Determinants of Small Business Performance: A Meta-Analysis

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Abstract The links between small business performance and its determinants were meta-analyzed in this study. A search of the literature uncovered 27 articles that yielded 50 correlations. We found a significant relationship between the predictor variables and ROA, ROS, and ROI. However, the size of the effect was quite small.

The importance of small business to the economic health of the nation is generally acknowledged by academicians and practitioners. According to the Small Business Administration (2008), 99.7 percent of all businesses in the United States are small. They also employ 50.6 percent of the non-farm private sector workforce.

In spite of the impressive numbers, research on determinants of small business performance has been scanty. A number of researchers have, as Rutherford and Oswald (2000) point out, examined the impact of individual characteristics, firm characteristics, and environmental characteristics on small business performance. The results of previous empirical studies on determinants of small business performance have been inconclusive.

A major purpose of the present study is to cumulate the findings of empirical research on determinants of small business performance. A second purpose is to use a larger sample of studies to estimate population values for the relationships between small business performance and its antecedents.

Previous Research on Determinants of Small Business Performance

As Cragg and King (1988) and Rutherford and Oswald (2000) observe, previous research on determinants of small business performance fell into three categories: individual characteristics, firm characteristics, and environmental characteristics.

Individual Characteristics of the Firm

Studies that fell under this category have examined the relationship between individual characteristics and performance such as: age, education, managerial experience, industry experience, leadership practices, race, CEO personality, and gender (Foley, 1985; Begley & Boyd, 1986; Lussier, 1995; Steiner & Solem, 1988; Miller and Toulouse, 1986; Fasci & Valdez, 1998; Frith, 1998; Ozcelik et al., 2008).

Characteristics of the Firm

Studies that fell under this category have examined firm characteristics such as strategy/planning, structure, competitive orientation, top management team, culture, organizational growth, family control, operations management, and stage of development (Robinson, et al., 1984; Riggs & Bracker, 1986; Miller & Toulouse, 1986; Bracker and Pearson, 1986; Gable & Topol, 1987; Bracker, et al., 1988; Weinzimmer, 1997; Stoica & Schindelmitte, 1999; Lerner & Almor, 2002; Pleshko, 2006; Megicks, 2007; Danes, et al., 2008; Oswald, et al., 2009).

Characteristics of the Environment

Studies that fell under this category have examined contacts with customers, suppliers, competitors, regulatory organizations, consultants, creditors, stockholders, and financial institutions. Other aspects of the environment include perceived uncertainty in the industry environment (Dollinger, 1985; Shrader, et al., 1989; Sawyerr, 2003).

Method

Sample

We conducted an extensive search in order to identify studies examining the relationship between small business performance and its antecedents. First, we used computer-aided keyword searches of ABI Inform, Business Service Premier, and JSTOR using keywords 'small business performance' and 'determinants of small business performance.' Second, we manually researched key journals in various business disciplines (e.g. *Academy of Management Journal, Administrative Science Quarterly, American Journal of Small Business, Entrepreneurship Theory and Practice, Journal of Applied Psychology, Journal of Business and Entrepreneurship, Journal of Business Strategies, Journal of Business Venturing, Journal of Management, Journal of Management Studies, Journal of Managerial Issues, Journal of Managerial Psychology, Journal of Small Business Management, Journal of Small Business Strategy, Long-Range Planning, Management Decision, Management Science,* and *Small Business Forum.*

Third, we also employed what has been termed a snowballing procedure by Davis and Rothstein (2006). A snowballing procedure is scanning of the references included in the relevant studies to identify other relevant studies. To be included in our meta-analysis, studies had to report a Pearson product-moment correlation, an f-

statistic, t-statistic, or chi-squares with their corresponding degrees of freedom.

Overall, our search produced 27 studies, with 50 effect sizes, and a total sample size of 15,543. The sample size is derived from adding the number of companies on which each of the 27 studies relied.

Table 1
Studies Included in Meta-Analysis

Study	Sample Size	Independent Variable	Dependent Variable
Robinson, Pearce, Vozikis, and Mescon (1984)	51	Stage of Development	Sales, ROS # of Employees
Ackelsberg and Arlow (1985)	135	Planning	Growth in Sales Profit Index
Dollinger (1985)	82	Environmental Contact	Sales, Net Income Profit Index
Orpen (1985)	52	Long-Range Planning	Sales Growth ROA
Bracker and Pearson (1986)	188	Planning	Sales Growth
Dollinger and Kolchin (1986)	81	Boundary Spanning Activity	Profit Index
Miller and Toulouse (1986)	97	Strategy, Structure and CEO Personality	Sales Growth Profit ROI
Riggs and Bracker (1986)	183	Operations Management	Sales Growth
Gable and Topol (1987)	179	Planning	Sales Profits
Bracker, Keats, and Pearson (1988)	73	Planning	Sales Growth Net Income
Cragg and King (1988)	179	Organizational Characteristics	Profit Sales
Covin and Slevin (1989)	161	Environmental Hostility, Structure, Strategic Posture, Competitive Tactics	Profit Index

Table 1 (Continued)

Study	Sample Size	Independent Variable	Dependent Variable
Shrader, Mulford, and Blackburn (1989)	97	Strategic and Operational Planning, and Environmental Uncertainty	Sales Net Income
Kalleberg and Leicht (1991)	312	Gender	Net Income
Weinzimmer (1997)	74	Top Management Team Variables	Sales Growth
Fasci and Valdez (1998)	604	Male and Female Owned	Profit Index
Frith (1998)	197	Market Orientation, Minority, and Woman-Owned	ROS Sales Growth
Kean, Gaskill, Leistritz, Jasper, Bastow-Shoop, Jolly, and Sternquist (1998)	456	Community Characteristics, Business Enviroment, and Competitive Strategies	ROS
Stoica and Schindehutte (1999)	242	Adaptability	Profit Index
Lerner and Almor (2002)	220	Strategic Capabilities and Management Styles	Sales Net Income # of Employees
Sawyer, McGee, and Peterson (2003)	153	Perceived Environmental Uncertainty	Net Income ROA Sales Growth
Wang and Ang (2004)	40	Environment, Resource-based Capabilities, Strategy, and Venture Capital backed Firm's Involvement	Sales # of Employees
Pleshko (2007)	125	Strategic Orientation, and Organizational Structure	Sales Profits

Table 1 (Continued)

Study	Sample Size	Independent Variables	Dependent Variables
Megicks (2007)	305	Levels of Strategy	ROI
Danes, Teik-Cheok loy, and Stafford (2008)	572	Planning	Sales Growth
Ozcelik, Langton, and Aldrich (2008)	229	Leadership Practices	Sales Growth Company Performance
Oswald, Muse, and Rutherford (2009)	2631	Percent of Family Control	Sales Growth Revenue Capital Structure

Meta-analyses were conducted using Hunter and Schmidt (1990) procedures. It is a technique that allows one to aggregate correlation coefficients across empirical studies to derive unbiased estimates of population relationships by correcting for the presence of statistical artifacts. Hunter and Schmidt (1990) suggest that the best estimate of the size of the correlation between two variables is the weighted average in which each correlation is weighted by the number of subjects in that study.

A number of studies included in our sample contain multiple measurements of predictor and criterion variables. As Volckner and Hofmann (2007) observe, studies with multiple effect sizes may have a greater impact on the results of the meta-analysis than studies that only contribute one effect size. Bijmolt and Pieters (2001) suggest two general approaches for dealing with multiple measurements: The first approach is to represent each study by a single value, such as an average effect size (Hunter & Schmidt,1990).

A second approach is the complete set approach. Under this approach, the values of all measurements within the studies are incorporated and treated as independent (weighted) replications (Kirca et al., 2005; Tellis, 1988; Volckner & Hofmann, 2007). As Bijmolt and Pieters (2001), Volckner and Hofmann (2007) observe, this single value approach results in a serious loss of information. We chose to employ the complete set approach because Bijmolt and Pieters (2001) demonstrated the superiority of this approach in a Monte Carlo study and a re-analysis of a published marketing data set.

Recognizing that studies with many measurements may have a greater effect than studies with fewer or single measurements on the results of our meta-analysis, we chose to adopt the Volckner and Hofmann (2007) approach of weighting the effect sizes by the inverse of the number of multiple measures in the study.

Results

Since studies examining the impact of various predictor variables on small business performance have generally fallen into three groups: individual characteristics, firm characteristics, and environmental characteristics (Rutherford & Oswald,

2000), all 27 studies were placed in those three categories. Six studies were included in more than one category. In addition, since the effect size seems to vary from one performance indicator to another (Boyd, 1991; Schwenk & Shrader, 1993) meta-analyses were performed separately for three sets of performance measures: ROA, ROI, and ROS; sales or revenue growth; and profitability index or net income. Seven separate meta-analyses were performed in this study, one involving all 27 studies and one each on the three groups of performance indicators and the three categories (individual, firm, and environment) for classifying small business performance studies. All seven meta-analyses are shown in Table 2.

Table 2
Meta Analysis Results

Category	N	R	$\sigma^2 r$	$\sigma^2 e$	$\sigma^2 p$	r/σp
All Studies	15,543	.05	.005	.003	.002	1
ROS, ROA, ROI	1,311	.08	.007	.005	.002	2
Megicks	305	.22				
Sawyerr et al.	153	.11				
Robinson et al.	51	.13				
Orpen	52	.06				
Miller & Toulouse	97	.02				
Frith	197	.02				
Kean et al.	456	.02				
Sales/Revenue Growth	7,968	.04	.006	.003	.003	0.8
Shrader et al.	97	.05				
Sawyerr et al.	153	.08				
Cragg & King	179	.02				
Robinson et al.	51	.12				
Dollinger	82	.05				
Orpen	52	.08				
Riggs & Bracker	183	.19				
Miller & Toulouse	97	.03				
Bracker et al.	73	.21				
Bracker & Pearson	188	.22				
Ackelsberg & Arlow	135	.14				
Gable & Topol	179	.04				
Ozcelik et al.	229	.06				
Wang & Ang	40	.13				
Frith	197	.09				
Weinzimmer	74	.23				
Oswald et al.	2,631	-.001				
Oswald et al.	2,631	-.003				
Danes et al.	572	.17				
Pleshko	125	.28				

Table 2 (Continued)

Category	N	R	$\sigma^2 r$	$\sigma^2 e$	$\sigma^2 p$	r/σp
Net Income/Profit Index	2,822	.08	.004	.006	-.002	-
Shrader et al.	97	.02				
Sawyerr et al.	153	.05				
Cragg & King	179	-.02				
Dollinger	82	.05				
Dollinger	82	.02				
Miller & Toulouse	97	.03				
Dollinger & Kolchin	81	.22				
Bracker et al.	73	.10				
Ackelsberg & Arlow	135	.09				
Gable & Topol	179	.02				
Stoica & Schindehutte	242	.09				
Fasci & Valdez	604	.15				
Kalleberg & Leicht	312	.03				
Covin & Slevin	161	.06				
Pleshko	125	.19				
Lerner & Almor	220	.04				
Individual Characteristics	11,184	.02	.003	.001	.002	.44
Kalleberg & Leicht	312	.03				
Ozcelik et al.	229	.02				
Ozcelik et al.	229	.06				
Frith	197	.02				
Frith	197	.09				
Lerner & Almor	220	.08				
Lerner & Almor	220	.04				
Lerner & Almor	220	.04				
Danes et al.	572	.17				
Oswald et al.	2,631	-.001				
Oswald et al.	2,631	-.003				
Oswald et al.	2,631	.001				
Fasci & Valdez	604	.15				
Miller & Toulouse	97	.03				
Miller & Toulouse	97	.03				
Miller & Toulouse	97	.02				

Table 2 (Continued)

Category	N	R	$\sigma^2 r$	$\sigma^2 e$	$\sigma^2 p$	r/σp
Firm Characteristics	3,889	.11	.007	.007	0	-
Pleshko	125	.28				
Pleshko	125	.19				
Cragg & King	179	-.02				
Cragg & King	179	.02				
Wang & Ang	40	.16				
Wang & Ang	40	.13				
Kalleberg & Leicht	312	.03				
Bracker et al.	73	.21				
Bracker et al.	73	.10				
Megicks	305	.22				
Danes et al.	572	.17				
Shrader et al.	97	.05				
Shrader et al.	97	.02				
Weinzimmer	74	.23				
Bracker & Pearson	188	.22				
Gable & Topol	179	.04				
Gable &Topol	179	.02				
Riggs & Bracker	183	.19				
Miller & Toulouse	97	.03				
Miller & Toulouse	97	.03				
Miller & Toulouse	97	.02				
Robinson et al.	51	.12				
Robinson et al.	51	.13				
Robinson et al.	51	.07				
Robinson et al.	51	.03				
Orpen	52	.08				
Orpen	52	.06				
Ackelsberg & Arlow	135	.14				
Ackelsberg & Arlow	135	.09				
Environmental Characteristics	1873	.07	.002	.006	-.004	-
Frith	197	.02				
Frith	197	.09				
Wang & Ang	40	.16				
Wang & Ang	40	.13				
Sawyerr et al.	153	.05				
Sawyerr et al.	153	.08				
Sawyerr et al.	153	.11				
Covin & Slevin	161	.06				
Kean et al.	456	.02				
Stoica & Schindehutte	242	.09				
Dollinger & Kolchin	81	.22				

As Table 2 shows, the cumulated effect size across all 50 correlations produced an r of .05. This effect size was based on an overall sample size of 15,543 firms. The comparison of the overall corrected standard deviation of .05 to the mean of .05 is only 1.0 standard deviation above zero. This is a borderline result. The probability of a zero or below zero correlation, however, cannot be ruled out. From a qualitative perspective, the population correlation is positive for all the studies.

The effect size for ROS, ROA, and ROI is .08, and is based on a sample size of 1,311. A comparison of the corrected standard deviation for these group of studies of .04 to the mean of .08 is two standard deviations above zero. So the probability of a zero or below zero correlation with this group is highly unlikely. Even though the effect size of .8 is significant, it still amounts to .6 percent of the variation in small business ROS, ROA, and ROI. In other words, the average determinant only accounts for .6 percent of the population variation.

For the sales or revenue growth group, there were 20 correlations ranging from -.003 to .28. The sample size was 7,968, and the effect size was .04. A comparison of the corrected standard deviation of .05 to the mean of .04 is .8 standard deviation above zero. So the probability of a zero or below zero correlation cannot be ruled out. The net income or profitability index group had an effect size of .08, and is based on a sample size of 2,822. An r/6p comparison was not meaningful in this group since σ^2p had a -.002 value. Sampling error could not be ruled out.

The effect size for the individual characteristics group is .02 and is based on a sample size of 11,184. A comparison of the corrected standard deviation for this group of studies of .045 to the mean of .02 is only .44. Less than one standard deviation above zero. So the probability of a zero or below zero correlation cannot be ruled out.

The effect size for firm characteristics is .11, and is based on a sample size of 3,889. An r/σp comparison was not meaningful in this group since σp had a zero value. Sampling error could not be ruled out for this group.

The effect size for the environmental characteristics group is .07, and is based on a sample size of 1,873. An r/σp comparison was not meaningful in this group also, since σ^2p had a
-.004 value. Again, sampling error could not be ruled out.

Discussion

As Boyd (1991) observes, the presence of measurement error will consistently lower the estimate of a correlation coefficient or effect size. We did not correct the observed effect sizes in this study for measurement error because most of the studies did not report reliabilities for the predictor and dependent variables. If we had been able to correct for measurement error (or attenuation) some of the borderline effect sizes reported here may have reached significance.

Future Research

In light of the lack of reporting of reliability coefficients in the studies in our meta-analysis, one obvious remedy would be for future researchers to report the reliabilities of the measures in their studies. A second suggestion would be to use multiple indicators to measure variables of

interest, especially small business performance (Bagozzi & Phillips, 1982; Keats, 1983; Boyd, 1991). In light of the very low average effect size of .08 observed in our ROA, ROS, and ROI group meta-analysis, another suggestion for future researchers would be to include more predictors in their studies.

Ketchen et al. (1997), in their meta-analysis of configuration and performance relationship, found that studies using longitudinal designs reported larger effect sizes. We would suggest more longitudinal studies for this reason, and also in order to demonstrate causality. Our hope is that once these suggestions are incorporated, a future meta-analysis will be able to observe stronger effect sizes.

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