1 Strongly Agree	70	64.8%	58	53.7%
2 Agree	26	24.1	36	33.3%
3 Slightly Agree	6	5.4%	10	9.3%
4 Neutral	2	1.9%	1	.9%
5 Slightly Disagree	3	2.8%	2	1.9%
6 Disagree	1	.9%	0	0.0%
7 Strongly Disagree	0	0.0%	0	0.0%
Total	108	100.0%	107	99.1%
Mean	1.565		1.626	
Mode	1.000		1.000	
Median	1.000		1.000	
Standard Deviation	.998		.841	
Kurtosis	5.972		3.608	
Skewness	2.348		1.674	

Question 3

3. Industry Experience. Startup firms that are managed by people without prior industry experience have a greater chance of failure than businesses that are managed by people with prior industry experience.

1 2 3 4 5 6 7

Value or Descriptive Statistic	Failure Business		Successful Business	
1 Strongly Agree	32	29.6%	33	30.6%
2 Agree	34	31.5%	39	36.1%
3 Slightly Agree	25	23.1%	20	18.5%
4 Neutral	9	8.3%	8	7.4%
5 Slightly Disagree	3	2.8%	4	3.7%
6 Disagree	4	3.7%	4	3.7%
7 Strongly Disagree	1	.9%	0	0.0%
Total	108	100.0%	108	100.0%
Mean	2.380		2.287	
Mode	2.000		2.000	
Median	2.000		2.000	
Standard Deviation	1.345		1.286	
Kurtosis	1.350		1.081	
Skewness	1.178		1.176	

Question 4

4. Management Experience. Startup firms that are managed by people without prior management experience have a greater chance of failure than businesses that are managed by people with prior management experience. (Management experience refers to a job with a management title; and having decision making authority in the areas of planning, organizing, staffing, leading, and controlling)

1 2 3 4 5 6 7

Value or Descriptive Statistic	Failure Business		Successful Business	
1 Strongly Agree	28	25.9%	22	20.4%
2 Agree	38	35.2%	34	31.5%
3 Slightly Agree	24	22.2%	20	18.5%
4 Neutral	8	7.4%	12	11.1%
5 Slightly Disagree	3	2.8%	12	11.1%
6 Disagree	6	5.6%	7	6.5%
7 Strongly Disagree	1	.9%	1	.9%
Total	108	100.0%	108	100.0%
Mean	2.463		2.843	
Mode	2.000		2.000	
Median	2.000		2.000	
Standard Deviation	1.397		1.554	
Kurtosis	1.231		-.463	
Skewness	1.219		.694	

Question 5

5. Planning. Startup firms that do not develop specific business plans have a greater chance of failure than firms that develop specific business plans. (A specific plan states the purpose of the business and objectives; it specifies strategic moves necessary to accomplish the objectives. The plan includes a cost-profit projection. The plan is based on a comparison to competition and a determination of how the firm will compete--low prices; superior- quality, service, location, selection; new product-service, etc.)

1 2 3 4 5 6 7

Value or Descriptive Statistic	Failure Business		Successful Busin	
1 Strongly Agree	27	25.0%	29	26.9%
2 Agree	43	39.8%	42	38.9%
3 Slightly Agree	24	22.2%	11	10.2%
4 Neutral	10	9.3%	17	15.7%
5 Slightly Disagree	1	.9%	5	4.6%
6 Disagree	3	2.8%	3	2.8%
7 Strongly Disagree	0	0.0%	0	0.0%
Total	108	100.0%	107	99.1%
Mean	2.296		2.402	
Mode	2.000		2.000	
Median	2.000		2.000	
Standard Deviation	1.138		1.317	
Kurtosis	1.542		.091	
Skewness	1.099		.912	

Question 6

6. Professional Advisors. Startup organizations that do not use professional advisors (accountants, lawyers, bankers, consultants, etc.) have a greater chance of failure than businesses that use professional advisors.

1 2 3 4 5 6 7

Value or Descriptive Statistic	Failure Business		Successful Business	
1 Strongly Agree	16	14.8%	16	14.8%
2 Agree	25	23.1%	25	23.1%
3 Slightly Agree	24	22.2%	31	28.7%
4 Neutral	20	18.5%	17	15.7%
5 Slightly Disagree	13	12.0%	7	6.5%
6 Disagree	9	8.3%	7	6.5%
7 Strongly Disagree	1	.9%	7	6.5%
Total	108	100.0%	108	100.0%
Mean	3.182		3.139	
Mode	2.000		3.000	
Median	3.000		3.000	
Standard Deviation	1.542		1.603	
Kurtosis	-.740		-.015	
Skewness	.354		.726	

Question 7

7. Education. People without any college education have a greater chance of failing than people with one or more years of college education.

1 2 3 4 5 6 7

Value or Descriptive Statistic	Failure Business		Successful Business	
1 Strongly Agree	5	4.6%	2	1.9%
2 Agree	9	8.3%	13	12.0%
3 Slightly Agree	18	16.7%	18	16.7%
4 Neutral	21	19.4%	28	25.9%
5 Slightly Disagree	16	14.8%	18	16.7%
6 Disagree	27	25.0%	20	18.5%
7 Strongly Disagree	12	11.1%	9	8.3%
Total	108	100.0%	108	100.0%
Mean	4.509		4.324	
Mode	6.000		4.000	
Median	5.000		4.000	
Standard Deviation	1.683		1.546	
Kurtosis	-.860		-.831	
Skewness	-.292		-.019	

Question 8

8. Staffing. Startup firms that cannot attract and retain quality employees have a greater chance of failure than organizations that can attract and retain quality employees.

1 2 3 4 5 6 7

Value or Descriptive Statistic	Failure Business		Successful Business	
1 Strongly Agree	30	27.8%	26	24.1%
2 Agree	37	34.3%	52	48.1%
3 Slightly Agree	26	24.1%	18	16.7%
4 Neutral	7	6.5%	6	5.6%
5 Slightly Disagree	5	4.6%	2	1.9%
6 Disagree	3	2.8%	3	2.8%
7 Strongly Disagree	0	0.0%	1	.9%
Total	108	100.0%	108	100.0%
Mean	2.343		2.250	
Mode	2.000		2.000	
Median	2.000		2.000	
Standard Deviation	1.239		1.193	
Kurtosis	.861		3.468	
Skewness	1.030		1.6567	

Question 9

9. Product/Service Timing. Firms that select products/services that are too new (low sales) or too old (product is in the decline stage of sales volume) have a greater chance of failure than firms that select products-services that are in the growth stage.

1 2 3 4 5 6 7

Value or Descriptive Statistic	Failure Business		Successful Business	
1 Strongly Agree	5	4.6%	19	17.6%
2 Agree	36	33.3%	36	33.3%
3 Slightly Agree	21	19.4%	22	20.4%
4 Neutral	32	29.6%	23	21.3%
5 Slightly Disagree	13	12.0%	6	5.6%
6 Disagree	1	.9%	2	1.9%
7 Strongly Disagree	0	0.0%	0	0.0%
Total	108	100.0%	108	100.0%
Mean	3.139		2.694	
Mode	2.000		2.000	
Median	3.000		2.000	
Standard Deviation	1.172		1.249	
Kurtosis	-.958		-.485	
Skewness	.151		.455	

Question 10

10. Economic Timing. Firms that startup during a recession have a greater chance of failure than businesses that are started during expansion periods.

1 2 3 4 5 6 7

Value or Descriptive Statistic	Failure Business		Successful Business	
1 Strongly Agree	9	8.3%	15	13.9%
2 Agree	21	19.4%	25	23.1%
3 Slightly Agree	17	15.7%	22	20.4%
4 Neutral	29	26.9%	18	16.7%
5 Slightly Disagree	15	13.9%	17	15.7%
6 Disagree	12	11.1%	6	5.6%
7 Strongly Disagree	5	4.6%	7	4.6%
Total	108	100.0%	108	100.0%
Mean	3.704		3.324	
Mode	4.000		2.000	
Median	4.000		3.000	
Standard Deviation	1.619		1.657	
Kurtosis	-.744		-.628	
Skewness	.157		.423	

Question 11

11. Age. Younger people starting a firm have a greater chance of failure than older people.

1 2 3 4 5 6 7

Value or Descriptive Statistic	Failure Business		Successful Business	
1 Strongly Agree	0	0.0%	0	0.0%
2 Agree	12	11.1%	15	13.9%
3 Slightly Agree	10	9.3%	13	12.0%
4 Neutral	30	27.8%	27	25.0%
5 Slightly Disagree	18	16.7%	26	24.1%
6 Disagree	29	26.9%	20	18.5%
7 Strongly Disagree	9	8.3%	7	6.5%
Total	108	100.0%	108	100.0%
Mean	4.639		4.407	
Mode	4.000		4.000	
Median	5.000		4.000	
Standard Deviation	1.463		1.447	
Kurtosis	-.843		-.824	
Skewness	-.243		-.123	

Question 12

12. Partners. A business started by one person has a greater chance of failure than a business started by partners.

1 2 3 4 5 6 7

Value or Descriptive Statistic	Failure Business		Successful Business	
1 Strongly Agree	3	2.8%	2	1.9%
2 Agree	5	4.6%	9	8.3%
3 Slightly Agree	9	8.3%	7	6.5%
4 Neutral	25	23.1%	23	21.3%
5 Slightly Disagree	13	12.0%	20	18.5%
6 Disagree	35	32.4%	28	25.9%
7 Strongly Disagree	18	16.7%	19	17.6%
Total	108	100.0%	108	100.0%
Mean	5.009		4.944	
Mode	6.000		6.000	
Median	5.000		5.000	
Standard Deviation	1.562		1.582	
Kurtosis	-.304		-.475	
Skewness	-.631		-.542	

Question 13

13. Parents. Startup owners whose parents did not own a business have a greater chance of failure than people whose parents did own a business.

1 2 3 4 5 6 7

Value or Descriptive Statistic	Failure Business		Successful Business	
1 Strongly Agree	3	2.8%	0	0.0%
2 Agree	4	3.7%	18	16.7%
3 Slightly Agree	21	19.4%	19	17.6%
4 Neutral	20	18.5%	30	27.8%
5 Slightly Disagree	10	9.3%	5	4.6%
6 Disagree	31	28.7%	26	24.1%
7 Strongly Disagree	18	16.7%	10	9.3%
Total	107	99.1%	108	100.0%
Mean	4.822		4.296	
Mode	6.000		4.000	
Median	5.000		4.000	
Standard Deviation	1.647		1.619	
Kurtosis	-.918		-1.203	
Skewness	-.342		.152	

Question 14

14. Minority. Minority business owners have a greater chance of failure than nonminorities.

1 2 3 4 5 6 7

Value or Descriptive Statistic	Failure Business		Successful Business	
1 Strongly Agree	3	2.8%	2	1.9%
2 Agree	1	.9%	14	13.0%
3 Slightly Agree	6	5.6%	11	10.2%
4 Neutral	33	30.6%	36	33.3%
5 Slightly Disagree	22	20.4%	11	10.2%
6 Disagree	30	27.8%	24	22.2%
7 Strongly Disagree	13	12.0%	10	9.3%
Total	108	100.0%	108	100.0%
Mean	4.963		4.407	
Mode	4.000		4.000	
Median	5.000		4.000	
Standard Deviation	1.353		1.571	
Kurtosis	.434		-.828	
Skewness	-.555		-.084	

Question 15

15. Marketing. Startup owners without marketing skills (sales, advertising, pricing, etc.) have a greater chance of failure than owners with marketing skills.

1 2 3 4 5 6 7

Value or Descriptive Statistic	Failure Business		Successful Business	
1 Strongly Agree	10	9.3%	9	8.3%
2 Agree	36	33.3%	40	37.0%
3 Slightly Agree	33	30.6%	26	24.1%
4 Neutral	13	12.0%	14	13.0%
5 Slightly Disagree	9	8.3%	12	11.1%
6 Disagree	7	6.5%	6	5.6%
7 Strongly Disagree	1	.9%	1	.9%
Total	108	100.0%	108	100.0%
Mean	2.963		3.019	
Mode	2.000		2.000	
Median	3.000		3.000	
Standard Deviation	1.325		1.394	
Kurtosis	-.055		-.166	
Skewness	.732		.747	

Question 16

16. Other. Are there other major contributing factors to business success vs. failure not listed above? If yes, please write them here.

Additional failure CEO write-in responses included:

Attitude and hard work- 12%

Location- 3%

Family problems and owner operated- 2%

Expansion, costs, government, contracts, and people skills- each 1%

5 percent repeated variables in the model

72 percent left the question blank

Additional successful CEO write-in responses included:

Attitude and hard work- 13%

Government- 3%

Location- 2%

Delegation, communications, use of information, family problems, and values- each 1%

5 percent repeated variables in the model

73 percent left the question blank and 5% repeated variables in the model.

Question 17

17. (Failure only) What would you say was the major factor in your filing for Chapter 11?

Only one failed response selected a variable from the list, industry experience, and rated it as slightly disagree (5 on a scale of 7)
36 percent of failed respondents selected a variable from the list and strongly agreed or agreed
25 percent selected the economic recession as the cause
3 percent left the question blank
8 percent stated bank problems
6 percent selected tax problems
5 percent stated loss of large customers
5 percent stated accounts receivables problems
4 percent stated legal problems
2 percent each stated- expansion, theft, partner problems, and high overhead
1 percent each stated- strike, fire, family problems, and president Bush.

Percentages exceed 100 due to a few multiple responses and rounding.

17. (Success only) What would you say is the major reason for your firms success?

None of the respondents gave an unreliable response

25 percent gave reliable responses

43 percent left the question blank

14 percent stated hard work

12 percent stated their superior product/service

4 percent stated that they were owner operated

2 percent stated values

1 percent each stated- adaptability, repeat business, and common sense.

Question 18

18. This business was started with what amount of operating capital?

More than needed About right Less than needed

1 2 3 4 5 6 7

Value or Descriptive Statistic	Failure Business		Successful Business	
1 More than needed	5	4.6%	5	4.6%
2	7	6.5%	6	5.6%
3	4	3.7%	9	8.3%
4 About right	35	32.4%	33	30.6%
5	13	12.0%	15	13.9%
6	28	25.9%	29	26.9%
7 Less than needed	15	13.9%	9	8.3%
Total	107	99.1%	106	98.1%
Mean	4.757		4.604	
Mode	4.000		4.000	
Median	5.000		4.500	
Standard Deviation	1.613		1.547	
Kurtosis	-.287		-.289.	
Skewness	-.517		-.473	

Question 19

19. This business started with what degree of record keeping and financial control?

Inadequate - Very poor

Adequate - Very good

1 2 3 4 5 6 7

Value or Descriptive Statistic	Failure Business		Successful Business	
1 Inadequate - very poor	5	4.6%	2	1.9%
2	9	8.3%	9	8.3%
3	14	13.0%	9	8.3%
4	18	16.7%	28	25.9%
5	18	16.7%	17	15.7%
6	28	25.9%	29	26.9%
7 Adequate - vert good	16	14.8%	14	13.0%
Total	108	100.0%	108	100.0%
Mean	4.694		4.778	
Mode	6.000		6.000	
Median	5.000		5.000	
Standard Deviation	1.721		1.549	
Kurtosis	-.766		-.596	
Skewness	-.455		-.404	

Question 20

20. Years of experience the CEO had in this industry prior to running this firm.

_____ years

Value or Descriptive Statistic	Failure Business	Successful Business
0	19 17.6%	20 18.5%
1 - 5	21 19.4%	32 29.7%
6 - 9	10 9.3%	9 8.4%
10	17 15.7%	20 18.5%
11 - 15	17 15.7%	11 10.2%
16 - 20	13 12.0%	9 8.3%
21 - 25	11 9.3%	3 2.8%
26 >	5 4.6%	4 3.7%
Total	107 99.1%	108 100.2%
Mean	10.000	8.389
Mode	0.000	0.000
Median	10.000	6.000
Standard Deviation	8.339	7.987
Kurtosis	-.308	2.071
Skewness	.652	1.358

Question 21

21. Years of management experience the CEO had prior to running this business.

_____ years

Value or Descriptive Statistic	Failure Business	Successful Business
0	19 17.6%	33 30.6%
1 - 5	22 20.4%	23 21.3%
6 - 9	15 13.9%	11 10.2%
10	17 15.7%	9 8.3%
11 - 15	14 13.0%	11 10.2%
16 - 20	12 11.1%	16 14.8%
21 - 25	8 4.6%	2 1.8%
26 - 30	3 2.8%	3 2.8%
Total	107 99.1%	108 99.9%
Mean	9.299	7.630
Mode	0.000	0.000
Median	8.000	5.000
Standard Deviation	7.744	8.211
Kurtosis	-.026	-.295
Skewness	.767	.863

Question 22

22. What type of startup plan was developed by the firm?

Very Specific	Specific	General	No plans
1	2	3	4
5	6	7	

Value or Descriptive Statistic	Failure Business		Successful Business	
1 Very specific	11	10.2%	9	8.3%
2	9	8.3%	12	11.1%
3 Specific	23	21.3%	25	23.1%
4	10	9.3%	18	16.7%
5 General	32	29.6%	32	29.6%
6	17	15.7%	9	8.3%
7 No plans	6	5.6%	3	2.8%
Total	108	100.0%	108	100.0%
Mean	4.093		3.843	
Mode	5.000		5.000	
Median	5.000		4.000	
Standard Deviation	1.705		1.517	
Kurtosis	-.879		-.682	
Skewness	-.285		-.170	

Question 23

23. As a startup firm, what amount of professional advise did your business use?

Great use of advisors

Advisors not used

1

2

3

4

5

6

7

Value or Descriptive Statistic	Failure Business		Successful Business	
1 Great use of advisors	10	9.3%	1	.9%
2	15	13.9%	10	9.3%
3	19	17.6%	24	22.2%
4	20	18.5%	12	11.1%
5	18	16.7%	20	18.5%
6	21	19.4%	25	23.1%
7 Advisors not used	5	4.6%	15	13.9%
Total	108	100.0%	107	99.1%
Mean	3.963		3.019	
Mode	6.000		2.000	
Median	4.000		3.000	
Standard Deviation	1.718		1.394	
Kurtosis	-1.024		-.166	
Skewness	-.099		.747	

Question 24

24. CEO education level completed prior to managing this firm. Part-time college attendance requires 10 courses/30 credits to count as one year completed.

grade school 1 2 3 4 5 6 7 8
 high school 9 10 11 12
 college (one year) 13 14 15 16 (four year)
 graduate school 17 18 19 20 21 22

Value or Descriptive Statistic	Failure Business		Successful Busin	
8 grade school	2	1.9%	2	1.9%
9 - 11 years	3	2.8%	4	3.7%
12 high school	20	18.5%	26	24.1%
13 - 15 years	26	24.1%	25	23.1%
16 college	24	22.2%	31	28.7%
17 - 18 years graduate school	21	19.5%	14	13.0%
19 - 22 years advanced graduate school	11	10.2%	5	4.7%
Total	107	99.2%	107	99.2%
Mean	15.318		14.533	
Mode	16.000		16.000	
Median	16.000		15.000	
Standard Deviation	2.980		2.593	
Kurtosis	-.075		-.070	
Skewness	.025		.040	

Question 25

25. What level of difficulties did this firm have recruiting and retaining quality employees as a startup business?

Much difficulty Some Little difficulty
 1 2 3 4 5 6 7

Value or Descriptive Statistic	Failure Business		Successful Business	
1 Much difficulty	7	6.5%	5	4.6%
2	2	1.9%	17	15.7%
3	5	4.6%	9	8.3%
4 Some	22	20.4%	28	25.9%
5	15	13.9%	15	13.9%
6	42	38.9%	20	18.5%
7 Little difficulty	14	13.0%	11	10.2%
Total	107	99.2%	105	97.2%
Mean	5.037		4.286	
Mode	6.000		4.000	
Median	6.000		4.000	
Standard Deviation	1.596		1.719	
Kurtosis	.588		-.937	
Skewness	-1.042		-.143	

Question 26

26. In what stage were your products/services when the firm was started?

Introduction Growth Mature Decline
 1 2 3 4 5 6 7

Value or Descriptive Statistic	Failure Business		Successful Business	
1 Introduction	8	7.4%	5	4.6%
2	6	5.6%	11	10.2%
3 Growth	26	24.1%	18	16.7%
4	28	25.9%	30	27.8%
5 Mature	27	25.0%	34	31.5%
6	7	6.5%	5	4.6%
7 Decline	5	4.6%	2	1.9%
Total	107	99.1%	105	97.2%
Mean	3.944		3.952	
Mode	4.000		5.000	
Median	4.000		4.000	
Standard Deviation	1.446		1.311	
Kurtosis	-.114		-.138	
Skewness	-.110		-.380	

Question 27

27. In what stage was the economy when the firm was started?

Recession

Expansion

1

2

3

4

5

6

7

Value or Descriptive Statistic	Failure Business		Successful Business	
1 Recession	13	12.0%	9	8.3%
2	12	11.1%	12	11.1%
3	11	10.2%	17	15.7%
4	27	25.0%	20	18.5%
5	16	14.8%	19	17.6%
6	17	15.7%	22	20.4%
7 Expansion	12	11.1%	9	8.3%
Total	108	100.0%	108	100.0%
Mean	4.111		4.204	
Mode	4.000		6.000	
Median	4.000		4.000	
Standard Deviation	1.851		1.755	
Kurtosis	-.952		-.945	
Skewness	-.157		-.212	

Question 28

28. Age of the CEO when first managing the firm. _____ years.

Value or Descriptive Statistic	Failure Business	Successful Business
17 - 25	11 10.2%	12 11.1%
26 - 30	13 12.0%	14 13.1%
31 - 35	28 25.9%	24 22.3%
36 - 40	23 21.4%	28 26.0%
41 - 45	16 14.8%	14 12.9%
46 - 50	7 6.5%	9 8.5%
51 - 58	9 8.4%	4 3.7%
Total	107 99.1%	105 97.6%
Mean	37.168	35.886
Mode	40.000	38.000
Median	36.000	36.000
Standard Deviation	8.809	8.841
Kurtosis	-.083	1.322
Skewness	.364	-.332

Question 29

29. The firm was started by? 1 one owner 2 more than one owner/partners

Value or Descriptive Statistic	Failure Business		Successful Busin	
1 One owner	62	57.4%	70	68.4%
2 More than one owner	46	42.6%	37	34.3%
Total	108	100.0%	107	99.1%

Question 30

30. Did the CEO's parents own their own business? 1 yes 2 no

Value or Descriptive Statistic	Failure Business		Successful Busin	
1 Parents owned a business	33	30.6%	45	41.7%
2 Parents DID NOT own business	75	69.4%	60	55.6%
Total	108	100.0%	105	97.2%

Question 31

31. The CEO is a: 1 minority 2 nonminority

Value or Descriptive Statistic	Failure Business		Successful Busin	
1 One owner	8	7.4%	6	5.6%
2 More than one owner	100	92.6%	101	93.5%
Total	108	100.0%	107	99.1%

Question 32

32. The CEO's level of marketing skills prior to starting this firm was?

Low/unskilled

High/skilled

1

2

3

4

5

6

7

Value or Descriptive Statistic	Failure Business		Successful Business	
1 Low/unskilled	6	5.6%	9	8.3%
2	16	14.8%	24	22.2%
3	8	7.4%	9	8.3%
4	20	18.5%	19	17.6%
5	20	18.5%	22	20.4%
6	26	24.1%	20	18.5%
7 High/skilled	12	11.1%	5	4.6%
Total	108	100.0%	108	100.0%
Mean	4.463		3.935	
Mode	6.000		2.000	
Median	5.000		4.000	
Standard Deviation	1.769		1.763	
Kurtosis	-.933		-1.198	
Skewness	-.381		-.108	

Question 33

33. Primary state of business operations.

1 Connecticut 2 Maine 3 Massachusetts

4 New Hampshire 5 Rhode Island 6 Vermont

Value or Descriptive Statistic	Failure Business		Successful Business	
1 Connecticut	22	20.4%	22	20.4%
2 Maine	5	4.6%	5	4.6%
3 Massachusetts	47	43.5%	47	43.5%
4 New Hampshire	21	19.4%	21	19.4%
5 Rhode Island	10	9.3%	10	9.3%
6 Vermont	3	5.6%	3	5.6%
Total	108	100.0%	108	100.0%

Question 34

34. Number of years this firm has been conducting business. ____ years.

Value or Descriptive Statistic	Failure Business	Successful Business
0	1 .9%	1 .9%
1	6 5.6%	7 6.5%
2	11 10.2%	8 7.4%
3	12 11.1%	11 10.2%
4	11 10.2%	7 6.5%
5	17 15.7%	15 13.9%
6	14 13.0%	11 10.2%
7	9 8.3%	16 14.8%
8	7 6.5%	12 11.1%
9	3 2.8%	5 4.6%
10	17 15.7%	15 13.9%
Total	108 100.0%	108 100.0%
Mean	5.491	5.815
Mode	5.000	7.000
Median	5.000	6.000
Standard Deviation	2.800	2.779
Kurtosis	-.946	-.965
Skewness	.187	-.135

Question 35

35. Greatest number of full-time workers ever employed. Two or more part-time employees can equal one full-time worker. _____ employees.

Value or Descriptive Statistic	Failure Business	Successful Business
0 - 5	29 26.8%	46 42.6%
6 - 15	27 24.9%	27 25.0%
16 - 25	21 19.5%	11 10.2%
26 - 50	20 18.5%	15 13.9%
51 - 99	7 6.5%	2 1.9%
100 - 300	4 3.8%	6 5.6%
Total	108 100.0%	107 99.1%
Mean	25.333	22.224
Mode	5.000	2.000
Median	15.000	8.000
Standard Deviation	37.789	42.332
Kurtosis	22.151	20.919
Skewness	4.215	4.180

Question 36

36. Identify the industry that best describes your firm's activities.

- 1 Agriculture, forestry, landscaping, fishing
- 2 Construction, building, painting, carpentry, heating, electrical,
- 3 Finance, insurance, real estate, etc.
- 4 Manufacturing, printer, publisher, etc.
- 5 Retail store, eating + drinking, service station, apparel, etc.
- 6 Wholesale durable and nondurable, manufacture's rep., etc.
- 7 Transportation, communication, trucking/warehousing, travel agent
- 8 Services- repair (appliances) business (advertising, computer),
professional (lawyer, accounting, engineering, doctor), personal
(beauty, barber, laundry/cleaning)

Value or Descriptive Statistic	Failure Business		Successful Business	
1 Agriculture	2	1.9%	2	1.9%
2 Construction	16	14.8%	16	14.8%
3 Fin., insurance, real estate	19	17.6%	19	17.6%
4 Manufacturing	11	10.2%	11	10.2%
5 Retail	24	22.2%	24	22.2%
6 Wholesale	3	2.8%	3	2.8%
7 Transportation, communications	6	5.6%	6	5.6%
8 Service	27	25.0%	27	25.0%
Total	108	100.0%	108	100.0%

Question 37

37. (failure only) What is the present status of this business?

1 Chapter 7 2 Chapter 11 3 Successfully out of Chapter

Value or Descriptive Statistic	Failure Business	
1 Chapter 7	15	13.9%
2 Chapter 11	84	77.8%
3 Out of Chapter	8	7.4%
Total	107	99.1%

37. (success only) Please identify your firms level of profit compared to your industry averages.

Below average Average Above Average
 1 2 3 4 5 6 7

Value or Descriptive Statistic	Successful Business	
1 Below average	4	3.7%
2	3	2.8%
3	18	16.7%
4 Average	48	44.4%
5	15	13.9%
6	14	13.0%
7 Above average	1	.9%
Total	103	95.4%
Mean	4.097	
Mode	4.000	
Median	4.000	
Standard Deviation	1.192	
Kurtosis	.596	
Skewness	-.226	

Question 38

38. What advice would you give to a high school and/or recent college graduate without any full-time business experience who is considering starting their own business. (If additional space is needed please use the back of the cover letter or separate sheet.)

(Open ended answers will be used later for articles.)

Question 39

39. What advice would you give to the owner of a new business?

(Open ended answers will be used later for articles.)

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