A LONGITUDINAL STUDY OF OPERATIONS STRATEGY DECISIONS, RESOURCES, AND PERFORMANCE IN THE NEW ZEALAND MANUFACTURING SECTOR.

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ABSTRACT

This paper examines the operations strategy - performance relationship among New Zealand manufacturers, using data from the 2005 and 2009 Business Operations Surveys carried out by the NZ Department of Statistics. A weighted stratified random sampling frame was used so the results represent data on practices and performance from over 5000 manufacturing firms. The capabilities that have emerged over the period to provide superior business performance centre around customer-related practices, quality management and other improvement programmes, and investment in modern equipment and technology.

INTRODUCTION

A key question in the field of operations strategy (OS) and operations management (OM) is how a firm's practices, resources and capabilities contribute to its achieving and maintaining competitive advantage relative to its competitors e.g. [23] [11] [1] [26]. OS researchers have contributed to the literature by examining the conditions under which specific practices, resources or structural arrangements are valuable. In particular, there have been two basic types of studies as identified by Ketokivi and Schroeder [14] recently. This paper examines business practices and resource strategies used by firms in New Zealand and their relation to business performance. It aims to contribute to the large-sample approach through statistical analysis and inference of two identical national surveys carried out in New Zealand in 2005 and 2009. It thus responds to the call for more longitudinal studies to "examine the stability of both practice and performance." [14 p.184]. The research questions are: Which business practices and resources have set successful companies apart from the others? How has the pattern of resources and capabilities (reflected in business practices) changed over the period 2005-2009? What are the implications for government policy?

LITERATURE REVIEW

Contemporary strategy research has two principal strands: industry-based approaches e.g. [19] [20] and resource-based approaches. The resource-based view (RBV) [17] [28] emphasises internal processes and choices regarding the firm's resources and capabilities that ultimately contribute to the firm's profitability [5]. It proposes that advantage comes from resources that the firm possesses that pass the so-called VRIN test i.e. are Valuable, Rare, Inimitable and Non-substitutable [2]. There is now a considerable extant literature relating the RBV to manufacturing strategy (e.g. [22])

Many researchers have argued how manufacturing capabilities should play an important role in how firms compete in markets and that they must continually develop these capabilities [9] [10] [12]. Ferdows and De Meyer [6] proposed a sequential expansion in a firm's capabilities. Since then many studies have shown an empirical relationship between various manufacturing practices and manufacturing and business performance e.g. [8] [27] [21] [25] [5] [13]. Much of the prior work in this area falls under what is called the "best practices approach" whereby the practices that are shown to be

linked to superior performance are interpreted and put forward as those factors that will lead manufacturers to better performance and competitive advantage [14].

A number of researchers have however found that the relationships between manufacturing practices, capabilities and performance are complex and not well understood [29] [4] [14] [25] or "oversimplified" [23]. These relationships, they argue, are contingent on manufacturing goals, strategic goals and integration.

Swink et al [[25] claimed the most important finding from their study was that "strategy integration has a central influence on the relationships among manufacturing practices, capabilities and performance" (p.447). [14] found that their evidence supported the strategic contingency approach as only one practice, JIT, was related to more than two dimensions of competitive performance. They suggest "this implies that as far as competitive performance is concerned, practices must be implemented for the right reason" (p.182).

DESIGN/METHODOLOGY/APPROACH:

The research model

The model used in this paper derives from earlier work by [27] and [9]. It extends their models by incorporating the strategic goals. The reasoning behind the model is that top management sets strategic competitive goals, these in turn lead to the focus on performance measurement (i.e. how the plant is evaluated in terms of the weighting for financial, cost, quality, delivery, flexibility and innovation goals. The plant management then makes operational resource decisions involving capital equipment, human resources etc. These resource strategies affect competitive operational performance on the key measures (cost, quality, delivery, flexibility, customer satisfaction and employee satisfaction). The operational performance is related to the business performance measures (profitability, productivity, market share change etc.) of the manufacturing plant. In a broader sense, the strategic goals box is how management intends to compete, the business focus box is how top management wants to measure, the practices and resources box is what plant management does, the operations performance is what it gets, and the business performance is what it should want. The direct linkage between practices and business performance will also be tested. Thus the overall model is

Strategic goals>>Business focus>>Practices and resources>>Ops performance>>Business performance

Survey data

This study uses data from the 2005 and 2009 Business Operations Surveys (BOS) carried out jointly by New Zealand's official statistics agency, Statistics New Zealand (NZ), and the Ministry of Economic Development. The survey has been carried out by Statistics NZ every year since 2005. The two surveys in this paper were identical for the purposes of this paper. The comprehensive data cover over 5000 respondent enterprises in each survey that are representative of the whole NZ economy, of whom around 1200 were classified as manufacturers. When weightings are taken into account the results are representative of the population of over 36000 enterprises and 5000 manufacturers.

An enterprise is defined as a business or service entity operating in New Zealand, such as a company, partnership, trust, government department or agency, state-owned enterprise, university or self-employed individual. The final estimated population size for the 2009 Business Operations survey was 36,347 enterprises.[24]. As these were official Government surveys, the response rate was excellent (around

85% with 96% or respondents answering 90% or more of the questions), and its sampling approach was meticulous. For a full technical discussion of the survey methodology see http://www.stats.govt.nz/browse_for_stats/businesses/business_growth_and_innovation/business-op-survey-2009-tables.aspx

RESULTS

In the regression analysis carried out, a separate model is used for each dependent variable as we wish to examine what management sees as important and where they put emphasis [7]. It is also important to allow for the multidimensional nature of operations and business performance [3] [14]. Also we wish to see the changes over time between the two surveys, so as to examine whether or how organisational processes and practices have been fashioned over the period in question [16] [18]. Significant coefficients only are shown. Owing to page limit requirements, only the links between practices and operational and business performance will be discussed.

The practices – operational performance link

2005 BOS

Business practices	Operations performance					
	cost	delivery	quality	flexibility	customer satisfaction	employee satisfaction
Equipment					.605863*	.950911**
Customers						
Suppliers						.684802*
Employees						
Improvement						
Systems						
r-squared	0.0048	0.0148	0.0292	0.0218	0.0362	0.0648
legend: * p<0.05; ** p<0.01; *** p<0.001						

2009 BOS

Business practices	Operations performance					
	cost	delivery	quality	flexibility	customer satisfaction	employee satisfaction
Equipment			.3473142**			
Customers						-.4145608*
Suppliers						
Employees						
Improvement			.3192415*	.3777419**	.331537**	.6146529***
Systems						
r-squared	0.0123	0.0072	0.0322	0.0191	0.0228	0.0308
legend: * p<0.05; ** p<0.01; *** p<0.001						

This link in the model is characterised by rather fewer significant relationships compared with the earlier links. In 2009 better quality performance was related to emphasis on equipment and improvement practices. Also the quality, flexibility, customer satisfaction and employee models included emphasis on improvement so for those managers the effort was paying off. The lack of significant relationships in many models in the above table suggests that it may not be possible to obtain superior performance on those measures because the practices have been internalised and are or were widely adopted. There was only weak explanatory power in the models.

The practices – business performance link

Each firm is asked to record against a qualitative 3-point scale (plus "don't know") their firm's situation for six items:

• profitability relative to major competitors;

• productivity relative to major competitors;

• market share relative to three years' prior;

• profitability relative to three years' prior;

• productivity relative to three years' prior;

• sales of goods and services change over the past twelve months.

The responses to each of these business result questions (the dependent variables in the analysis that follows) were divided into binary outcomes, grouping together the neutral and unfavourable responses as one outcome and the favourable responses as the other outcome for the variable. Probit regression analysis was then used on these data.

As [5] note the reason for converting the data into binary variables is that comparatively few respondents in each category responded that their firm was doing worse than their competitors or worse than their own history. Hence they adopted a maintained hypothesis that there was a respondent bias away from the neutral and unfavourable responses; i.e. they conjectured that many respondents who "should" have answered that their performance was unfavourable instead answered in the neutral rather than the unfavourable category. [5] [30] [15]

2005 BOS

Business practices	Business performance					
	relative profitability	relative productivity	sales change	profit change	productivity change	market share change
Equipment						.92664111*
Customers						
Suppliers						
Employees						.92316599*
Improvement					1.8354198**	
Systems						
legend: * p<0.05; ** p<0.01; *** p<0.001						

2009 BOS

Business practices	Business performance					
	relative profitability	relative productivity	sales change	profit change	productivity change	market share change
Equipment	1.264708***	1.020911**		.5418877*		.7770247**
Customers		.3542595*				
Suppliers						
Employees						
Improvement			1.022226**	.7969861**	.9620173**	1.288843***
Systems						
legend: * p<0.05; ** p<0.01; *** p<0.001						

In 2005 there were only two models that were significant. Productivity change was related to emphasis on improvement practices, and market share change with up-to-date equipment and emphasis on employee practices. By 2009 all models showed significance. The importance of the equipment bundle is apparent in four models, and emphasis on improvement practices also apparent in four models.

DISCUSSION

The changes between the surveys for the link between strategy and business focus indicate manufacturers moving to improve fit between their goals and how they intend to measure their performance. This is perhaps best illustrated with the inclusion of significant relationships in the financial and cost models. For the link between business focus and practice bundles, the results show manufacturers have realised the need for greater attention to customer-related practices and systems practices to fit with intended business measures.

In 2005 the results for the link between practices and operations performance showed few significant relationships and this suggested that the reason may be that as the survey asks for performance relative to their competitors and not in absolute performance terms. The results may also confirm Dean and Snell's (1996) suggestion that managers felt they needed to "do something" to attain legitimacy by adopting these practices. By 2009 it is clear some managers have been able to achieve superior performance in a number of areas particularly quality and also through emphasis on the improvement bundle of practices.

For the link between operations performance and business performance, the results show that achieving superior customer satisfaction is significant in most models for the business performance results. In 2009 some models showed that superior quality performance was significant for business performance. This suggests that quality may not necessarily be just an "order qualifier" these days.

The results for the direct link between business performance and practices show that by 2009 ensuring that plants have modern equipment and keep up with technology changes was significantly related to superior performance on four business results measures – relative profitability, relative productivity, profit change and market share change. Also emphasis on improvement practices was paying dividends for increased sales, profits, productivity and market share.

CONCLUSIONS

This paper has examined changes in the linkages between strategic goals, practices and operations and business performance for over 5000 New Zealand manufacturers over the period 2005 to 2009 using data from two official Government surveys. The results confirm the importance of focus or emphasis on innovation, and achieving customer satisfaction as these two were involved in many significant models. By 2009 some managers were achieving superior performance from emphasis on quality management and on improvement practices.

The results involving innovation suggest that managers have heeded the Government's mantra about innovation in products, services and processes being a very important order winner for New Zealand businesses. Ways to get better results from innovation needs to be disseminated more widely through exemplars to other firms in the economy.

REFERENCES

A full list of references is available from the author.