Model for Measuring small firm success

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Abstract

*Measuring small firm success has been a challenge for quite some time as the industry norms and country norms regarding the size of the firm in terms of capital and number of employees not being the same. This study attempts to predict a model, that would help the entrepreneur/owner manager to know with his own given capacities of capital, labour, experience and education what should be his level of sales to claim that the organization is successfully run. (**Key words:** Small firms, success, growth in capital investments, growth in sales, growth in number of employees)*

Measuring Success

Measuring small firm success has been a challenge in almost all economies. Success as a term can be related to performance which is positive in nature. Success is a complicated terminology that might mean profits, and /or sustenance, and growth in inputs as well as outputs of a firm. Measuring profits or growth is all relative and therefore difficult.

While there can be many reasons for the success of an enterprise like hard work and commitment, careful planning and execution on the part of the entrepreneur, say skills of the owner (Pearce et al., 1982), such success of the enterprise can be measured only on the basis of the economic prosperity of the firm.

Assessment of small firm success has been stimulating for quite long. The parameters used to measure the success of small firms are growth in capital, growth in sales, number of jobs created (Dyer et al., 2008, Brush, 1992) and profits. But there is no model that assures when such and such inputs are given the small firm would definitely succeed.

This study attempts to build a model which will predict the success of small firms with respect to expected sales turnover when the required inputs are available.

Small firm defined

When a business organization is big enough in size and public in terms of ownership, the economic performance gets measured and reported to public. Thus the well being or successes of large firms are easily measured. There are firms which are not big enough and/or not fit into corporate ownership pattern. They fall under small firm category. First of all, the

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industry norms and country norms regarding the size of the firm are different. The definitions of size as small, medium and large in general are in terms of capital and number of employees.

In India firms are defined as small on the basis of financial resources used in capital assets say investment in machineries (MSME, 2008) but number of employees should be 1-500 in the US to call a firm small. (Small Business Administration, 2008). Measuring success of such firms is the argument.

Objectives of The Study

The objective of the paper was:

To develop a model to predict the success of a small business.

Methodology

The study was designed as an exploratory research that attempted to study the small manufacturing firms and their performance in terms of capital, sales turnover, and number of employees and few more parameters.

For this purpose the list of small scale manufacturing firms that are engaged in production activities was collected through one of the business associations and further it was checked whether they had been in business for a minimum of the past five years. Out of the 600 firms that existed for a minimum period of past five years about 150 owner managers' of the firms were personally interviewed with the help of a pre-tested interview-schedule.

The study considered only the small manufacturing firms in and around Coimbatore. Continuous data on capital, sales, labour and staff were not available as the owner managers were not willing to share it in detail. They were not willing to share the profit figures. Therefore capital invested at start and at the time of study, sales at start and the time of study were only measured.

The data collected consisted of some demographics of the owners and the performance of their firms. The relevant data was analysed using regression analysis and was presented in the following section.

Results and Findings

Growth in capital invested

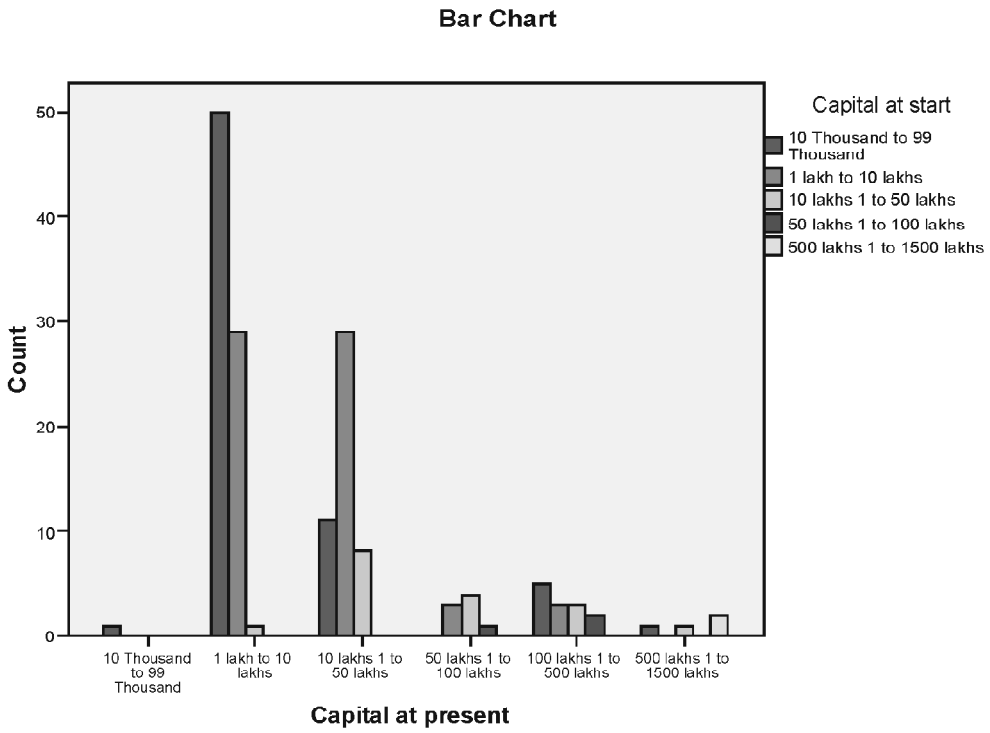
Capital invested includes the total of the fixed assets which will be equal to the total of the capital in the form of owners contribution and all retained earnings and loan if any for proprietary and partnership firms, share capital, retained earnings, reserve and surplus and deposits and loans if any joint stock companies.

The capital employed by the firms at start and at present would reveal the growth in the firm directly and growth in the economy indirectly.

The percentage growth in capital invested from start to present is one of important measures that can be used to study the growth of the firm.

The comparisons of capital employed at start of the enterprise **(chart 1)** and at the time of study by the small manufacturing firms of Coimbatore reveal that there is a very good growth in the amount of capital employed.

Chart 1 - Capital at Start Vs. Capital at Present



Financing Decisions

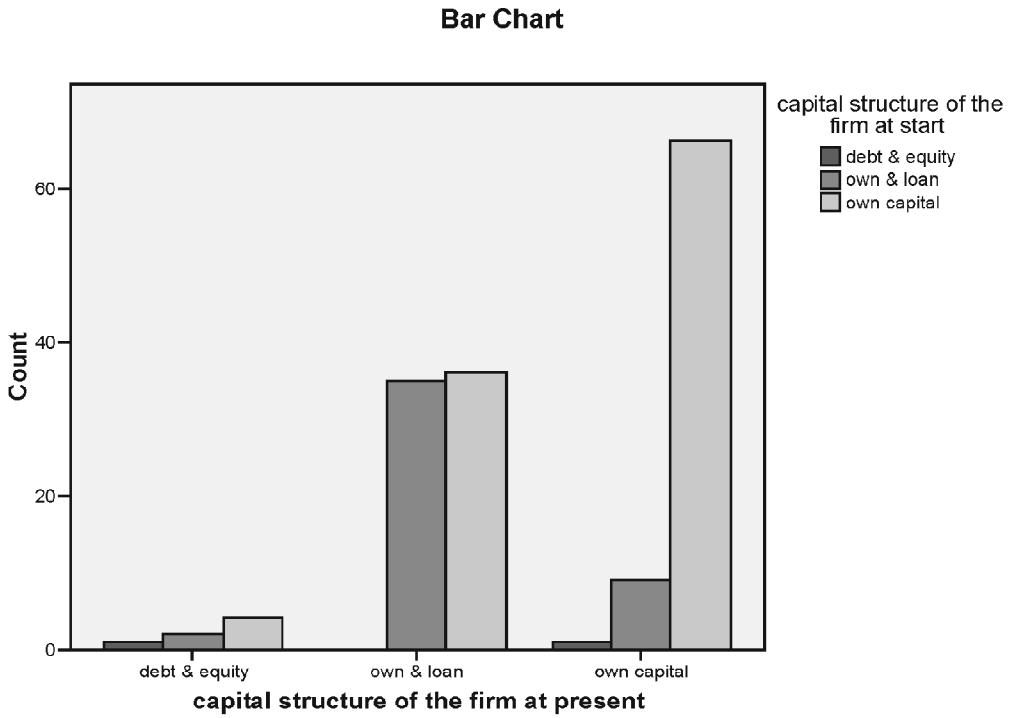
The financing decisions of small firms are more complicated than large firms. The financing decisions of the small manufacturing firms were on the basis of availability of sources of funds within the family, and the availability of borrowed capital.

The entrepreneurs generally assessed their capacity to borrow and repay and decided accordingly.

The chart 2 reveals the combinations of funds and capital structure of the firms.

The entrepreneurs were very clear about their capital structure. This aspect came out during the interview. Many of them had used only own funds in the initial years when they started their enterprises. Later on when they expanded they started using loan funds from Banks and financial institutions. In fact some of the entrepreneurs felt that Banks and Institutions started lending to them only because their firms were doing well and earning good profits.

Chart 2 - Capital Structure at start Vs. Capital Structure at present



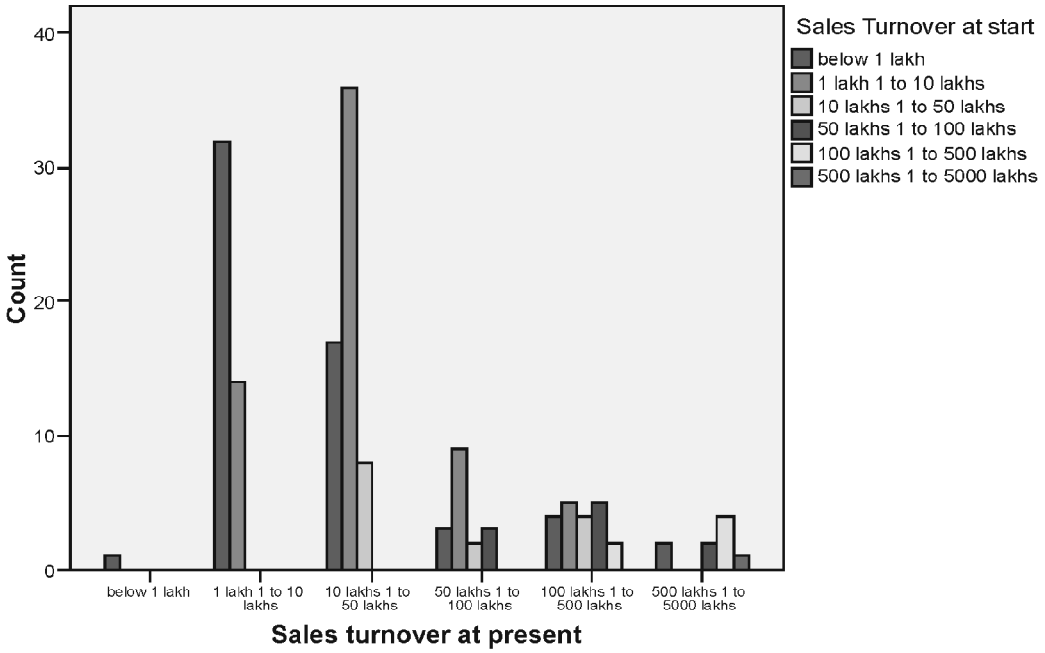
As expected there had been a change in the capital structure of the firms. This showed that the firms were growing and the change in the capital structure showed that there was a change in the attitude of the entrepreneurs in the sense that when opportunities knock they tried to use it to their convenience for the betterment of the firm. Few more firms had gone in for debt-equity (1.3% to 4.5%) combination while many firms had gone for loan along with own capital (29.9% to 46.1%) quite a large number still operated with own funds (49.4%).

Total sales at start & at present

Sales of an enterprise is another economic indicator, which could be used to compare two different periods to find whether there is a growth or not, and also to measure the efficiency of the entrepreneurs to run their firms effectively from the start itself.

Chart 3 - Sales Turnover at Start Vs. Sales Turnover at Present

Bar Chart



The chart 3 reveals the sales turnover of the firms at present over the years for almost all the firms had seen growth. It also reveals that there were firms which had a sales turnover of less than Rs. 1 lakh at the time of start had grown to a stage where their turnover is about Rs. 500 lakhs at the time of the study. The growth of sales turnover was remarkable for many a firm.

The Model

A regression analysis was carried out to predict a model to measure the success of a small firm.

Method

A correlation was carried out to find out the correlations for Dependent variable: Total sales turnover at present and Independent variables: Education in years, number of years of experience in job/assignment, life of the firm in number of years, experience of the entrepreneurs in their entrepreneurial career, number of labour at present, number of staff at present, and capital employed at present.

Table: 1

	TTOPT	V2	V3	V4	V5	V6	V7	V8
TTOPT	1.00							
V2	-.054	1.00						
V3	.192	-.040	1.00					
V4	.374**	-.107	.666**	1.00				
V5	.745**	.070	.105	.264**	1.00			
V6	.558**	-.131	.063	.459**	.563**	1.00		
V7	.352**	-.077	.096	.341**	.371**	.807**	1.00	
V8	.260**	-.255**	-.140	.031	.215**	.265**	.165*	1.00

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Discussion

The analysis revealed that there was a significant correlation between the dependent variable and few of the independent variables and also between some of the independent variables with each other at 95% significance level. There were also positive correlations between the dependent variable and few independent variables and also within independent variables. There were no negative correlations.

Model to measure success – Regression analysis for dependent variable Total Sales Turnover

Method

Dependent Variable : Total sales Turnover at Present Model 1analysis

The researcher built a regression model consisting of seven independent variables, to predict the total sales turnover at present. The data had been collected for total sales turnover at present, and seven different independent variables. A regression model was built. The variables on which the data were collected were as follows :

Dependent variable

Y = Total sales Turnover at Present in Rs. in lakh of the entrepreneur.

Independent variables

X_1 = Education (in yrs) of the entrepreneurs

X_2 = Number of years of experience in the job / assignment of the entrepreneurs.

X_3 = Number of years of experience in entrepreneurial career.

X_4 = Life of the firm in number of years

X_5 = Capital employed by the firm at present

X_6 = Number of labour at present

X_7 = Number of staff at present.

Input Data

The data set consisting of 154 observations were taken from the file "vtphd".

REG TABLE 2 model 1

ANOVA

Statistics (SPSS) Multiple Regression		Analysis of Variance; Dependent variable: Total sales turnover at start (vtphd)			
Effect	Sums of Squares	dF	Mean Squares	F	Sig. of F
Regression	27933224	7	3990460.523	33.648	.000
Residual	17314759	146	118594.243		
Total	45247983	153			

REG TABLE 3 model 1

Table Multiple Regression Results

All independent variables were entered in one block	
Dependent variable	Total Sales Turnover at present
Multiple R	.786
Multiple R – squareA	.617
djusted R- square	599
Number of Cases	.154
F(7, 146)	33.648 p < .000
Standard Error of Estimate	344.37515
Intercept	-259.223 Std Error: 89.058 t(146) = -2.911 < .004

Statistics Multiple Regression		Regression for Dependent variable Total Sales Turnover at present			
N = 154	B	Std. Error of B	Beta	t (146)	p – level
Intercept (constant)	-259.223	89.058		-2.911	.004
Education in years	28.327	14.706	.107	1.926	.056

No. of years of experience in job	3.698	3.739	.053	.989	.324
No. of years of experience in entrepreneurial career	4.985	4.381	.087	1.138	.257
Life of the firm in no. of years	4.826	4.812	.085	1.003	.318
Capital employed by the firm at present	1.748	.188	.595	9.320	.000
No. of labour at present	.768	.328	.265	2.346	.020
No. of staff at present	-1.692	1.141	-.133	-1.482	.140

Discussion

First, the correlations between all the variables, was carried out. The correlation table (output from the computer for the Pearson procedure) has been shown in Table: 1. The values in the correlation table were standardized and range from zero to one, positive and negative. The researcher observed that out of the set of independent variables (number of staff at present, number of years of experience in previous job/assignment, number of years of experience in the entrepreneurial career, life of the firm in number of years, capital employed by the firm at present, number of labour at present, education in years of the entrepreneurs), capital employed by the firm at present, number of labour at present, number of staff at present life of the firm in number of years, number of years of education of the entrepreneurs, number of years of experience in the entrepreneurial career were highly correlated (ranging from .745 to .195) with total sales turnover at present.

The correlation between capital employed at present, number of staff at present and number of labour at present, life of the firm in number of years, education in years of the entrepreneurs, number of years of experience in the entrepreneurial career, with total sales turnover at present and the absence of correlation of the other variable number of years of experience in previous job/ assignment, with total sales turnover at present was due to the nature of the variables. The experience of the entrepreneur in previous job or assignment did not have a correlation with total sales turnover at present, as the two variables originated at different places. The experience of the entrepreneur in his

entrepreneurial career did have a positive correlation with total sales turnover, as the two variables originated at the same points of time, i.e., at the time of study of the enterprise. The education of the entrepreneur and life of the firm in number of years were also positively correlated with the total sales turnover at present. This revealed that longer was the life of the enterprise higher was total sales turnover showing that the entrepreneurs run their industries in proper way.

The correlation table showed that the correlations were one-to-one correlations of each variable with the other variables. The correlation table also showed that the independent variables which were highly correlated with total sales turnover at present were also significantly correlated with each other. This indicated that they were not independent of each other and only one or two of them can be used to predict the dependent variable (total sales turnover at present).

Regression helped in eliminating some of the independent variables as all of them were not required. Some of them, being correlated with other variables, did not add any value to the regression model.

Regression Model

The regression model of the following form was used by entering all the seven 'X' variables in the model

$Y=a + b_1 x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7$

and the value of a, b_1, b_2, b_3, b_4, b_5, b_6, b_7.

In the output of regression model the value of 'B' gives all the co-efficient of the model which were as follows :

X_1 = 28.327

X_2 = 3.698

X_3 = 4.985

X_4 = 4.826

X_5 = 1.748

X_6 = .768

X_7 = -1.692

a (constant) = -259.223

These values were substituted in the above equation to get the value of Y(TSTPt).

TST.Pt = -259.223 + 28.327 * (education in years) + 3.698 * (no. of years of experience in the job/assignment) + 4.985 * (number of years of experience in e.career) + 4.826 * (life of the firm in number of years) + 1.748 * (capital employed at present) + .768 * (number of labour at present) – 1.692 * (number of staff at present).

Before using the above equation, the statistical significance of the model and R-square value were looked upon. These were available from table reg table 2, the analysis of variance table, and table reg table 3. From the last column of the table reg table 2, the analysis of variance table, the p- level, which was .000 was got. This indicated that the model was statistically significant. The p-level indicate the significance of the F value.

Interpretation

The R-square value was 0.726, from table reg table 3. From table reg table, 3, it was also noticed that t-tests for significance of the individual independent variables indicated that at a significance level of .000 (equal to a confidence level of 100% & 99.99%) only capital employed at present, and number of labour at present and education in years were significant in the model. The other four independent variables were individually not significant.

However, the researcher, decided to use the model as it was, and tried to apply if for decision making.

The real use of the regression model was to try and 'predict' total sales turnover at present in Rs. lakh, given all the independent variable values, or check the impact of a change in some of them on the total sales turnover figure of an individual entrepreneur.

The equation obtained meant, in effect, that total sales turnover of an entrepreneur would increase if the number of years of experience in the job/ assignment of the entrepreneur increases (2) or if the life of the firm in number of years increases (4) or if the capital employed at start increases (5) or if the number of labour at start increases (6) or if the number of years of education of the entrepreneur increases (1), or if the number of years of experience in the entrepreneurial career increases (3), (or) if the number of staff at start decreases.

The estimated increase in total sales turnover for every unit increase or decrease in the above variables was given by the coefficients of the respective variables.

For example, if the number of years of experience in the previous job/assignment was estimated to increase by 1, total sales to in Rs.lakh, were estimated to increase by 3.698, if all other variables remain unchanged. Similarly, if one more year increase in the life of the firm in number of years, the total sales turnover was expected to increase by 4.826 lakh, if the other variables were held constant.

There was only one coefficient, that of the number of staff at present, which did not make too much intuitive sense. If the number of staff at present was more, the total sales turnover at present was estimated to decrease according to the -1.692 coefficient of the variable number of staff. But, when looked at the individual variable t-tests, it was found that the co-efficient of the variable number of staff was statistically not significant (p-level 0.140 from table regression table 3). Therefore, it was not used in interpreting the regression, as it may lead to wrong conclusions. Strictly speaking, only three variables, capital employed by the firm at present, number of labour at present and education in years were significant statistically at 95% confidence level since their p-level was less than 0.050. The researcher therefore considered the relationship of total sales turnover at present with one of these variables, or all of these variables.

Predictions

Given the levels of X_1, X_2, X_3, X_4, X_5, X_6, and X_7 for a particular entrepreneur, the regression model can be used to predict total sales turnover. Before attempting that the researcher opted to redo the regression model so that the variables not statically significant were minimised or eliminated. For that either the forward stepwise regression method or the backward stepwise regression method could be followed, to try and eliminate the insignificant variables from the full regression model containing all seven independent variables.

Forward stepwise regression

Regression Table 4 - Model 2

ANOVA

Statistics (SPSS)Multiple Regression			Analysis of Variance; Dependent variable: Total sales turnover at start (vtphd)		
Effect	Sums of Squares	dF	Mean Squares	F	Sig. of F
Regression	27158898	3	9052966.036	75.070	.000
Residual	18089085	150	120593.900		
Total	45247983	153			

Regression Table 5 - Model 2 : Multiple Regression Results

Dependent variable	Total Sales Turnover at present
Multiple R	.775
Multiple R – squareA	.600
djusted R- square	592
Number of Cases	.154
F(3, 150)	75.070 p < .000
Standard Error of Estimate	347.26632
Intercept	-246.701 Std Error: 72.337 t(150) = -3.410 < .001

Statistics Multiple Regression			Regression for Dependent variable Total Sales Turnover at present		
N = 154	B	Std. Error of B	Beta	t (146)	p – level
Intercept (constant)	-246.701	72.337		-3.410	.001
Capital employed by the firm at present	1.971	.161	.670	12.231	.000
Life of the firm in no. of years	10.991	3.049	.193	3.604	.000
Education in years	29.112	13.944	.110	2.088	.039

When the forward stepwise regression was run in the spss package, the algorithm added one independent variable at a time, starting with the one which 'explained' most of the variation in total sales turnover at present (y), and added one more X variable to it, rechecked the model to see that both variables form a good model, then added a third variable if it still adds to the explanation of Y and so on. Table Reg Table 5 showed the result of a forward stepwise regression, which ended up with only three out of seven independent variables remained in the regression model. The three variables in the model were capital employed by the firm at present, number of labour at present and education in years.. It was noticed that the three significant variables (those with p-value <.050) at 95% confidence were capital employed at present, number of labour at present and education in years.

The new equation formed consisted of three variables instead of the one with seven independent variables earlier. This had economized on the four variables, which were not required, when it was decided to use the model from table reg table 5, instead of that from table reg table 3. The F-test for the model in table reg table 5, also indicated, that it was highly significant (F = 75.070, p<.000) and R-square value for the model was .600, which was close to the seven independent variable model of table reg table 3. When the model from table reg table 5 was used, the model was written as follows :

Total sales T.O at present = - 246.701 + 1.971 * (capital employed at present) + 10.991 * (life of the firm in number of years) + 29.112 (education in years).

Thus if an entrepreneur had employed a capital of 5 lakhs and was running the enterprise for 5 years and was a graduate then his total sales turnover at present should be

Y = -246.701 + 1.971 x (25) + 10.991 x (5) + 29.112 x (6)

= -246.701 + 49.275 + 54.955 + 174.672

= -246.701+ 278.902

= Rs. 32.201 lakhs

With the help of the above model the researcher tried to predict what should have been the total sales turnover at present for all the entrepreneurs covered by the study. The projected sales figures were compared and the deviations were worked out.

Future research

Those of the entrepreneurs who had a positive difference, i.e., actual sales being more than predicted sales can be picked out separately and a further analysis can be carried out to predict the successful entrepreneurs. Similarly the entrepreneurs who had negative difference, i.e., actual sales being less than the projected sales can be picked out separately for further analysis and the reasons for the same could be found out.

This model can be further enhanced after including parameters like net profit and net worth of the firms. Continuous data on the parameters used as well as suggested for future research can be collected for better fit of the model.

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