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A Model for Predicting Small Firm Performance: Increasing the Probability of Entrepreneurial Success

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Abstract. This study develops an Ordered Probit model to explain and predict small business relative performance in Chile. The sample includes 403 small businesses classified as: 158 failed, 101 mediocre, and 144 successful firms within all economic sectors. The model variables are: Internet, starting with adequate working capital, having good financial and accounting records, planning, owner formal education, professional advice, having partners, parents owning a business, and marketing efforts. Focusing on the critical variables can improve the probability of success of entrepreneurs, and public policy implications in Chile are discussed.

Keywords Entrepreneurship. New business. Relative Performance . Internet Adoption . Working Capital . Financial Information . Professional Advice. Planning . Education . Partners . Marketing. Ordered Probit.

Introduction

There is little doubt that new business ventures introduce a dynamic element into the economy and can make an important contribution to development (Fritsch, 2008). Entrepreneurship is the way to foster innovation and increase productivity, competitiveness and local and regional development (Reynolds et al., 1994; Westhead and Wright, 1998). Promoting entrepreneurship is perceived as a way to target unemployment and poverty (Robson et al, 2009). Thus, entrepreneurs have a relevant function in the economy; they engender employment creation, productivity growth, and produce and commercialize high-quality innovations (van Praag & Versloot, 2007). However, most firms fail in the first few years. Therefore, to increase the probability of creating a successful business is a main issue for those who dare to bear the risk of starting a new venture, and understanding why firms fail and succeed is crucial to the stability and health of the economy (Carter, Williams, & Reynolds, 1997; Pompe & Bilderbeek, 2005). Although there is incomplete information on firm entry and survival (Acs & Mueller, 2008), it can be found that each year in the USA there are more than half a million startups, but almost the same number close, although not all closings are failures (Bates, 2005). In Chile, less than 42% of small businesses survive five years and less than 50% survive 10 years (Cabrera, De la Cuadra, Galétovic, & y Sanhueza, 2002).

Supporting the need for entrepreneurial research in Chile is the fact that the GEM total entrepreneurial activity (TEA) is only 20.2% (GEM 2008) and that there is limited empirical entrepreneurial research. Although entrepreneurship research should be grounded in its national context, it can still be critiqued as almost exclusively focused on North American and European research sites, and research in other economic regions remains extremely limited (Welter & Lasch, 2008). In fact, Bruton, Ahlstrom, and Obloj (2008) stated that research in Latin America

has been unjustifiably ignored. West, Banford, and Marsden (2008) called for future enhancement of economic development of regions, including Latin America. Chile is currently making contributions to the development in Latin America and further research can guide entrepreneurial activities to continue this development.

Predicting entrepreneurial fate is an important area of research (Davidsson & Klofsten, 2003; Pompe & Bilderbeek, 2005; Westhead, Wright, & Ucabasaran, 2001) because performance prediction research benefits both the would be and current entrepreneurs; those who assist, train and advise them; those who provide capital for their ventures; their suppliers and creditors; researchers; and public policy makers (Dennis & Fernald, 2001). Thus, evidence providing insight for government and academic institutions may aid in their efforts to provide resources that may help reduce the incidence of bankruptcy or the fate of poor performance (Carter & Van Auken, 2006). With the need for empirical research in Chile, this study with public policy implications can strengthen the small business sector, which would result in more jobs, better income distribution, a greater social inclusion and eventually it could lead to increased economic development.

Although understanding the causes of business success and failure is a cornerstone of entrepreneurship research (Michael & Combs, 2008), discovering which critical factors or practices lead to business success and failure and measuring these effects is an unfulfilled purpose of small business research (Rogoff, Lee, & Sub, 2004). Thus, scholars seek further research to answer such questions as: Why does one person actually succeed in starting a business, while a second person gives up? Which variables explain success? Which business practices set successful firms apart from others? Which types of resources are most important to entrepreneurial development (West, et al., 2008)? Is there a global robust success vs. failure

prediction model (Lussier & Pfeifer, 2001)? Thus, public policy cannot easily determine which firms to target in order to increase the odds of entrepreneurship success (Minniti, 2008).

This study adds to the body of work on predicting business success and failure by addressing some critical research questions. It develops a prediction Ordered Probit model, which improves on the commonly used Binary Probit and Logit models, in that permits a better understanding of small enterprises performance, as suggested Hanlon and Saunders (2007). It provides quantifiable implication as to how entrepreneurs can minimize the probability of poor performance and increase the likelihood of business success. It presents public policy literature with implications for the Chile government and institutions to promote entrepreneurship. Finally, it contributes to the literature because, to date, no empirical success versus failure studies have been found that were conducted in Chile.

This article proceeds as follows. The next section provides a literature review of entrepreneurship research in Chile. The third section presents the model, followed by the methods and results. The sixth section includes public policy literature and implications in Chile, and the last section explores the limitations, further research, and conclusions.

The importance of a comparative small business study in Chile

Chile is a 16.5 million people economy, with a per capita GDP of approximately US\$14 million (PPP) (Inter-American Development Bank (2009)) and is the world largest copper producer. Its growth policy has been based on deregulation and free markets in all economic sectors since the mid-seventies. Through entrepreneurship and the development of its firms in an unregulated environment (Cárcamo-Huechante 2006), this economy grew quickly and became known as the Latin-American Tiger (de Mello and Mulder 2005).

Chile started economic and structural reforms one to two decades before other Latin-American countries (Ffrench-Davis 2002), and it achieved the highest per capita income in Latin America (Interamerican Development Bank 2009). However, its pace of growth has slowed down in the last 10 years. The growth rate achieved by each of the four administrations of the democratic governments (1990-2010) has followed a decreasing trend from 7,7% (1990-1994), 5.5% (1994-2000), 4.3% (2000-2006), to less than 3% (2006-2010) (Banco Central de Chile, 2009).

Growth through entrepreneurship and the development of private business was the building block in early growth (Cárcamo-Huechante 2006). However, the Chilean economy, which was once recognized as the most competitive of Latin America, today is only ranked 55th, out of 181 economies, in the “Doing Business Index” of The World Bank (2009) for the “Starting a Business” category. This downward trend goes against the democratic government search for growth-with-equity (Ffrench-Davis 2002). Therefore, there is a need to reshuffle resources and output from less to more efficient producers (Pavenik 2002).

Small and medium firms are the main employers in Chile, accounting for over 80% of labor. However, this sector faces important challenges for their survival and development (Congreso Nacional 2006, Marshall 2005). Small firms have a potential that would positively increase the country’s growth and employment. Although supporting and strengthening small business is the desire of all the Chilean political and economic sectors (Marshall 2005), important differences exist in the concrete proposals. Nevertheless, there is some common agreement among scholars that technology, innovation, entrepreneurship capacity, and education are important. It is also admitted that not only public policy is required, but there is also a need to

develop a culture where people are willing to start a business, that is, to wake up the entrepreneurship spirit.

To date, research in Chile has focused only on certain economic sectors, or to the use and incorporation of a particular tool as some specific technology. It is also possible to find some studies regarding small firm efficiency and in depth studies regarding their characteristics (Cabrera, et al., 2002; Silva, Majluf, & Paredes, 2006), but there is no reference with regard to the specific causes that lead these companies to succeed and fail.

The Model

There is no generally accepted list of variables distinguishing business success from failure. The literature list of performance variables in this study was based on Lussier (1995), who included the major variables identified in journal articles as contributing to performance. Lussier and Halabi (2008) updated the literature. See Table 1 for a comparison of 25 studies that support, do not support, or do not mention each of these 15 variables.

“Insert Table 1 Here”

Various success and failure (S/F) studies have been conducted (Carter & Van Auken, 2006; Cooper, Dunkelberg, Woo, & Dennis, 1990; Dennis & Fernald, 2001; Pompe & Bilderbeek, 2005; Reynolds, 1987; van Gelder, de Vries, Frese, & Goutbeek, 2007; Westhead et. al, 2001). The most extensive was the Lussier (1995) model because the study examined the efficacy of the 15 variables identified from the 20 prior studies, including Cooper et al. (1990) and Reynolds (1987). To be included in the Lussier (1995) S/F model, a variable had to have been included in a study that had at least three variables identified as contributing factors to success and failure. It has been used to predict business performance cross-nationally in Croatia (Lussier & Pfeifer,

2001, Lussier & Halabi, 2010), the USA and Chile (Lussier & Halabi, 2008). It is also a nonfinancial model, which is more appropriate than financial models for small business research, particularly due to the lack of reliable information. Other models use sales as a predictor, and are thus not appropriate to use with startup business (Scherr, 1989). Lussier also uses resource-based theory as entrepreneurs make judgments about which resources are more or less important, based on their expectations about the future of the venture (Lichtenstein and Brush 2001).

To adapt the Lussier (1995) model, some changes were applied. The correlated variables were eliminated to correct for the multicollinearity problems and the variable minority was excluded from the study since it is not relevant in Chile as there are so few minorities. Finally, since back in the early 1990s, the Internet was not commonly used by small business, this variable was added to update the model as a measure of the use of elementary technology. See Table 2 for an explanation, hypothesis and measures of the independent variables utilized in the Model.

“Insert Table 2 Here”

Methodology

Design and Sample

Entrepreneurship journals tend to favor replication studies (Gamboa & Brouthers, 2008). Brush, Manolova, and Edelman (2008) called for the replication of research in other countries. To this end, the primary methodology of this study was to adapt and update the Lussier (1995) survey research study in Chile. Survey research, particularly mail surveys, has been a staple in quantitative research on small business and entrepreneurship (Brush, et al., 2008; Dennis, 2003).

In fact, an examination of four journals (ET&P, ISBJ, JBV, JSBM) revealed that one-third of the articles were based on mail surveys (Newby, Watson, & Woodliff, 2003). The self-reporting questions were obtained from Lussier (1995) to collect data.

The commonly used firm level of analysis was employed with a random sample of 1,800 small businesses selected from the Chile National Chamber of Commerce database, and the survey instrument was emailed to the owner/CEO. There were 430 questionnaires answered and returned, resulting in a response rate of 24%. However, 27 had missing data, resulting in 403 usable questionnaires. All six major economic areas of Chile are included in the sample, making it a national sample, and thus, results may be generalized to the entire country. As a test of non-response bias (Dean, Shook, & Payne, 2007), early and late responders were compared and no significant differences were found.

Measures and the Model

There are various ways of measuring performance. Much of the literature uses a traditional view of success as being related to a positive financial performance. However, there is a recent trend which measures success according to business owners' own objectives rather than an imposed "one size fits all benchmark" (Chell & Baines, 1998, Castillo & Wakefield, 2006). Brush et al. (2008) also stated that the narrow focus on financial and economic measures should be reconsidered. The approach adopted to the dependent variable was a subjective one, as in Escribá-Esteve et al., 2008; Jennings et al, 2003 & Poon et al., 2006. Small firms are usually reluctant to disclose financial information, thus a subjective dimension is more feasible to obtain and a more uniform measure between the sample. Previous studies that have used both subjective

and objective measurements have found a high correlation between the objective and the subjective magnitudes (Escribá-Esteve et al, 2008).

Assuming that owners manage detailed and accurate information, perception becomes reality with business performance. In addition, when working with privately owned small business, it is very difficult to access their financial statements, since entrepreneurs are not willing to disclose private information. Indeed, with survey research, a high percentage of respondents do not answer the questions regarding their financial performance (Lussier, 1995; Lussier & Halabi, 2008). Thus, reaching profitability on a Likert scale is commonly used in entrepreneurship research (Wang, 2008; Wiklund & Shepherd, 2008). To this end, the selected dependent variable appraises perceived relative business performance, based on profitability as compared to industry average, on a Likert scale from 1-3.

To dichotomize the scale for the probit model, the questionnaire asked owner/CEOs to identify their firm's level of profits compared to industry average. 1 rankings (worse than average) were classified as failures, 2 rankings (same as average) were categorized as mediocre, being neither failed or success, and 3 rankings (better than average) were classified as successful.

As shown in Table 2, eight independent variables are included to explain and predict relative business performance. It also lists the measurement level of each variable and the expected relation with performance. Five of the variables are measured on a 7 point Likert scale and all are ranked 1 low and 7 high: adequate (sufficient) working capital (WC), clear and complete financial and accounting information (INF), specific business planning (PLAN), higher levels of owner education (EDU), and degree of marketing efforts (MRKT). Three of the variables were nominal level measures labeled 1 or 0: 1 = use of Internet (INT) 0 = do not use

Internet, 1 = partners (PART) 0 = no partners, and 1 = parents owned a business (PARN) 0 = did not own a business.

Regression is the commonly used statistical analysis of entrepreneur research (Brush, et al., 2008). Most studies use a Bivariate Logistic regression to test the model, as in Lussier (1995, 2001), Cooper et al. (1990), Carter and Van Auken (2006) and Reynolds and Miller (1987; 1989). This study utilizes an Ordered Probit regression analysis. Whereas bivariate logit/probit arbitrarily categorize a firm's result in one of the two groups, thus deviating mediocre performances either to failure or to success, an Ordered model permits one to further classify the dependent variable. In this sense, a Multinomial model would be fine in the same way. However, Multinomial Logit/Probit models have the disadvantage of what is well known as the *independence of irrelevant alternatives* property (Greene, 2000), overestimating the probabilities. Moreover, a Multinomial model ignores that the dependent variable categories have a preferred order, therefore losing efficiency of the estimators. Indeed, if one disregards that the dependent variable categories have an order, the mistake of not utilizing part of the available information is unavoidable and the parameters estimation, still unbiased, will have higher standard errors.

Consequently, an Ordered Probit technique is appropriate for analyzing this data. The main idea is that under this ordered response there exists a latent random variable continuously distributed, which is represented by these interval values. The distribution parameters of the subjacent latent variable are estimated by Maximum Likelihood methods.

The model to estimate is (based on Table 1 variable labels) is

$$\begin{aligned} \text{Firm Relative Performance} = & \beta_1 * INT + \beta_2 * WC + \beta_3 * INF + \beta_4 * PLAN + \beta_5 * EDU + \beta_6 * PART \\ & + \beta_7 * PARN + \beta_8 * MRKT \end{aligned} \quad (1)$$

The Maximum Likelihood estimation method accounts for the heteroskedasticity of variance (y/x) since it is based in the distribution conditional to x . With the slope parameters β_i and the threshold parameters κ_i it is possible to estimate the likelihood of a 1, 2 or 3 relative performance.

Regarding the cut point or threshold parameters interpretation, Daykin (2002) suggested that if the dependent variable measure shows that most firms are in either one extreme or the other (for example, very poor relative performance or very good relative performance), one would expect that the threshold would be tightly bunched in the middle of the distribution, very close to one another. If, on the other side, firms appear to be more balanced, it would be expected that the cut point be widely dispersed.

In addition, it could happen that the cut points adjust to the questionnaire wording, in order to obtain the dependent variable, and might be doubtful and hard to understand. If this is the case, one would expect that the middle threshold to be far apart, reflecting an indifference on the part of the respondents who may not understand the question. This is important, as the questionnaire wording can be improved between studies, and a contraction toward the middle might be a sign of improvement.

In addition to Probit regression analysis, descriptive statistics and test of mean and proportion differences between relative successful, mediocre and failed firms were also run.

Results

Control Variables

Control variables that affect relative performance include firm size (number of employees), firm age, and industry (Escribá-Esteve et al., 2008; Lussier & Pfeifer, 2001; Reynolds, 1987; Shane, 1996). Small firms are more likely than large firms to fail (Reynolds,

1987). In the sample, the average size, as measured by the number of employees, of the failed firms was 17 employees (s.d. 31), of the mediocre firms was 17 (s.d. 25) and 30 (s.d. 51) for successful firms. The sample was based on small businesses and the means of successful, mediocre, and failed firms is not significantly different at the .05 level. Therefore, firm size should not bias the results.

The age of a business also affects relative performance because new firms have a higher probability of experiencing a poor relative performance than established businesses and new businesses often lose money. However, the mean age, with similar medians, of failed businesses were 14.24 (s.d. 11.3) years, 15.2 (s.d. 13.7) years for mediocre firms and 15.16 (s.d. 13) for successful companies. Therefore, all groups are mature and the mean difference is not significant at the .05 level. Thus, age should not bias the results.

Industry can also affect success, as service and retail firms tend to have higher failure rates (Lussier, 1996a, 1996b). However, all industry sectors were included in the sample; Chi-square testing found no significant differences between the successful, mediocre, and failed businesses by industry. Thus, there are relatively equal numbers of firms that performed well, mediocre or poorly by industry, and industry should not bias the results.

Descriptive Statistics and Test of Differences

In addition to testing the model, the 8 variables in the model were tested for statistical differences. Table 3 provides the descriptive statistics for each variable. To test for differences, success, mediocre, and failed relative performance were used as the independent variable and each of the 8 variables in the model were used as the dependent variables. Chi-square was run for the three variables with dummy values. The one-way ANOVA was run to compare mean

differences between the successful, mediocre, and failed firms for the other five interval level variables. The results of the test of differences between the successful, mediocre, and failed businesses supports the model. In all but three of the variables (education, partners, and parents) the mean or proportion percentage differences were significant, as seen in Table 3. The successful firms had a higher proportion using the Internet, they started with more working capital, they kept updated and accurate financial and accounting information, they developed more detailed plans, and they pursued marketing efforts.

“Insert Table 3 Here”

Although not statistically different, the successful business owners have a higher level of education. The lack of significant difference may be due to the fact that there is no straight correlation between entrepreneurship and education. This finding is consistent with Escribá-Esteve et al. (2008) who, in contrast with most literature, did not find a moderator effect of the educational level of the owner or manager on the performance relationship.

Examining the descriptive statistics, the sampled entrepreneurs had an average of 2.9 years of college when starting a business. Most respondents have undertaken entrepreneur and management activities before starting their new venture. Those who worked at the employee level previously did so for an average of 8.5 years before starting their own business at the age of 34. Education variability among entrepreneurs is high. Some start a business with just an elementary school education, whereas others have completed graduate studies. Because there are exceptions with low levels of education, does not mean that education is not important. Further research is required on this point.

Ordered Probit Regression Model Test Results

Ordered Probit regression model test results are presented in Table 4. As shown, the model is significant and all the parameter estimates beta coefficients, except for education, are significant, being 5 of the 8 variables significant at the .01 level. The Ordered Probit regression result testing the model (LL test) was -805.15 and the Chi-square was 66.65, with the model significance level at $p = 0.000$.

“Insert Table 4 Here”

The classification results show that, for a typical firm, which adopts sample mean values for all the exogenous variables X vector, the expected probability of relative success is 34%, the odds of showing a mediocre relative performance are 28%, and those of pursuing an unsuccessful venture are 38%. The model is also useful at predicting the probability of success of any firm. For example, if one takes the sample median values for the X vector, instead of taking the mean values, the estimated probabilities are, respectively, 52%, 26% and 22%.

From the Ordered Probit Regression results one can obtain the marginal effects of the interval and dummy explanatory variables. Results are shown on Table 5.

“Insert Table 5 Here”

A view of these tables indicates, for example, that as planning increases by one point, probabilities of obtaining a failed performance are expected to drop 2.2%, the probability of showing a mediocre performance would drop 1.7%, and the probability of successful performance would increase 3.9%. Boosting the amount of working capital would diminish the probability of failing 3.6%, would decrease the odds of a mediocre performance 2.6%, and would increase the likelihood of a successful venture by 6.2%. The same analysis has to be done for the rest of the interval variables. A complete set of calculations of these values is available upon request. Marginal effects on dummy variables are shown as well. A firm that uses the

Internet will increase the probability of succeeding by 4.7% and will decrease the risk of failing by 5.4%.

The model coefficient signs reveals that engaging in business planning activity, accessing adequate amounts of working capital, increasing marketing efforts and keeping clear and complete financial records and control can increase the probability of higher levels of relative performance. In particular, results confirm the association between planning activity and relative performance that is evident in most of the literature, as in Gibson & Cassar (2005) and Woods & Joyce (2003), as well as the need for adequate working capital and good financial records and control (Carter & Van Auken, 2006).

Even though there is a generalized use of Internet in corporate environments, the extent of Internet use still varies among small firms. Thus, a more current finding is the support for the need to use the Internet to succeed in all size business ventures. This is consistent with Carter and Van Auken (2006) finding that bankrupt firms are less likely to use the Internet in their business operations and with Forth and Mason (2006) findings that skill shortages in information and communication technology have an indirect negative impact on relative performance. There is a enormous potential benefit for the use of Internet in the small business sector. Indeed, their small size enables them to be more adaptable and responsive to changing conditions than larger organizations and to further benefit from the speed and flexibility that the electronic environment offers (Simmons et al., 2008).

Two unexpected findings were “partners” and “parents who owned a business” having a significant negative effect (rather than positive) on the business venture. These two variables were not significant in the Lussier (1995) and Lussier and Pfeifer (2000) U.S.A. and Croatia studies. The differences might be due to the development level of the country, but more research

is needed to answer this question. On the one side, having partners can be helpful to a new business, and 41% of successful firms did have partners. But having partners in Chile could be a source of potential conflicts.

A third of the sample's parents owned a business and could have been good or poor role models. Some of the parents may have been poor examples, such as not engaging in planning, or the heirs may have taken over the failing business from their parents, with little chance of making the business a success. Plus, entrepreneurs have no control over their parents owning a business. So in any case, these variables are less important than the others.

Conclusions and Some Public Policy Implications

This study aimed to add to the existing entrepreneurship literature in understanding which variables to target in order to increase the odds of new ventures success. Some important contributions to the new business research are brought about: critical variables for business success can be summarized in two groups: first, it is a necessary condition to count on the adequate amount of working capital and, second, possess entrepreneurial skills and/or management tools. These findings have relevant implications for managers or owner-managers, as well as for policy makers. A discussion of the main findings and their policy implications follows.

Public Policy and Macro Environment

Public policy is recognized as a key tool that governments use to foster entrepreneurship and economic prosperity (Desrochers & Sautet, 2008; Gohmann, Hobbs, & McCrickard, 2008; Parker, 2008; Sousa, C. & Bradley, F, 2009). In a summary of the literature, Minniti (2008)

stated that it is clear that government policy shapes the institutional environment in which entrepreneurial decisions are made. However, despite much research, we still don't know for sure what policies are more conducive to productive entrepreneurship, but it is clear that government influence is not always necessarily desirable and that one size does not fit all (Sousa, C. & Bradley, F. 2009). According to Robson et al. (2009) these macroeconomic factors tend to have an impact on entrepreneurial intentions or activity.

Although policies needed vary across countries, two policies are critical for promoting growth in any country. First, policies should protect commercial freedom, property rights, and enforceable contracts. Second, given the vulnerability for monopolization, fostering opportunities for grassroots entrepreneurship is important through an active supply-side competition policy, emphasizing access to essential business services and other required local inputs (Minniti, 2008).

Small firms can contribute in demonopolizing industry structures (Doern, 2009). Chile policies do protect free enterprise and its antimonopoly institutions work effectively. But there are still considerable barriers to entrepreneurship and many of its policies have helped discriminatively large business, thus preventing the small business sector from achieving its potential. Therefore, public policy should be further developed to foster entrepreneurship and small business.

Barriers to Entrepreneurship

This study results show that working capital is a necessary condition for success. Indeed, it is important to develop and apply key resources to ensure business success (Packalen, 2007), and it is even more important for small firms because they have resource constraints that put them at a disadvantage when competing with large businesses (Kirchhoff, Newbert, Hasan, &

Armington, 2007) as they often have difficulty obtaining access to resources (Hanlon & Saunders, 2007).

Even though the Chilean legal and regulatory environment has improved substantially in recent years, the time and costs of starting a business in Chile are still high. Nine procedures must be followed to start a business, which take an average of 27 days, as compared to an average of 6 procedures and 15 days for the OECD countries (Djankov, S., La Porta, R., López-Silanes, F & Shleifer, A, 2002). This cost, as a percentage of the Gross National per Capita Income, constitutes 8.6% in Chile, as compared to a lower 5% in the OECD countries.

It is often the case that the need for working capital forces an entrepreneur to turn to partners which, according to this study's results, seems not to always be in the firm's best interest. Reducing the time and costs would provide incentives for the creation of new ventures and would release resources that could be used to boost working capital, thus increasing the probability of success.

Any agency providing funding for new ventures or for the expansion of the existing ones require a business plan. Banks, venture capitalists and business angels will need sight of business plans before considering investment (Richbell et al., 2006). There are some public resources available for new ventures in Chile, but the targeted public should be prepared to develop a proper business plan, which would also help to make the venture more successful. It is critical to simplify the information needed to be eligible for these benefits, and to reduce the paperwork required to obtain the funds.

Best Practices

This study demonstrates that there are some managerial practices shown to increase the odds of success, which should orient entrepreneurship public policy strategy. While most agree

on the benefits of entrepreneurship, the understanding of how and when governments intervene to assist entrepreneurs, as well as which, if any, entrepreneurs should receive assistance still has substantial knowledge gaps, and remains controversial (Robson et al., 2009).

Commonly used government policies include financing, taxation, regulations on trade, and encouragement of innovation activities. Among the most effective policies are providing risk capital, education and research, the development of entrepreneurial training programs, linkages between universities and entrepreneurs, incubators, chambers of commerce, networking, and most of all, science, technology, and research parks (Minniti, 2008; Parker, 2008).

Note that Internet use by small firms is still low in Chile. Only 51% use the web to expand business opportunities, which means that there is still room to improve the use of this technology. Therefore, it is of particular relevance that public policy of Chile help small business by offering incentives to develop and use the Internet and other technologies. Research supports that middle-income countries should focus on increasing human capital, upgrading technology availability, and promoting enterprise development (Acs & Szerb, 2007). It has shown as well that the effect of business regulations has an impact on the success of nascent and young business entrepreneurship (van Stel, Storey, & Thurik, 2007). Thus, when calling for bids regarding technology development funds, policy makers should inform the community, simplify the complex paperwork as well as increase these resources to promising entrepreneurs.

Most of the literature examined reveal that entrepreneurs need to engage in planning, as new ventures experience significant difficulties in finding a viable business model, and they often need to adapt their initial business plans (Andries & Debackere, 2007). Woods and Joyce (2003) found that those firms that were growing fast used more planning tools than those who were not, and the declining firms used the fewest. But there is also a need to provide training to

improve the chances of business success (Robson & Obeng, 2008) and that it is the lack of knowledge that is the obstacle in using the planning tools and not the value that the small firms managers place on the tool once it has been heard of (Woods and Joyce, 2003).

Easier access to working capital would aid new ventures. However, working capital without adequate planning and administration of good accounting information and financial control would be a waste of resources. Thus, the government could supply more professional advice to small business at low or no cost to entrepreneurs through courses and advisors who can provide an understanding of the capital needs to start a business, how to keep records, and financial controls. Management training should include how to develop a business plan, how to conduct ongoing strategic planning, and how to market the small business. Unlike large firms, small firms tend to be reactive rather than proactive with respect to the labor pool, and are not likely to signal which specific skills they require giving little priority in providing formal within-firm skills. Lack of appropriate skilled workers holds back investment, innovation and productivity. (Bryan, 2006).

Finally, it is important to emphasize that the degree of clear and complete financial and accounting information was a critical variable in small business performance. In order to give businesses incentives to manage better financial and accounting information, thereby increasing the probability of success, public policy makers should align the requirements of tax information to the management needs of the firm. In Chile, firms provide the least information needed to comply with the requirements of the Internal Tax Revenue Service. A financial improvement would be for businesses to adopt the international financial reporting standards (IFRS) as a gradual substitute of the current generally accepted accounting principles (GAAP).

Limitations and Further Research

The results provide some insight into the area of entrepreneurial theories of market competition (Peneder, 2008) that leads to success. The current study supports the Lussier (1995) success vs. failure prediction model because it uses the model variables and is also significant in Chile. However, the current model is more robust because it extends the Lussier logistic regression model (success or failure) to an ordered probit regression model (failed, mediocre, or successful), and the model has been updated to include the use of the Internet. The model can be used to assess a firm's potential for success, and society can benefit in direct and indirect ways via the reallocation of limited resources toward higher potential businesses. However, there are other variables that may influence business performance that are not in the model, thus further research is needed to increase the explanatory power of the model, which could also increase its predictive power.

Since mostly subjective data was utilized for many key variables due to lack of objective trustable information, the study may suffer some weaknesses associated with the use of perceptual data. In particular, in future studies the subjective measures of relative performance could be combined with some objective measures, such as accounting information.

With the trend toward increasing globalization, international global business performance prediction models become more valuable. However, the model needs to be tested in other countries to further validate the predictor variables on a global scale.

Prediction models are an aid, not a replacement for, existing business venture decision-making techniques. Also, the model does not provide numerical guidelines for variables distinguishing success from failure. For example, how much working capital is enough to improve the probability of success, and how detailed should plans be. Indeed, business planning

can take a variety of forms, from the informal to formalized and carefully prepared plans (Richbell et al. 2006). This study has utilized the variable planning, not specifying its form. It would be relevant to further assess the impact of formal written plans or business plans on relative performance.

Judgment is needed when applying the model. When the business is strong on some variables and weak on others, the judgmental assignment of a probability of success is more subjective. With mixed strengths and weaknesses among the variables, the other decision criteria previously used by entrepreneurs, managers, investors, lenders, and suppliers become increasingly important when they assign a probability of success or failure to a business. Thus, further research that uses the model variables with more objective measures can improve the variables' ability to predict performance.

In conclusion, the Probit Ordered model is significant and the model variables do in fact predict relative performance. Thus, an entrepreneur can use the model to better understand which resources are needed to increase the probability of success and those that advise entrepreneurs can help them use the model. Investors and creditors can use the model to better assess a firm's potential for success. Public policy makers can use the model to assist entrepreneurial ventures so that society can benefit in direct and indirect ways via the allocation of limited resources toward higher potential businesses. Entrepreneur and small business educators can show the model variables to influence future business leaders, public policy makers, and their practices. Researches can continue to further develop the model.

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Table 1

A Comparison of Variables Identified in the Literature as Factors Contributing to Business Success versus Failure

Senior Author	Independent Variables														
	capt	rkfc	inex	maex	plan	prad	educ	staf	psti	ecti	age	part	pent	mior	mrkt
Barsley	F	-	F	F	F	F	-	-	-	-	-	-	-	-	-
Bruno	F	F	-	F	F	-	-	F	F	F	-	-	-	-	F
Cooper 90	F	-	N	N	F	F	N	-	F	F	F	F	-	F	-
Cooper 91	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	-	-	-	-	-	-	-
Gaskill	N	F	F	F	F	F	N	-	-	N	-	-	-	-	F
Hoad	-	-	F	N	N	F	F	-	-	-	-	-	-	-	-
Kennedy	F	-	-	F	F	-	-	-	-	F	-	-	-	-	-
Lauzen	F	F	-	F	F	-	-	F	-	-	-	-	-	-	-
Lussier 95	N	N	N	N	F	F	F	F	N	N	N	N	F	N	N
Lussier 96a	N	F	N	F	F	F	N	F	N	F	N	F	F	N	F
Lussier 96b	N	F	N	N	F	F	N	N	F	F	N	N	N	N	N
Lussier & C 96	F	F	F	N	F	F	F	F	N	F	N	N	F	F	N
Lussier & Pf 01	N	N	N	N	F	F	F	F	N	N	N	N	N	N	N
McQueen	F	-	F	F	-	-	-	-	-	-	-	-	-	-	F
Reynolds 87	F	F	-	-	F	-	-	N	F	-	-	-	-	-	N
Reynolds 89	F	F	-	-	F	-	N	N	F	-	N	F	-	-	-
Sage	F	-	-	F	-	-	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	15	13	11	15	16	14	9	9	7	8	2	4	4	3	6
Total N	6	2	5	6	2	0	5	3	5	5	7	5	2	4	5
Total -	4	10	9	3	7	11	11	13	13	12	16	16	19	18	14

F supports variable as a contributing factor
N does not support variable as a contributing factor
- does not mention variable as a contributing factor

1. Capt: working capital
2. Rkfc: record keeping and financial control
3. Inex: industry experience
4. Maex: management experience
5. Plan: planning
6. Prad: professional advice
7. Educ: formal education
8. Staf: staffing
9. Psti: product service timing
10. Ecti: economic activity
11. Age: age
12. Part: partners
13. Pent: parents
14. Mior: minority
15. Mrkt: marketing efforts

Table 2

Explanation, Hypothesis and Measures of Independent Variables utilized in the Probit Model

Internet (INT). Dummy variable that proxies the use of elementary technology by the entrepreneur. Hypothesis: businesses that use the Internet will have a greater chance of success.

(Nominal level data 1 = used Internet and 0= does not use Internet).

Working Capital (WC). Variable that proxies the degree on which the business was started with sufficient working capital. Hypothesis: businesses that start with adequate working capital have a greater chance of success than firms that start undercapitalized.

(Likert scale 1 inadequate – 7 adequate capital).

Financial and Accounting information (INF). Degree of clear and complete financial and accounting information management. Hypothesis: businesses that keep updated and accurate records with adequate financial controls have a greater chance of success than firms that don't.

(Likert scale 1 poor – 7 good financial and accounting information).

Planning (PLAN). Variable that measures the specific degree of business planning. Hypothesis: firms that develop specific business plans have a greater chance of success than firms that don't.

(Likert scale 1 no planning – 7 very specific planning).

Education (EDU). Years of owner formal education. Hypothesis: people who start a business with a higher level of education have a greater chance of success.

(Likert scale 1 elementary – 6 graduate school).

Partners(PART). Dummy variable which asserts whether the business was started with partners. Hypothesis: a business started by partners has a greater chance of success than a firm started by one person.

(Nominal 1 = started with partners 0 = started without partners).

Parents (PARN). Dummy variable which asserts whether business owners parents own(ed) a business as well. Hypothesis: If they do (did) they have a greater chance of success than owners whose parents did not own a business.

(Nominal 1 = parents owned a business 0 = parents did not own a business).

Marketing (MARK). Variable which describes the owner's sales and marketing efforts. Hypothesis: business owners that make marketing and sales efforts have a greater chance of success than owners than don't.

(Likert scale 1 little marketing - 7 great use of marketing).

Table 3

Descriptive Statistics and Test of Differences

Model Variables	F Failed		M Mediocre		S Success	
	Performance Mean/ [Percentage %] (n = 158)	Failed s.d.	Performance Mean/ [Percentage %] (n = 101)	Mediocre s.d.	Performance Mean/ [Percentage %] (n = 144)	Success s.d.
(N = 403)						
1. Use of Internet	42.41% (F-S)*		48.51%		63.89% (S-F)*	
2. Working capital (1 - 7 adequate)	3.72 (F-S)*	1.48	3.94 (M-S)*	1.59	4.42 (S-F)*, (S-M)*	1.60
3. Financial and accounting info (1 - 7 good)	3.24 (F-M)*, (F-S)*	1.72	3.72 (M-F)*, (M-S)*	1.61	4.26 (S-F)*, (S-M)*	1.75
4. Planning (1 - 7 specific)	3.19 (F-S)*	1.87	3.41 (M-S)*	1.90	4.34 (S-F)*, (S-M)*	1.86
5. Education (1 elementary to 6 graduate)	3.89 (F-S)	1.18	4.02	1.19	4.29 (S-F)	1.19
6. Partners	44.94%		42.57%		40.97%	
7. Parents owned a business	37.97%		39.60%		33.33%	
8. Marketing (1 - 7 used)	3.38 (F-S)*	1.92	3.75 (M-S)*	1.84	4.51 (S-F)*, (S-M)*	1.87

* mean difference/proportion is significant at the .05 level.

Table 4

Ordered Probit Regression Model Test Results

Model Parameter Estimates ¹	β	SE³
Variables (N=403)		
1. Internet	0.364	(0.135)***
2. Working capital	0.094	(0.041)***
3. Financial and accounting info	0.087	(0.039)***
4. Planning	0.059	(0.037)*
5. Education	0.059	(0.056)
6. Partners	-0.317	(0.131)***
7. Parents	-0.238	(0.125)**
8. Marketing	0.086	(0.038)***
K1	1.140	(0.264)***
K2	1.857	(0.269)***
Model Test Results		
-2 Log Likelihood	805.15	
LR (zero slopes)	66.653	
Model p value	0.000	
Scaled R Square ²	0.158	
Classification Results		
P(y=1/X)	37.9%	Failure
P(y=2/X)	27.9%	Mediocre
P(y=3/X)	34.2%	Success
¹ Coefficient significance levels are denoted by * (.10) ** (.05) *** (.01).		
² *The scaled R-squared is a measure of goodness of fit relative to a model with only a constant term, computed as a nonlinear transformation of the LR test for zero slopes.		
³ QML (Huber/White) standard errors & covariance		

Table 5

Marginal Effects

Marginal Effects on Interval Variables

	Failed relative performance	Mediocre relative performance	Successful relative performance
Working Capital	-0.036	-0.026	0.062
Financial and Accounting Information	-0.033	-0.024	0.057
Planning	-0.022	-0.017	0.039
Education	-0.022	-0.016	0.038
Marketing	-0.033	-0.024	0.057

Marginal Effects on Dummy Variables

Internet

	Does not use Internet 0	Uses Internet 1	Change
P(y=1) Failed	0.471	0.416	-0.054
P(y=2) Mediocre	0.269	0.277	0.008
P(y=3) Successful	0.260	0.307	0.047

Partners

	Did not have partner(s) 0	Did have partner(s) 1	Change
P(y=1) Failed	0.410	0.485	0.075
P(y=2) Mediocre	0.278	0.267	-0.011
P(y=3) Successful	0.312	0.248	-0.064

Parents

	Parents did not own a business 0	Parents owned a business 1	Change
P(y=1) Failed	0.428	0.489	0.061
P(y=2) Mediocre	0.276	0.266	-0.010
P(y=3) Successful	0.296	0.245	-0.051