Full Length Research Paper

An investigation into the impact of investment appraisal techniques on the profitability of small manufacturing firms in the Nelson Mandela Bay Metropolitan Area, South Africa

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This study investigated the impact of investment appraisal techniques on the profitability of small manufacturing firms in the Nelson Mandela Bay area of the Eastern Cape Province, South Africa. Small firms are widely considered important to solving South Africa's unemployment problems and the rejuvenation of its economy. The study used survey data generated from one hundred and twenty four small manufacturing firms in the Despatch, Uitenhage and Port Elizabeth areas of the Nelson Mandela Bay to analyze their capital budgeting practices. The study ascertained, by statistically testing the hypotheses of the study, that small manufacturing firms' owners do not use sophisticated investment appraisal techniques when evaluating their proposed projects. A multiple regression analysis was employed to confirm the impact of investment appraisal techniques on the profitability of the small manufacturing firms. The study concluded that the use of non-sophisticated investment appraisal techniques has a negative impact on the profitability of small firms. Recommendations were made to improve the managerial and financial skills of the owners of small manufacturing firms.

Key words: Small firms, investment appraisal techniques, profitability.

INTRODUCTION

In today's economy, successful small manufacturing firms must be strategically poised to take advantage of constantly changing market opportunities. They must at the same time have a solid defense mechanism in place against competition. One of the most significant strategic decisions that a small manufacturing firm must make is how to allocate scarce investment resources amongst manufacturing processes and projects. Traditionally, capital budgeting methods have been used to evaluate and justify advanced manufacturing technology. In this context, capital budgeting is defined as the process of analyzing, evaluating and deciding whether resources should be allocated to a project or not. Capital budgeting

decisions are crucial to a firm's success for several reasons. Firstly, capital expenditure typically requires large outlays of funds. Secondly, firms must ascertain the best way to raise and repay these funds. Thirdly, most capital budgeting decisions require a long-term commitment and finally, the timing of capital budgeting decisions is crucial (Chan, 2004).

Erero (2003) postulates that small firms in South Africa, as in many other developed and developing nations, continue to make a substantial and ever-increasing contributions to economic activity and employment. The avenues through which these contributions manifest themselves include manufacturing, creativity, innovation and competitiveness, all of which are distinguishing attributes of small firms. The contribution of the small manufacturing sector in South Africa is estimated at eight percent (8%) of the GDP and a further fourteen percent (14%) of the employment sector. Almeida and Weisbach

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(2004) explained that small firms are being viewed as the engine of economic growth and are thought to play a crucial role in technological innovation and employment creation. Baumol (1999) further argues that relative to large firms, small firms are better placed to react to the challenges of increased competition and globalization of the markets. Small firms are more innovative, flexible and entrepreneurial which enable them to react speedily to opportunities and threats.

Department of Trade and Industry South Africa (DTI S.A) (2000) asserted that all over the world it has been recognized that small firms play an important role in the economic and social development of a country. There is worldwide consensus that high rates of economic growth contribute to economic and social development and poverty reduction. At the same time, there is a growing recognition that a reduction in poverty depends on the quality of growth, its composition, distribution and its sustainability of small firms in a country. Small firms account for approximately sixty percent (60%) of all employment in the economy and more than thirty five percent (35%) of South Africa's Gross Domestic Product (Ntsika, 2002). Small firms are often the vehicle by which the lowest income earners in the South African society gain access to economic opportunities at a time when the distribution of income and wealth in South Africa is amongst the most unequal in the world. In South Africa, as in many developing and semi-industrialized countries, the main problem experienced by owners or operators of small firms, is the difficulty in accessing business finance. In the current South African socio-political context, the "access to finance" issue becomes even more topical and sensitive to unemployment, with the result that income and wealth inequality levels continue to increase (Ntsika, 2002).

Frankly (2000) noted that the appraisal of new and existing capital investment projects is fundamental to the success of the small firm. The financial literature advocates the net present value as the principal model of investment appraisal. Seitz and Ellison (1999) postulates that in a perfect market, the value of the firm is maximized when the projects with the highest net present value are selected. It is deduced from this that the way to maximize a firm's value is to make good and unbiased estimates of the present value of projects.

Farragher et al. (1999) assert that the effective allocation of a firm's resources is a key to firm success. Most theorists such as Arnold (1998) hold that the effective allocation of resources can be best achieved through a sophisticated capital investment process. Such a process will enhance the probability of making good investment decisions by helping to ensure that a corporate strategy is followed, that all investment opportunities are considered and that ad hoc decision-making is minimized. More accurate and reliable capital budgeting is needed by smaller firms if they are to grow, remain competitive and optimize the value of the firm.

CAPITAL BUDGETING TECHNIQUES: AN OVERVIEW

Capital budgeting, which can be described as the formulation and financing of long-term plans for investment, is one of the most important responsibilities of the owners/managers of small manufacturing firms. The decisions made during the capital budgeting process determine the future growth and productivity of the firm. Capital budgeting is a process designed to achieve the greatest profitability and cost effectiveness in the private and public sectors of the economy. Capital budgeting and the estimation of the cost of capital (the rate of return that a firm must earn on its investments to ensure that the minimum requirements of the providers of capital are met) are the most important financial decisions facing owners/managers of the small firms.

The need for relevant information and analysis of capital budgeting alternatives has inspired the evolution of a series of methods to assist firms in making the "best" allocation of resources. Amongst the earliest methods available were the non-discounted cash flow methods and the discounted cash flow techniques. The non-discounted cash flow methods are form of capital budgeting techniques used in evaluating the uncertainty and risk of the value of a firm without considering the time value of money. These techniques are biased in selecting projects and also do not consider cash flows in investment decisions. The techniques constitute the traditional payback period (PB) and the accounting rate of return (ARR) techniques as thus discussed (Chartered Institute of Management Accountants [CIMA], 2002).

Traditional payback period (PB)

CIMA (2002) defines payback as 'the time it takes the cash inflows from a capital investment project to equal the cash outflows, usually expressed in years'. When deciding between two or more competing projects, the usual decision is to accept the one with the shortest payback. Payback is often used as a "first screening method". This implies that when a capital investment project is being considered, the first question to ask is: 'How long will it take to pay back its cost'?

Accounting rate of return (ARR)

The accounting rate of return is the ratio of the project's average after-tax income in relation to its average book value (Copper, 1999). Accounting rate of return (ARR) evaluates the project based on standard historical cost accounting estimates. The accounting rate of return also referred to as the book rate of return, bases project evaluation on average income and on accounting data rather than the projects cash flows. Unlike the payback period, this technique produces a percentage rate of return figure which is then used to rank the alternative investments.

Discounted cash flow analysis on the other hand is a method of evaluating an investment by estimating future cash flows and taking into consideration the time value of money. This is also called capitalization of income. The discounted cash flow technique (DCFT) requires both an understanding of compound interest and an ability to set out the inflows and outflows likely to result from a particular decision to invest. Maximizing a firm's value is dependent on correct investment choices, thus management needs sound and reliable tools to minimize the risk of poor investment decisions. The changing nature of global markets and the high interest rates paid on borrowed money by the small firms in a dynamic environment necessitated the need to examine the merits of different types of discounted cash flow techniques which are explicitly discussed below.

Net present value

This is the present value of cash flows discounted at the cost of capital, less the investment outlay. An understanding of various project evaluation techniques provides the investor with valuable tools for determining which projects, if any, should be accepted or rejected. The net present value is a popular technique for investment decision because it is a financial measure that ascertains the time value of money invested in a business (Peel and Bridge, 1998).

Internal rate of return (IRR)

This is a capital budgeting method which uses discounted cash flows in order to decide on the viability of long term investments. If the IRR is greater than the project's cost of capital or hurdle rate, (the required rate of return in a discounted cash flow analysis) the project will add value to the company. The internal rate of return (IRR) technique is that rate of return which equates the present value of the future cash inflows to the present value of the cash outflows (Copper, 1999).

Discounted payback period (DPP)

The discounted payback period method takes into account the time value of money. The discounted pay-back period represents the time it takes for the present value of a project's cash flows to equal the cost of the investment. The following example will help to clarify the application of the discounted payback period method of investment appraisal technique.

Profitability index (PI)

This investment evaluation method is used to evaluate proposals for which net present values have been determined. The profitability index is determined by dividing the present value of each proposal by its initial investment. The Profitability Index is also referred to as the benefit cost ratio. A project is acceptable if its PI is greater than 1.0 and the higher the PI, the higher the project ranking (Reinford, 2001).

The small manufacturing firms used for this study satisfied the requirement of the National Small Business Act of South Africa (NSBA) (1996) as amended in (2003). The NBS Act defines a small manufacturing firm thus:

Total full paid employees: Less than 50
Total annual turnover: Less than thirteen million rand (R 13.00 m)
Total gross asset value: Less than five million rand (R 5.00 m)

LITERATURE REVIEW AND HYPOTHESES

The search for reliable techniques for investment decision-making is currently one of the problems facing small firms. More accurate and reliable capital budgeting is therefore needed by smaller firms if they are to grow, remain competitive and optimize their value. Capital budgeting techniques are probably one of the least understood tools of financial management and as a result, one of the least used by small organizations (Harris, 2003). The theoretical framework of this study is based on the Modigliani and Miller's neo classical theory of finance and investment (1958) as discussed below.

Modigliani and Miller's theory on investment (1958)

Modigliani and Miller (1958) argue that managers should ignore financing and dividend decisions as irrelevant and focus on positive net present value (NPV) investment opportunities that would maximize the value of the firm. Thus the analytical framework for determining a project's NPV as derived from discounted cash flows analysis (DCF) came to provide a rational basis for collective decision-making. The classical theory by Modigliani and Miller (1958) identifies sophisticated evaluation methods as a tool for maximizing the profitability of the small firms. Hastie (1998) on the contrary regarded the financial theory that recommends the utilization of sophisticated techniques such as net present value to improve decision making and maximize the value of the firm as unwarranted. Hastie objected to these assumptions (a statement that is assumed to be true and from which a conclusion can be drawn) because there are many more "apparently acceptable" projects than a firm can approve either because of limited capital or raw materials or because of limited management or technical talent which is common amongst small firms. Hastie noted that the

use of incorrect assumptions has been a more significant source of bad investment decisions than the use of simple measurement techniques. Investment decision making could be improved significantly if the emphasis were placed on asking the appropriate strategic questions (important) and providing better assumptions rather than on increasing the sophistication of measurement techniques.

Adler (2006) argued that discounted cash flow (DCF) should be removed from financial theory as it is increasingly irrelevant to contemporary business practice and can be dangerous in evaluating proposed projects. He further illustrated that DCF can be used accurately from the position of hindsight, but it is little help in predicting the future course of business. He argued that a "gut feeling" can be put to better use than strict mathematical models of potential profits in deciding to pursue a new venture. He concluded that DCF is meaningless and as such should not be applied in evaluating capital budgeting decisions or rather should be replaced with less restrictive and more optimistic methods. The internal rate of return (IRR) method assumes re-investment of the funds at the IRR. Finally, the net present value (NPV) method requires an appropriate discount rate to value expected cash flows. The NPV method may underestimate the value of the investment project and may cause the management to pass up valuable investment opportunities, therefore, in general, they do not provide owner/managers with the flexibility they need when making strategic investment decisions.

Brink et al. (2003) noted that turnovers of SMEs in South Africa are low and are decreasing because of factors such as small market size, low demand and a lack of sufficient knowledge on competitors. SMEs rarely conduct marketing research on their competitors and the needs of their customers. They also suffer from marketing factors such as insufficient marketing, misreading of customers' trends and needs and poor location. The high level of illiteracy among the owners/managers of small firms in South Africa, suggest that the lack of application of sophisticated investment appraisal techniques will have a negative impact on their profitability. Consequently, it is hypothesized that:

H_1: Small firms do not make use of sophisticated investment appraisal techniques in making their investment decisions

H_2: Sophisticated investment appraisal techniques have a positive impact on the profitability of small firms.

RESEARCH METHODOLOGY

Data collection

The study covered SMEs in the manufacturing sector conforming to the definition given by the National Small Business Act of South Africa (1996) as amended in 2003. Manufacturing activity is, broadly, defined to include the manufacturing of the following products, namely: food products, beverages, paper and paper products, plastic products, wood and wood products, fabricated metal products, basic metals, non-metallic mineral products, machinery and equipment and furniture, food product, footwear and leather products (Statistics South Africa, 2004).

The study was conducted in the Nelson Mandela Metropolitan Bay area of the Eastern Cape Province of South Africa. The Nelson Mandela Metropolitan Bay area consists of Despatch, Uitenhage and Port Elizabeth. According to the Eastern Cape Socio-Economic Consultative Council (2005) this area forms the backbone of the economy of the Eastern Cape with its manufacturing sector contributing fifty percent (50%) of the province's manufacturing output and its services contributing thirty nine percent (39%) of the province's community services output. Hence, the metropole is the largest contributor to the economy of the Eastern Cape Province; it contributes forty four percent (44%) of the provincial Gross Domestic Product (GDP). The survey population for this study was obtained from the Small Enterprise Development Agency (SEDA). The mandate of SEDA is to design and implement a standard national delivery network that must uniformly apply throughout the country by the support of the Department of Trade and Industry. It provides small business and medium-sized enterprises with an invaluable gateway to information on starting; managing and growing a business (Small Enterprise Development Agency (SEDA), 2002).

Probability sampling method was used for the study. Probability sampling involves selection methods in which all the members of a sample are chosen through a random process. In probability sampling each of the population has a known, non-zero chance of being included in the sample. Simple random sample was used to draw a sample of one hundred and fifty three of the population. A requirement included in the survey was that the responding SME must keep accounting records or prepare annual financial statements. This requirement is needed for the quantitative analysis of the impact of investment appraisal techniques on the profitability of the respondents. Studies as Fatoki (2006) reveal that not all SMEs keep books of account or prepare annual financial statements. The survey revealed that one hundred and twenty four small firms kept books of account.

The data for the research were gathered through self-administered questionnaires. This involved a direct face-to-face meeting between the researcher and the respondents. This allowed the researcher to visit the small manufacturing firms' owners/managers in the study area. The questions in the questionnaire were divided into sections A to E, which comprised of twenty questions covering five major areas. These questions were tailored to achieve the objective of the study. In order to achieve a good response from the above mentioned questions, the researcher employed both the structured and unstructured types of questions in the questionnaire.

Method of analysis

The study utilized an estimated regression equation to test the hypothesis that the sophisticated investment appraisal techniques have a positive impact on the profitability of the small manufacturing firms. To test this hypothesis, analysis of financial data of the respondents was collected and means values were calculated for the dependent and independent variables.

The estimated regression equation is analyzed thus:

$$ROA = \acute{\alpha} + \beta_1\,NPV + \beta_2\,ARR + \beta_3\,PB + \beta_4\,IRR + \beta_5\,PI + \beta_6\,DPB + \beta_7\,Size + \varepsilon_1$$

where;
ROA = return on assets (profitability)

α = a constant
β_1 NPV = the effect in Rand of the net present value technique
β_2 ARR = the effect in Rand of the accounting rate of return technique
β_3 PB = the effect in Rand of the payback technique
β_4 IRR = the effect in Rand of the internal rate of return technique
β_5 PI = the effect in Rand of the profitability index technique
β_6 DPB = the effect in Rand of the discounted payback technique
β_7 Size = the size of the firm.
ε_1 = the "noise" term reflecting other factors

RESULTS

The results show that out one hundred and twenty four respondents that participated in the survey eighty five (69%) respondents do not use sophisticated investment appraisal techniques when making investment decisions. Thirty nine percent respondents make use of sophistical investment appraisal techniques when making investment decisions. Therefore, the first hypothesis that small firms do not make use of sophisticated investment appraisal techniques when making investment decisions is not rejected.

The profitability of the small manufacturing firms was measured by return on assets (ROA). The return on assets (ROA) as measure of profitability was determined based on the calculation of the earning after interest and taxes (EAIT) and total assets (T.A). The analysis of variance (ANOVA) shown in Table 1a explains the model summary of the multiple regression analysis. This implies that investments appraisal techniques played an important role in the determination of profitability by the small manufacturing firms in the study area. However, the P-value of the independent variables in the multiple regression models in Tables 1b and c explained the significance and relationships of each of the independent variables on profitability. It is therefore concluded that, the relationship between sophisticated investment appraisal techniques and profitability is significant. This then implies that, the application of sophisticated investment appraisal techniques has a positive impact on the profitability of the respondents. The traditional methods which comprise of payback method (PB) and accounting rate of return (ARR) were regressed against profitability to determine their significance and relationships to profitability. It was ascertained in the multiple regression model (Table 1b) that payback method (PB) which shows a high collinearity with other methods used by the respondents is not significant to profitability at a P-value of (0.532) and does not have a positive relationship with the profitability of the respondents at a P-value of (-1.183).

These results further confirmed that accounting rate of return (ARR) is not significant to profitability at a P-value of 0.069 and is negatively related to profitability at a P-value of -4.751. This result implies that traditional methods (PB and ARR) of investment appraisal techniques have a negative relationship with profitability. Based on the estimations of the multiple regression analysis the second hypothesis which states that sophisticated investment appraisal techniques have a positive impact on the profitability of small manufacturing firms is not rejected.

DISCUSSIONS

The primary objectives of the study were to investigate (1) if small firms make use of sophisticated investment appraisal techniques when making investment decisions (2) the impact of sophisticated investment appraisal techniques on the profitability of small firms. The results indicated that small firms mostly do not make use of sophisticated investment appraisal techniques. In addition, the results indicated that the use of investment appraisal techniques has a positive impact on profitability. The recommendations of the study included that: It is important for the owners of small firms to get involved in training and skill development. Training consultants could be used to train the owners of small firms. In addition, low levels of financial literacy can impact the degree to which entrepreneurs use sophisticated investment appraisal techniques. The government should broaden its efforts to ensure that a high level of financial literacy is universal to entrepreneurs. Government agencies such as SEDA, Development Corporations can organize training for new SMEs. Awareness should be created for the training programmes through advertisements in local and national media.

In addition, the provision of and access to, impartial and expert financial advice can help entrepreneurs. Accountants are in an excellent position to provide this advice. Government should consider subsidizing accountancy advice for small firms. Non-governmental organizations should be well funded through local and international grants to help with the training need of new SMEs. Training seminars can also be organized. Furthermore, a "learning from peers" or mentorship approach can be instituted by government agencies to help new SMEs. The involvement of mentors particularly through the Regional Development Agencies can be developed. Business should look at using non-executives at an early stage to bring external expertise and guide investment decisions. Further studies could investigate if industry differences and the age of the firm could have a major impact on the use of investment appraisal techniques.

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Table 1a. Extract of the multiple regression model that shows the impact on investment appraisal techniques on profitability (ANOVA).

Model	Sum of square	df	Mean square	F	Sig.
Regression	1100.483	3	157.212	3.955	0.01[a]
Residual	2822.295	61	39.751		
Total	3922.778	64			

a. Predictors: (constant), OTHERS, PI, NPV, GF, ARR, IRR, DPB.
b. Dependent Variable: ROA.

Table 1b. Extract of the multiple regression model that shows the impact on investment appraisal techniques on profitability (coefficient).

Model	Unstandardized coefficient		Unstandardized coefficient	t	Sig.
	B	Std. error	Beta		
(Constant)	6.320	13.471		.469	.640
NPV	3.944	2.373	-0.194	-1.662	0.101
IRR	10.140	3.405	-0.350	-2.978	0.004
ARR	-4.751	2.574	-0.214	-1.846	0.069
DPB	12.925	4.640	-0.351	-2.785	0.007
PI	44.985	10.461	0.714	4.300	0.000
GF	-5.119	2.464	-0.242	-2.077	0.041
Others	-1.183	1.884	0.074	0.628	0.532

a. Dependent Variable: ROA.

Table 1c. Extract of the multiple regression model that shows the impact on investment appraisal techniques on profitability (excluded variable).

Model	Beta In	t	Sig.	Partial correlation	Collinearity statistics
					Tolerance
1 PB	.[a]	.	.	.	.000

a. Predictors in the model: (constant), OTHERS, PI, NPV, GF, ARR, IRR, DPB.
b. Dependent Variable: ROA.

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