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BUSINESS STRATEGY AND ORGANIZATIONAL PERFORMANCE: MEASURES AND RELATIONSHIPS

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Abstract. The relationship of strategy-performance linkages is central in strategic management research. A large number of empirical studies have applied strategic typologies distinguishing strategic types to investigate these linkages. Of the numerous strategic typologies, Miles and Snow's framework has been one of the most scrutinized and validated strategy classifications. Although, there is a wide array of settings that provides a host of relationships for various business domains, no systematic review in the extant literature is available that summarizes the measures and the relationships used for operationalization of the strategy-performance linkages, especially when longitudinal financial data is used. The purpose of this study is, therefore, to provide an updated review of relevant literature to know the research designs, data collection and analysis methods, strategy and performance measures, and the findings for strategy-performance relationships. An empirical example by applying refined scoring methodology is also presented for identification of strategic types and their relationship with performance using seven years' financial data from joint stock companies representing "cement and other minerals" sector of Pakistan.

Keywords: Strategy, Performance, Strategic typology, Scoring method

JEL classification: M10

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I. INTRODUCTION

The strategy-performance relationship has been examined in numerous works, both empirically and theoretically. The focus of this study is on empirical studies. In empirical studies, the linkage between strategy and performance is typically operationalized by using various measures and explicit ideas of causality fuelled by Miles and Snow's (1978) idea of strategic types and Porter's (1980) generic strategies. These studies offer workable frameworks for distinguishing strategic types and for evaluating their impact on various measures of performance (Luoma, 2015).

Development and application of strategic typologies have emerged as an important research area in strategic management. In this context, the leading contributions include: Miles and Snow's (1978) strategic types (Prospectors, Analyzers, Defenders and Reactors); Porter's (1980) set of "generic strategies" (Cost Leadership, Differentiation and Focus); Miller's (1990) high-performance "gestalts" (Craftsman, Builder, Pioneer and Salesman); and Treacy and Wiersema's (1995) three strategic types (Operational Excellence, Product Leadership and Customer Intimacy). The theoretical insights of these typologies stimulate a stream of subsequent research. The typology of Miles and Snow (1978) has been one of the most enduring, scrutinized and applied frameworks (Hambrick, 2003; Lin *et al.*, 2014). This strategic typology represents four strategic types as prospectors, analyzers, defenders and reactors. It is argued that these strategic types may exist simultaneously within industries and the viable strategies (prospectors, analyzers and defenders) if properly implemented, would yield similar results and outperform Reactors — a non-viable strategy.

The applicability of Miles and Snow's (1978) typology is widespread and it is applied in numerous settings investigating a number of measures and relationships. There is, however, an absence of updated information in summarized form about the strategy and performance measures and their relationships, especially when archived financial data is used. Also, the mainstream research is mostly in developed countries leaving room for research in developing countries.

The purpose of the present study is, therefore, to provide an updated summary of the studies to know the research designs, data collection and analysis methods, strategy and performance measures, and the findings of the results for strategy-performance relationships. An empirical analysis of strategy-performance using seven years financial data from joint stock companies representing cement and other mineral sector of Pakistan is also presented.

II. LITERATURE REVIEW

STRATEGY AND PERFORMANCE

Strategy is about making choices (Porter, 1985). It is a way to ensure a sustainable competitive advantage by investing the resources needed to develop key capabilities leading to the long-term superior performance (Lin *et al.*, 2014). According to Hambrick (1982), organizational strategy has been defined sometimes as normatively (Andrews, 1971) and sometimes descriptively (Miles and Snow, 1978; Mintzberg, 1978). The organizations use strategy to deal with changing environments as it brings novel combinations of circumstances to the organization. The study of strategy includes the actions taken, content of strategy, and the processes by which actions are decided and implemented. Performance is an intrinsic construct in the strategy literature. The concept of performance is three fold. For example, performance can be approached as the ultimate goal of management, an end in itself, and can be highlighted at the level of individual managers, teams, businesses and corporations. Performance can also be approached from a measurement perspective, with a focus on the selection of the appropriate indicators and levels for quantifying an organization's outcomes (Guérard *et al.*, 2013; Luoma, 2015; Richard *et al.*, 2009).

STRATEGIC TYPOLOGIES

Strategic typologies are the frameworks that identify multiple competitive strategies available to business units. Typologies provide a theoretical basis for identifying strategic groups across industries (Parnell, 2011; Zamani, *et al.*, 2013). The typologies developed by Miles and Snow (1978) and Porter (1980) remained among the most widely cited, tested, criticized, and refined frameworks. The typology of Miles and Snow (1978) is particularly suitable as a context in which to investigate strategy-performance relationships of firms from different industries having different firm size. The typology has been subjected to numerous tests of its scrutiny and validity in a wide array of settings (Ghoshal, 2003; Hambrick, 2003; Ketchen, 2003) and is suitable for studies where archival financial data is used (Bentley *et al.*, 2013; Blackmore and Nesbitt, 2013; Evans and Green, 2000; Hambrick, 1983; Thomas and Ramaswamy, 1996).

Miles and Snow (1978) developed their well-known framework based on intensive literature review and continuous empirical study of four industries namely college textbook publishing, electronics, food processing and health care. Their framework can be used as a model to analyze an

organization as an integrated and dynamic whole to understand the relationships among strategy, processes and structure. They developed a theoretical framework composed of adaptive cycle (a model of the adaptive process) and strategic typology (four empirically determined means of moving through adaptive process). In addition, they related this framework to available theories of management.

The strong support for Miles and Snow typology is evidenced from its application by researchers in a variety of industries including: financial industry (*e.g.* banks, saving and loans, insurance, mutual funds, brokerage etc.); non-financial (*e.g.* manufacturing: electronics, chemical, plastic, semi-conductors etc.); service (transportation, hospitals, hotels/lodging etc.); public sector organizations (such as colleges, hospitals, local governments, nursing homes, schools, state owned enterprises etc.) and other areas (such as construction, churches, and retailing etc.) (Table 1).

The presence of strategic types is supported by the studies for single industry (Conant *et al.*, 1990; Datta *et al.*, 2009; McDaniel and Kolari, 1987; Shortell and Zajac, 1990; Smith *et al.*, 1986; Smith *et al.*, 1989; Zahra, 1987), multi-industry (Blackmore and Nesbitt, 2013; Rajaratnam and Chonko, 1995; Jennings *et al.*, 2003; Miles *et al.*, 1978; Olson *et al.*, 2005; Slater *et al.*, 2011; Snow and Hrebiniak, 1980), and cross-country analysis (DeSarbo *et al.*, 2005; Parnell *et al.*, 2015). There is an uneven distribution of strategic types among industries. The majority of the data collection methods used in these studies is based on questionnaire using self-typing approach. The studies which applied archived data either found only two strategies (prospectors and defenders) as the extreme strategies (Hambrick, 1981, 1982, 1983; Datta *et al.*, 2009; Thomas and Ramaswamy, 1996) or three strategies where defenders and prospectors are taken at the extreme ends and analyzers as the balancing strategy (Bentley *et al.*, 2013; Jennings and Seaman, 1994; Saraç *et al.*, 2014). The identification of reactor strategy is ignored in such cases except for Evans and Green (2000) who considered reactor, instead of analyzers, as the balancing strategy.

Most of the studies used either paragraph approach or collected perceived information through standard questionnaire to operationalize the intended strategy. Few studies used archival data for measuring realized strategy. For identification of strategic types, self-typing approach, cluster analysis, and scoring methods are mostly used. In scoring methods, particularly when archived financial data is used, ranking techniques (quintiles, percentiles, scoring) are used generally. But there is no standardized method of identifying strategic types in this way.

TABLE 1

Research Evidence on Strategy-Performance Relationships

Reference	Industry(s)	Sample	C	SC	DT	Performance	Strategy	Findings
Snow and Hrebiniak (1980)	Automotive, Air Transportation, Plastic, Semiconductors	247	US	ST	Q	ROA	D, A, P, R	All strategic types are present but defenders and prospectors outnumbered analyzers and reactors; Defenders, prospectors, and analyzers outperformed reactors in all industries except for highly regulated industry. Reactor showed an inconsistent behaviour.
Hambrick (1983)	Growth non-Innovative, Growth Innovative, Mature non-innovative, Mature innovative	1230	US EU	RC	A	ROI CFOI	D, P	Defenders outperformed prospectors in terms of current profitability and cash flows; Prospectors outperformed defenders in terms of market share gains in innovative industries; The terms "Prospector-Like" and Defender-Like" were introduced.
Smith *et al.* (1986, 1989)	Electronics	47	US	SM	Q I	Sales Growth; Profit; ROA; Overall	D, A, P, R	There is a significant difference in performance of strategic types; Analyzers and prospectors performed significantly better than reactors in terms of sales growth and profits; all viable strategies outperformed reactors in terms of overall performance and ROA; Firm size explained the differences in strategy-performance relationship.
Conant *et al.* (1990)	HMOs			ST	Q	General Profitability; ROI	D, A, P, R	All viable strategies performed equally well and outperformed reactors.
Parnell and Wright (1993)	Catalogue and Mail-order Houses	104	US	ST	Q	Revenue Growth; ROA	D, A, P, R	All viable strategies outperformed reactors in terms of ROA and sales revenue growth rate; Prospectors showed higher sales growth; Analyzers higher ROA; Combination strategies are a viable means of sustaining competitive advantage.

Reference	Industry(s)	Sample	C	SC	DT	Performance	Strategy	Findings
Rajaratnam and Chonko (1995)	Banking, Brokerage, Hospital, Hotel, Insurance, and Transportation	410	US	ST	Q	Earnings Growth Rate; Sales Growth Rate; ROI ROS	D, A, P, R	All strategic types do exist showing an uneven distribution; Analyzers outnumbered others; All viable strategies performed equally well in all industries and outperformed reactors in all industries.
Woodside *et al.* (1999)	Industrial manufacturing, Banking, Export Services, Retailing, Distribution and other organizations	93	FI	ST	Q	General Profitability; ROI	D, A, P, R	All strategic types do exist; Strategic types are weakly associated with performance; All viable strategies outperformed reactors.
Jennings *et al.* (2003)	Banking, Brokerage, Hospitals, Hotel/ Lodging, Insurance, Transportation	410	US	ST	Q	Earnings Growth Rate; Sales Growth Rate; ROI ROS	P, A, D, R	Viable strategies performed equally; Reactors performed below viable strategies in all performance measures.
Jusoh and Parnell (2008)	Manufacturing Firms from 12 Industries	120	MY	ST	Q	Operating Income Sales Growth Sales Revenue ROI, Cash Flow	P, A, D, R	Malaysian firms view competitive strategy differently and are more likely than their Western counterparts to emphasize the use of financial measures of organizational performance. Findings also highlight the difficulties faced when Western measurement scales are employed in non-Western emerging nations.
Parnell (2010)	Retailers	277	US	ST	Q	Sales Growth; Growth in Profit; Market Share ROA; ROE; ROS; Overall	P, A, D, R	Distribution of strategic types is uneven with prospectors outnumbered others; Reactors and "Stuck in the middle" businesses were outperformed by viable strategies; Prospectors modestly outperformed defenders and analyzers; Reactors performed poorly; Firms

Reference	Industry(s)	Sample	C	SC	DT	Performance	Strategy	Findings
						Performance; Competitive Position		with high strategic clarity outperformed firms with low strategic clarity.
Parnell *et al.* (2012)	Manufacturing, Services	404 107	TU CH	ST	Q	Sales Growth; Growth in Profit; Market Share ROA; ROE; ROS; Overall Performance; Competitive Position	P, A, D, R	Viable strategies outperformed reactors in both countries; In China, defenders' performance was highest followed by prospectors, and analyzers; In Turkey, analyzers performed above all followed by defenders and prospectors; The performance of prospectors and reactors was negative in China while analyzers and reactors performed negatively in Turkey.
Blackmore and Nesbitt (2013)	SMEs from Multi-industries	1772	AU	CA	A	ROE; ROA; Growth in Employment; Growth in Sales; Growth in Assets	P, A, D, R	Distribution of strategies across industries is uneven. There is a significant difference in the performance of strategic types in terms of ROA, growth in employment, and growth in assets; Insignificant difference in performance in terms of ROE and growth in sales; Size and industry effect is significant;; Higher performance of reactors (Static) in terms of ROA.
Zamani *et al.* (2013)	Manufacturing Firms from Multi-industries	129	IR	ST	Q	ROI Profitability Market Share Growth Overall Performance	P, D, R	Both prospectors and defenders outperformed reactors; Defenders performed negatively in terms of growth and overall performance; Combination of strategy performed better than the pure strategy.
Saraç *et al.* (2014)	Joint Stock Companies (All Industries)	190	TU	CA	A	ROA	P, A, D	The difference in performance among the strategies was found but that was insignificant; Insignificant impact of strategy, size, and industry on performance; The interaction of strategy and size has significant impact on performance.

Reference	Industry(s)	Sample	C	SC	DT	Performance	Strategy	Findings
Parnell *et al.* (2015)	SMEs, Manufacturing, Hospitality, Services, Others	176 166	US CH	ST	Q	Sales Growth; Growth in Profit; Market Share ROA; ROE; ROS; Overall Performance; Competitive Position	P, A, D, R	Viable strategies performed better than reactors; Firms with Strategic Clarity performed better than those with less clarity. In USA, prospectors performed above all followed by defenders, analyzers, and reactors. In China, defenders performed above all followed by analyzers, prospectors, and reactors. Analyzers in USA and prospectors in China performed poorly; Small sized firms performed better than medium sized in both countries.

NOTE: SC = Strategy Classification: ST = Self-Typing; RC = Relative Classification; RS = Rank Score; CA = Cluster Analysis; SM = Scoring Method

DT = Data Type: Q = Questionnaire; A = Archival; I = Interview Strategy: P, A, D, R = Prospectors, Analyze rs, Defenders and Reactors.

There is a clear dearth of studies in Asia on strategy-performance linkage applying Miles and Snow typology. Among the selected studies**,** Asia represents countries like Japan, China, Turkey, and Iran only. Out of these countries, only one study uses the financial data with cluster analysis technique, not scoring method, for strategy identification and strategy-performance relationship. No study is found, specifically in South Asia (India, Pakistan, Sri Lanka, and Bangladesh) that applies Miles and Snow typology with archived financial data for investigating strategy-performance linkage.

The support for Miles and Snow's assumption that viable strategies perform equally well in the long-run is overwhelming (Conant *et al.*, 1990; Rajaratnam and Chonko, 1995; Jennings *et al.*, 2003; Parnell, 2010; Saraç *et al.*, 2014; Snow and Hambrick, 1980; Woodside *et al.*, 1999). There are evidences where inconsistent results are also found (*see* for more details, Blackmore and Nesbitt, 2013; Hambrick, 1983; Parnell *et al.*, 2012; Parnell *et al.*, 2015; Parnell and Wright, 1993; Smith *et al.*, 1986, 1989; Zamani *et al.*, 2013).

The differences in performance of strategic types are because of the varying nature of performance measures and environments. For example, defenders outperform prospectors in terms of current profitability and prospectors outperform defenders in terms of market share (Hambrick, 1983), prospectors show higher sales growth and analyzers provide higher ROA (Parnell and Wright, 1993); prospectors perform better than other types (Saraç *et al.*, 2014; Zamani *et al.*, 2013), etc.

The variation in performance is also found in cross-country analysis under same studies (Parnell *et al.*, 2012; Parnell *et al.*, 2015). Although, viable strategies outperformed reactors, their performance is negative in many instances. For example, prospectors performed negatively in China and analyzers performed negatively in USA and Turkey (Parnell *et al.*, 2012; 2015).

The performance of defenders is negative in terms of growth and overall performance (Zamani *et al.*, 2013). The influence of firm size on performance is significant (Blackmore and Nesbitt, 2013; Jennings *et al.*, 2003; Smith *et al.*, 1986, 1989) as well insignificant (Saraç *et al.*, 2014). Similarly, the influence of industry was significant (Blackmore and Nesbitt, 2013) as well insignificant (Saraç *et al.*, 2014). Also, strategic clarity (Parnell *et al.*, 2015) and strategic combination (Zamani *et al.*, 2013) return better performance.

The performance of reactors is below viable strategies in majority instances. However, reactors also perform better in some cases, for example, in highly regulated industry (Snow and Hrebiniak, 1980) and in terms of ROA (Blackmore and Nesbitt, 2013). This supports the argument by Zahra and Pearce (1990) that the preassumed inferiority of reactor strategy to others is questionable. Conant *et al.* (1990) also argue that the reactors have the capacity and potential to incrementally improve their strategic practices and sustain environmental conditions sufficiently.

The summary of the strategy and performance variables along with information about the sample size, research methods and tools and techniques used to carry out the research applying Miles and Snow typology using archived data is presented in Table 2.

The proxies used for measuring strategy are targeted to find; the marketing and R&D focus; growth and production capability; capital intensity; cost efficiency; and diversification of the firms. For financial performance, measures such as ROA, ROE, ROS, Growth rates, Return on Capital Employed (ROCE), Cash Flow on Investment (CFOI), EPS, and Annual Stock Return etc. are used whereas customer satisfaction and service quality are used as non-financial performance measures (Bentley *et al.*, 2013; Blackmore and Nesbitt, 2013; Ittner *et al.*, 1997; Evans and Green, 2000; Hambrick, 1983; Thomas and Ramaswamy, 1996).

The data were collected from PIMS, COMPUSTAT, and financial statements etc. in majority cases. Average data is generally used for operationalisation of strategic types. However, the time period (number of years) varies from study to study. Regression analysis in its various forms (OLS, multiple regression, logistic regression etc.) and ANOVA is applied in most of the studies for investigating strategy-performance relationship.

III. METHODOLOGY

DATA

The data for this research consists of 21 listed firms on Pakistan Stock Exchange (PSE) for seven years (2008-2013) of "Other Non-Metallic Mineral Products" industry having two sub-sectors (Cement and Mineral Products). The firms with the age of at least seven years and non-zero sales for all years have been included in the study. The data source is State Bank of Pakistan's publication "Financial Statement Analysis of non-financial Companies.

TABLE 2

Summary of the Strategy and Performance Variables Where Archived Data is Used

Source	Strategy and Performance Variables	Dataset and Research Techniques
Hambrick (1983)	Strategy Measures ● *Entrepreneurial Attributes*: Product R&D/Sales; Marketing Expense/Sales; Relative Integration Forward ● *Engineering Attributes*: Gross Fixed assets/Employees; Relative Integration Backward; Relative Compensation rates; Relative direct costs; Process R&D/Total R&D; Value Added/Employees; Capacity Utilization; Competitive Devices; Relative Price; Relative Service; Relative Quality Performance Measures ● ROI, Cash Flow on Investment (CFOI), Share Growth	*Data*: 4 years (1978-82) average data were drawn from the Profit Impact of Market Strategies (PIMS) database. *Strategy Classification*: Percent Scores *Analysis*: Univariate t-tests and multivariate regressions (with dummy variables)
Shortell and Zajac (1990)	Strategy Measures ● The number of diversified services offered (home health care, outpatient diagnostic services, geriatric screening, health promotion, and sports medicine); the number of these diversified services added in the past two years; the number of these services planned; and the number of high-technology services offered; ratio of outpatients to inpatient services Performance Measures ● Market Share, Market Growth	*Data*: Data of two pints in time (1984-85 and 1986-87) were collected for 574 hospitals. The source of data is American Hospital Association. *Strategy Classification*: Factor Analysis *Analysis*: ANOVA, Correlation
Thomas and Ramaswamy (1996)	Strategy Measures ● Marketing expenditure - A ratio of marketing expenditure to total sales; Research and development expenditure - A ratio of research and development expenditure to total sales; Production expenditure - A ratio of cost of goods sold to total sales; Asset intensity - A ratio of total assets per employee was used to measure asset intensity. Performance Measures ● ROS (Sales), ROA, ROE	*Data*: 3 years average data (1987-89) of 83 firms from Fortune 500 belonging to electronic, chemical and petroleum industries which earn 70% of sales from single industry. The source of data is COMPUSTAT. *Strategy Classification*: Cluster Analysis *Analysis*: ANOVA

Source	Strategy and Performance Variables	Dataset and Research Techniques
Ittner *et al.* (1997)	Strategy Measures ● The ratio of research and development expenditures to sales; Market to book ratio; Employees to sales Ratio; The number of new products and services introduction Performance Measures ● Financial (Sales, EPS, ROA etc); Non-financial (Customer satisfaction, Service quality, etc.)	*Data*: Two years data (1993-94) of 317 firms having chemicals (27), machinery (23), electrical and gas services (27), and commercial banks (21 firms) etc. of different size. *Strategy Classification*: Weights Scores *Analysis*: Partial Least Square Method (PLS) using Structural Model
Evans and Green (2000)	Strategy Measures ● Cost Efficiency: Projected (Total Expense-historical total expense)/Sales; Product Mix Breadths: Number of Product Lines and Services; Projected Sales Growth: (Forecasted Sales-Historical Sales)/Historical Sales; Projected Change in the Marketing Expenditure: (Forecasted Marketing Expense-Historical Marketing Expense)/Sales Performance Measures ● ROS, Growth (Firm Size)	*Data*: 97 firms (manufacturing = 32, Services = 43, Wholesale = 6, Recreation = 2, and Food Service = 14) *Strategy Classification*: Scoring Method *Analysis*: MDA and ANOVA
Chong *et al.* (2010)	Strategy Measures ● Related Diversification (RD) : Extent a firm operates in number of different product lines within an industry; Unrelated Diversification (UD): Extent a firm operates in number of different industries; Institutional Investors (INST): End of the year % of total outstanding common voting shares owned by institutional investors; Financial Pressure (DEBT): The ratio of total current liabilities to equity; The ratio of long-term debt to equity; Research and Development Intensity (R&D): The firm's R&D to sales ratio; Advertising Intensity (ADV): The firm's advertising to sales ratio Performance Measures ● ROA	*Data*: US corporation (non-financial) listed in Fortune 500 of 1999. Period of study is 1990-98. data on 190 firms ranged in size from $3 billion to $178 billion in revenue in 1998. The sources of data include COMPUSTAT, Compact D, etc. *Strategy Classification*: *Analysis*: Causal relationships among variables are modeled as Directed Acyclic Graphs (DAG) using PC-algorithm

Source	Strategy and Performance Variables	Dataset and Research Techniques
Balsam *et al.* (2011)	Strategy Measures ● SG&A/Sales: Ratio of selling, general and administrative expenses to net sales; R&D/Sales; Sales/COGS; Sales/CAPEX: Ratio of net sales to Capital expenditure on property plant and equipment; Sales/P&E: Ratio of sales to net book value of plant and equipment; Employee/Assets: Ratio of employees to total assets Performance Measures ● ROA, Annual Stock Return	*Data*: 1658 firms having 15 years data (1992-2006) using Five Year averages. *Strategy Classification*: CFA *Analysis*: Correlation, Regression
Blackmore and Nesbitt (2013)	Strategy Measures ● New product/service development; Change in markets targeted; Change in advertising; Change in distribution; Change in production technology; Comparison of performance; Formal business planning Performance Measures ● ROE, ROA, Growth in employment; Growth in Sales, Growth in assets;	*Data*: Longitudinal data of 1773 SMEs from database of surveys conducted from 1994-95 through 1997-98. *Strategy Classification*: K-Means Cluster Analysis *Analysis*: ANOVA
Bentley *et al.* (2013)	Strategy Measures ● The ratio of research and development to sales; the ratio of employees to sales; a historical growth measure (one-year percentage change in total sales; the ratio of marketing (SG&A) to sales; a measure of employee fluctuations (standard deviation of total employees); and a measure of capital intensity (net property, plant and equipment scaled by total assets), respectively Performance Measures ● ROA, Growth	*Data*: 17 years (1993-2009) for strategy types construction. The source of data is COMPUSTAT. *Strategy Classification*: Scoring Method *Analysis*: Logistic Regression, ANOVA
Saraç *et al.* (2014)	Strategy Measures ● The ratio of research and development to sales; the ratio of employees to sales; a historical growth measure (one-year percentage change in total sales; the ratio of marketing (SG&A) to sales; a measure of employee fluctuations (standard deviation of total employees); and a measure of capital intensity (net property, plant and equipment scaled by total assets), respectively Performance Measures ● ROA, Growth	*Data*: 6 years data (2006-2011) of 190 listed firms at Istambul Stock Exchange categorized as small, medium and large on the basis of employees (< 50, 50-250 and > 250 respectively). *Strategy Classification*: Cluster Analysis *Analysis*: ANOVA, Regression

Source	Strategy and Performance Variables	Dataset and Research Techniques
Lin *et al.* (2014)	Strategy Measures ● *Marketing and R&D Capability*: R&D to Sales Ratio; Marketing Expense to Sales ration ● *Production Capability*: COGS to Sales Ratio Performance Measures ● ROIC, ROS, and Capital Turnover	*Data*: 10 years average data of 35 semiconductor firms. Source of data is COMUSTAT. *Strategy Classification*: Strategic game model using multiple-objective programming in lingo Software *Analysis*: Multiple-Objective Programming

MEASURING STRATEGIES

Following Anwar and Hasnu (2016), four measures are used to capture the strategic orientation of the firms. MESR: Marketing Expenses (Selling, Administration, and general expenses) to Sales Ratio. It indicates the firms' focus on exploiting new products and services and highlights firms' propensity towards innovation and market research by differentiating the products and services. The ratio covers the entrepreneurial dimension of Miles and Snow typology where prospectors are expected to have greater marketing expenditure than defenders. COGSR: Cost of Goods Sold to Sales Ratio. The ratio identifies the firms' focus on internal production efficiency and addresses both the administration and entrepreneurial dimensions of the typology. Prospectors are expected to have higher production costs. CASGR: Compound Annual Sales Growth Rate (CASGR): A historical Growth Measure. The ratio highlights the historical growth perspective and covers the administrative and entrepreneurial dimensions with prospectors having the greater potential for growth than defenders. This ratio is calculated as:

$$CASGR = \left(\frac{Ending\,Value}{Beginning\,Value} \right)^{\left(\frac{1}{No.of\ years} \right)} - 1$$

CIR: Capital Intensity Ratio — net property, plant and equipment scaled by total assets. The measure shows the firms' commitment to technological efficiency and covers the engineering dimension. Defenders are expected to have higher value as they focus on single core cost-efficient technology.

MEASURING PERFORMANCE

To avoid subjectivity and a restricted view of performance, multiple financial performance measures of profitability (ROA, ROE, ROS and ROCE) are used for analysis.

IV. RESULTS AND ANALYSIS

IDENTIFICATION OF STRATEGIC TYPES

Scoring methodology of Anwar and Hasnu (2016) for identification and classification of strategic types using archived financial data is applied for this study. To classify a firm belonging to a specific strategic group, the strategy scores are calculated at four points in time. The overall long-term strategic orientation of the firms was calculated by using seven years (2007-13) average data whereas short-to-medium term strategic orientation of the firms is calculated for the years 2011, 2012, and 2013 taking preceding 5

years average data respectively. This helped for identification of viable, consistent, flexible and reactor strategic types. To classify a firm having a viable strategy, it must follow same strategy in at least three times out of four. Otherwise the firms are marked as a reactor.

TABLE 3

Identification of Strategic Types and Their Transition Over the Time

S. No.	Firm* Name	Strategic Transition				Final Category
		2011	2012	2013	(Overall)	
Cement Industry						
1	F1	Prospector	PA-Like	Analyzer	Prospector	Reactor
2	F2	DA-Like	DA-Like	DA-Like	DA-Like	DA-Like
3	F3	Analyzer	Analyzer	Analyzer	Analyzer	Analyzer
4	F4	DA-Like	DA-Like	DA-Like	DA-Like	DA-Like
5	F5	PA-Like	Analyzer	Analyzer	Analyzer	Analyzer
6	F6	Analyzer	Analyzer	Analyzer	Analyzer	Analyzer
7	F7	DA-Like	Analyzer	PA-Like	DA-Like	Reactor
8	F8	DA-Like	Analyzer	Analyzer	Analyzer	Analyzer
9	F9	DA-Like	DA-Like	DA-Like	DA-Like	DA-Like
10	F10	Analyzer	Analyzer	Analyzer	Analyzer	Analyzer
11	F11	PA-Like	Analyzer	Analyzer	Analyzer	Analyzer
12	F12	Analyzers	PA-Like	Analyzer	Analyzer	Analyzer
13	F13	PA-Like	Analyzer	DA-Like	PA-Like	Reactor
14	F14	PA-Like	PA-Like	PA-Like	PA-Like	PA-Like
15	F15	DA-Like	DA-Like	Analyzer	DA-Like	DA-Like
Mineral Products Industry						
16	F16	Analyzer	Analyzer	Analyzer	Analyzer	Analyzer
17	F17	Prospector	Prospector	Analyzer	Prospector	Prospector
18	F18	Analyzer	Analyzer	Analyzer	Analyzer	Analyzer
19	F19	DA-Like	Defenders	Defender	Defender	Defender
20	F20	PA-Like	Analyzer	Analyzer	Analyzers	Analyzer
21	F21	DA-Like	Analyzer	PA-Like	Analyzer	Reactor

*Firms' names are coded for anonymity purpose.

To understand this process, the example for categorization and behaviour of firms for the selected industry is presented in Table 3. The stance of firm in a long term fall under one of the viable strategies but the behaviour of the firms during short term period or transition varies. This variation identifies the consistent, flexible and reactor strategies listed in the last column. The rows show the transitions of the strategic types over the time. The firms at serial numbers 1, 7, 13, and 21 are reactor firms and the firms at serial numbers 2, 3, 4, 6, 9, 10, 14, 16, and 18 follow flexible strategies while the rest of the firms follow consistent strategy. The second last column classifies the firms in their long-term orientation which may be different from the final classification. For example, the overall classification for reactor strategy in our selected industry is prospector, DA-Like, PA-Like, and Analyzer respectively. Hence, a viable strategy in a long-term may behave like reactor strategy during transition period.

STRATEGIC ORIENTATION

The results for the distribution of firms according to strategic types and strategic behaviour along with their group performance are presented in Tables 4 and 5. Most of the firms are following analyzer strategy (48%), followed by DA-Like and Reactors (19% each). The presence of PA-Like and pure strategies (defenders and prospectors) is nominal (5% each). The results for strategic groups based on strategic flexibility, strategic consistency and reactor strategy show that majority of the firms (43%) is adapting flexibility in their strategic behaviour followed by consistent behaviour (38%) and reactors (19%).

TABLE 4

Performance of Strategic Types and Industry Averages

Performance	N	ROA	ROE	ROS	ROCE
Defender	1	1.80	5.14	1.72	2.91
DA-Like	4	**8.93**	**14.33**	**7.19**	**12.02**
Analyzer	10	2.40	4.32	–7.42	0.63
PA-Like	1	–0.75	–2.37	–7.06	–1.16
Prospector	1	0.47	0.99	–6.56	–3.24
Reactor	4	0.30	–2.27	–4.90	0.70
Industry Analysis	21	2.97	4.54	–3.66	2.65

Bold = Highest, Underline = Least

TABLE 5

Performance of Consistent, Flexible and Reactor Strategies

Other non-metallic mineral products	Strategic Orientation	N	ROA	ROE	ROS	ROCE
(Cement and other mineral products)	Consistent	9	3.48	5.27	–10.53	1.88
	Flexible	8	**3.75**	**7.11**	**4.69**	**4.49**
	Reactors	4	0.30	–2.27	–4.90	0.70
Industry Averages		21	2.97	4.54	–3.66	2.65

Bold = Highest, Underlined = Least

STRATEGY AND PERFORMANCE

The performance of DA-Like firms is above all other strategic types and industry averages for all four performances measures followed by the performance of defenders who performed above industry average in three measures. The performance of PA-Like is poor, even less than reactors, for all measures. Reactors and prospectors also performed poorly.

Firms with flexible strategy performed above industry averages and outperformed reactors in all performance measures. On the other hand, firms following consistent strategies performed better than industry in terms of ROA and ROE and better than reactors in three performance measures. Hence, firms adapting both flexible and consistent strategies brought better results outperforming reactors. The performance of firms varies with the change in firm size. Large firms performed well and above industry averages for all measures followed by small sized firms. Medium sized firms performed poorly and showed negative performance for all measures (Table 6).

TABLE 6

Firm Size and Performance

Firm Size	Performance			
	ROA	ROE	ROS	ROCE
Small	1.13	3.07	–2.42	–0.17
Medium	–1.50	–1.94	–21.23	–5.71
Large	**5.32**	**7.75**	**4.26**	**6.94**

Bold = Highest, Underline = Lowest

One way ANOVA (Univariate models) were run to test whether the performance of strategic groups, in terms of strategic types and in terms of strategic behaviour, is similar or not. Similarly the effect of firm size on firm performance was tested. A two way ANOVA (multivariate models) were run to see whether there is any interaction effect of strategic types and firm size; and the interaction effect of strategic behaviour and firm size. The results for both types of ANOVA are presented in Table 7.

TABLE 7

The Results for Goodness of Fit Test: F-Values

Performance	Strategy[1]	Strategic Behaviour[2]	Size	Strategy * Size	Strategic Behaviour * Size
ROA	0.43	0.21	1.33	1.96	1.53
ROE	0.37	0.40	0.66	1.50	1.38
ROS	0.14	0.62	1.90	1.48	1.20
ROCE	0.34	0.10	1.60	2.13	1.48

NOTE: 1 = strategic types, 2 = strategic consistency, flexibility and reactor

It is evidenced that the variation in performance due to changes in strategic types and strategic behaviour is insignificant for all performance measures. The interaction for both combinations is also insignificant. However, the interaction effect is more than the individual impact.

V. DISCUSSION

There is variation in the performance of the strategic types but the difference is insignificant. The results are consistent with the assumptions of Miles and Snow typology. The support for Miles and Snow's assumption that viable strategies perform equally well in the long-run is overwhelming (Conant *et al.*, 1990; Rajaratnam and Chonko, 1995; Jennings *et al.*, 2003; Parnell, 2010; Saraç *et al.*, 2014; Snow and Hambrick, 1980; Woodside *et al.*, 1999). On the other side, the variations in performance among strategic types are consistent with many studies where it was found that difference in performance measures, environments, market efficiencies/deficiencies, level of competition, and innovativeness are the reasons of these variations

(Blackmore and Nesbitt, 2013; Hambrick, 1983; Snow and Hrebiniak, 1980; Zahra and Pearce II, 1990).

The presence of pure strategies is almost negligible. The reason can be that in practice, firms adopt a greater variety of competitive strategies that go far beyond the pure strategies created by theory. On the other hand, hybridization offers many strategic options at the business level for firms, irrespective of the industry they are in. This concept is getting space in literature (Pertusa-Ortega *et al.*, 2009; Pertusa-Ortega *et al.*, 2010; Salavou, 2013, 2015; Thornhill and White, 2007). The problems associated with pure strategies might turn into arguments for the adoption of hybrid strategies because in this way: they may address customer needs better; they may be more difficult to imitate; and they may generate a more flexible and wider view (Pertusa-Ortega *et al.*, 2009).

The poor performance of prospecting strategies (prospectors and PA-Like) could be due to one of the reasons argued by Hambrick (1983) that there is a "liability of newness" and the cost of innovation in terms of: the development, production, and marketing of new products; modification of plants and equipment; establishment of new supplier arrangements and inventory buildups; skill set of sales and distribution personnel etc. According to Miles and Snow (1978), such organizations cannot prosper financially unless their markets continually seek new products. Therefore, the prospector strategy, in its purest form, is relatively uncommon. This is true for our findings.

VI. CONCLUSION

The purpose of this research was to update the literature and present it in a meaningful way regarding measures and relationships used in strategy-performance linkage research where Miles and Snow typology is applied. Based on selected measures and by adapting scoring methodology, an empirical analysis for a small industry is also presented. The research enhances current understanding of the strategy-performance linkage. The framework for identification strategic groups provides more theoretical insights and attention as it can be applied to other typological research. The empirical research evidence on strategy-performance relationship, methodology, and findings will help the future researcher to investigate more on the subject.

A number of opportunities for future research have been identified. First, as most of the research is in developed countries, the country and

environmental context of this study will offer many insights for replicating the research in similar contexts. Second, the performance comparison of the strategic groups based on their strategic orientation can further be explored and investigated. Third, future studies could utilize different measures, both subjective and objective, for operationalization of strategy and performance. We hope that this research will serve to stimulate the interest of scholars in this regard.

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