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Operations strategy processes: how significant are they?

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Abstract

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Keywords

they, strategy, operations, processes, significant

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Stream 15: Technology, Innovation and Supply Chain Management
Competitive Session

Operations Strategy Processes: How Significant Are They?

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ABSTRACT

Ongoing challenges associated with the implementation of formally developed strategies call for studying the functional level strategy processes from fresh perspectives. This paper presents evidence drawn from the Canadian oil and gas industry towards establishing the statistical significance of alternative operations strategy processes and organisational contextual factors. The analysis discerned four strategy process configurations representing singular and multiple combinations of three strategy process modes identified in previous qualitative studies. The findings will help advance the understanding of operations strategy processes and may contribute to theory building, as the evidence was drawn from a relatively large sample of data representing an industry sector that has not been previously reported.

Key Words: alternative operations strategy processes, organisational context

WHY STUDY OPERATIONS STRATEGY PROCESSES?

Since the publication of seminal contributions by [Mintzberg and colleagues \(1976, 1978\)](#) many authors have asserted that strategies develop through such deliberate means as structured analysis of organisational and environmental factors or scenario development, as well as through more mundane efforts like ad-hoc responses to market opportunities or addressing urgent operational issues ([Dale, 2002](#); [Hayes, 1985](#); [Wheelwright, 1984](#)). Although the efforts put into studying strategy processes appear to have peaked some years ago, there still seems to be no coherent body of knowledge – developed through the decades of scholarly efforts – available to inform either practice or ongoing research. For instance, apart from acknowledging the significance of the alternative forms of strategy formation and the influence of a range of contextual factors, operations strategy process research has not produced a commonly agreeable framework explaining the alternative forms of strategy development that can be useful to those practitioners who strive to improve organisational performance, or those scholars who aspire to develop more substantial theories of strategy processes. Particularly, in the context of operations strategy, the rationale behind the strategy process-context-performance nexus is, at best, obscure. The vast majority of

previous studies have examined operations strategy processes at such high levels of analytical abstraction and have adopted normative perspectives that they render little support towards operationalising the key constructs. Moreover, despite its popularity and intuitive appeal, the relevance of the prescriptive ‘formal planning’ approach to strategy has been constantly undermined by a number of practicalities: for example, cognitive limitations of decision makers (related to information processing); time and resource constraints that impede the capacity for comprehensive analysis of information; lack of contingency value; and the difficulties faced by managers in implementing strategy in the wake of having to deal with more urgent operational issues (Quintus and George, 2005).

This paper reports on a study that examined the significance of alternative operations strategy processes and selected contextual factors while improving the external validity of the consolidated knowledge developed through recent empirical studies. The evidence drawn from the study confirmed that alternative forms of operations strategy development do indeed exist in practice and that certain organisational factors do influence strategy processes. The analysis also identified four clearly discernible strategy process configurations representing singular and multiple combinations of the three process modes established through the literature review. It was also able to partially explain the differences between these alternative process configurations in terms of certain organisational contextual factors.

SYNTHESISING CURRENT KNOWLEDGE OF OPERATIONS STRATEGY PROCESSES

For the purpose of the study reported in this paper, operations strategy has been defined as ‘the conditional and consistent patterns of decisions and actions of an organisation that determine or shape the resources, capabilities and work routines of its operations system in supporting a set of competitive priorities agreed upon at the business–unit level’ (Anderson et al., 1989; Hill, 1992; Leong et al., 1990; Skinner, 1969; Wheelwright, 1984). The patterns of decisions and actions, as reflected in this definition, acknowledge the both deliberate and emergent aspects of strategy formation. Also implied in this definition are the role and scope of functional strategy that establish its link to the business–level strategy. For instance, within the formal top-down planning approach to strategy development, an agreement on

competitive priorities ought to be reached at the business unit level. As part of this exercise, the operations function is expected to articulate its strategic contribution to business unit-level strategy and garner the support of other functions for the same (Hill, 2005). This will then serve as the overarching framework for guiding decisions and actions within the operations function that support capability building, as well as value creation and delivery, based on an agreed set of competitive priorities. However, in the absence of such formal planning, operations decisions and actions may come about through an intuitive process of managerial interpretation, judgement and entrepreneurial instinct.

The primary focus of the early efforts into studying operations strategy processes has been on articulating the operations strategy construct through conceptual reasoning rather than advancing process understanding through empirical studies (Anderson et al., 1991; Samson and Whybark, 1998). For example, the first process model advocated by Skinner (1969) has conceptualised the operations strategy process by way of articulating the constituent elements and linkages between those elements, including the organisational and environmental factors that influence the strategy process. This model has been later expanded, by incorporating the emerging perspectives of strategy such as the market-based view and resources-based view of competition, but have adopted largely normative and analytical approaches to strategy development (Swamidass and Darlow, 2000; Rusjan, 2005).

Building on these early works, numerous studies have further explored the links between operations strategy and other broader aspects such as organisational context, environmental conditions and business performance, thereby positioning the operations strategy concept within the broader context of business and corporate level strategies (Ho, 1996; Leong et al., 1990; Mills et al., 1995; Swamidass and Newell, 1987; Ward and Duray, 2000; Williams et al., 1995). These later studies have used both conceptual reasoning and empirical data to establish the relationships between major constructs of the operations strategy process, content, context and operations performance. However, due to the inherent limitations of the methods used, including the adoption of predominantly deductive or positivist approaches to research, and the level of analytical abstraction employed, most of these empirical studies have only been able to examine these relationships at an aggregate (macro) level.

A more recent and still growing stream of scholarly work has focused on operationalising the operations strategy concept through various means: disaggregating the macro-level constructs of the above models and frameworks into less abstract elements, including the use of various display formalisms to capture or describe operations strategy processes in practice; devising alternative ways of applying the concept; and developing analytical tools and techniques to assist with strategy development (Berry et al., 1999; Cagliano and Spina, 2000; Cleveland et al., 1989; Fine and Hax, 1985; Garvin, 1993; Hill, 2005; Kim and Arnold, 1996; Mills et al., 1995; Platts and Gregory, 1992; Tan and Platts, 2004).

Overall, there are several attributes common to these research efforts: first, they have been strongly influenced by the rational top-down planning approach to strategy; second, the vast majority of those studies have conceptualised the operations strategy process at a highly abstract level; and third, they have often used quantitative methodological approaches, thus leaving out the rich interactions and organisational processes that form the basis of strategy formation. However, several more recent studies have marked a shift away from this long-standing tradition (bias).

Swamidass and colleagues (2001) have captured three evolving alternatives to the popular top-down rational planning approach used in operations strategy development, namely, a coherent pattern of actions, major improvement programs and the pursuit of core operations capabilities. For instance, they found that consistent patterns of incremental decisions and actions have represented step-wise but focused investments in the operations system aimed at meeting specific competitive priorities. Barnes (2002), based on the findings of a qualitative empirical study, has concluded that operations strategy is formed in a complex process of managerial interpretation under the influence of individual, cultural and political factors. By comparison, Rytter and colleagues (2007) have conceptualised the operations strategy formation process in terms of “events of dialogue and action taking place in five dimensions of change: technical-rational, cultural, political, project management and facilitation” (p. 1107). Their findings have further confirmed the complexities of operations strategy processes that displayed “sequential and parallel, planned and emergent, ordered and disordered and top-down and bottom-up characteristics” (p. 1109) and the influence of, and the interactions between, contextual factors. A more recent empirical

study by Kiridena and colleagues (2009) have constructed three conceptual schemas representing linear and parallel, converging and diverging and sequential and iterative progression of strategic initiatives across four distinct phases identified as initiation, consolidation, commitment and realisation. The multiple modes of initiation, alternative paths of consolidation and differing forms of commitment and realisation constituting three alternative forms of operations strategy development have been explained using the nature of strategic initiatives, their paths of progression and the influence of internal and external contextual factors (Figure 1). As outlined in the next section, the theoretical basis that informed the design of the empirical investigation was drawn from the qualitative empirical studies reported above.

Collectively, these empirical studies have asserted that the alternative ways in which operations strategies develop in practice are neither accurately captured nor adequately explained by the rational planning model alone. Cumulatively, they have provided useful insights into the alternative forms of operations strategy formation, as well as the complementary and contingency roles played by alternative strategy processes. Some of these studies have also explored the influence of internal and external contextual factors (e.g. organisational structure, culture, firm size, maturity, ownership type, market conditions and level of competition) on the strategy process. However, the underlying process dynamics or the organisational processes that form the basis of such alternative approaches to strategy formation have not yet been subject to statistical testing. Therefore, there is a clear need for statistically validating the deeper structures of operations strategy formation developed through the qualitative studies referred to above, to augment the limited understanding provided by the existing normative frameworks. As a first step in that direction, the study reported on in this paper endeavoured to establish the significance of alternative forms of operations strategy processes with causal understanding while improving the external validity of the consolidated knowledge and understanding developed through the qualitative studies reported above. As such, the study has been designed in the form of a large sample questionnaire survey of operations strategy processes that can progressively cover organisations in a range of industry sectors (i.e. manufacturing, distribution, retail and services) and geographical regions.

This paper addresses two related research questions in the context of operations strategy development, as follows:

- What factors contributed to what strategic processes to exist in an organisation; and
- What process configurations existed and how they were related to the various internal organisational and external environmental contextual factors.

EXPLORING THE ALTERNATIVE FORMS OF OPERATIONS STRATEGY DEVELOPMENT

Anecdotal, as well as some empirical, evidence suggest that strategy processes are contingent upon such contextual factors as the nature of the business, level of competition, firm size, the stage of firm development and organisational culture, as well as the professional backgrounds and personal attributes of the decision makers involved (Barnes, 2002; Slevin and Covin, 1997; Mills et al., 1995; Papadakis et al., 1998). Some process characteristics (i.e. temporal dimensions and procedural rationality) of strategic decisions related to operations systems may also vary from organisation to organisation depending on the types of operations process employed (Whybark, 1997). However, as it is not feasible to test an exhaustive list of variables and relationships in a single study, or report all analysis and findings in a single paper, this paper has considered the three alternative forms of operations strategy development, in terms of three modes depicted in Figure 1 (adapted from Kiridena et al, 2009), and the four contextual factors listed in Figure 2 (Barnes, 2002; Rytter et al., 2007), and will report the findings accordingly.

 Insert Figure 1 about here

 Insert Figure 2 about here

The variables representing these two constructs, along with other variables such as the size and maturity of organisations, were measured using 1-5 Likert scale responses in the survey. The survey consisted of 54 questions in total that were organised into four sections: general information; strategy formation; organisational contextual factors; and operations performance. Each of the latent variables was

represented by three to five questions. The online survey requests were sent out to 800 middle to senior – level managers directly responsible for managing operations in 670 organisations in the Canadian oil and gas industry mainly located in the provinces of Alberta and British Columbia. Out of the total of 278 responses returned, only 203 of the surveys were complete and usable for the study.

The data was coded and analysed using SPSS17. First, a reliability analysis was undertaken to test the validity of the survey questions using factor analysis. Then, the two key research questions presented earlier in this paper were addressed using regression analysis, cluster analysis and analysis of variance techniques. However, all the questions included in the survey were not used in the analysis due to statistical reasons (as elaborated elsewhere in the analysis) or other discretionary reasons in relation to the publication of appropriate content to suit the target audience.

EMPIRICAL EVIDENCE SUPPORTING THE SIGNIFICANCE OF ALTERNATIVE OPERATIONS STRATEGY PROCESSES

The sample of data used in this study represented a range of companies from small start-up exploration companies to large multinational production companies. The average age of the firms was 39.25 years with a range of 1-107 years, which indicates that a good majority of the companies would be at the established or pioneering stage of development, and therefore can reasonably expected to have established organisational structures and processes for dealing with issues of strategic significance.

As shown in the Table 1, nearly 60% of respondents worked for the large companies with more than 450 employees. These large companies are more established multinational companies either locally-based or internationally-based. Most of these companies had a significant stake in the Canadian oil and gas industry and continue to invest in large projects. One quarter of the respondents came from small companies. Most of these companies are start-ups or small-scale producers.

Insert Table 1 about here

The sample used in this study also represented a quite diverse organisational setting, as shown in Table 2. For instance, more than 60 percent of the respondents worked for multinational companies while one-third of them worked for privately-owned companies. As shown in Table 1, locally-based proprietary category represented small companies while multinational companies represented larger companies.

Insert Table 2 about here

We believe, the three organisational factors: stage of development (maturity); size of the organisation (as represented by number of employees and annual sales revenue); and ownership type effectively serve as general descriptors of the sample of organisations chosen for this study.

Before empirically testing our propositions, we checked the reliability and dimensionality of the key measures used. Principal component analysis was first used to verify if the proposed three strategy processes exist in practice. The results revealed three distinct factors with each process mode consisting of two items. We then conducted another principal component analysis on contextual variables of formalisation, centralisation, industry competitiveness, and market dynamism. Each of these variables was measured by three questions, but one item was eliminated for industry competitiveness and another for market dynamism due to low factor loading values in rotated component matrix. Tables 3-5 summarise the factor analysis results and descriptive statistics.

Insert Table 3 about here

Insert Table 3 about here

Insert Table 4 about here

Insert Table 5 about here

These results established the statistical significance of the three strategy process modes and the four contextual factors identified through the review of extant literature, hence their existence in practice.

Furthermore, the significance of co-relations between the key factors mean that they can be treated as distinct variables that represent the two key constructs; operations strategy process and context.

To address the first research question, we used stepwise regression (Table 6), which automatically identified independent variables most significantly related to dependent variables.

 Insert Table 6 about here

The results showed that strategy Process mode-1 was positively predicted by Centralisation ($\beta=.200$; $p<.01$). Process mode-2 was negatively predicted by Formalisation ($\beta=-.311$; $p<.001$) but positively by Annual Sales ($\beta=.136$; $p<.001$). Finally, Process mode-3 was negatively predicted by Centralisation ($\beta=-.224$; $p<.001$) and, to a lesser extent, Formalisation ($\beta=-.126$; $p<.10$), but positively predicted by Number of Employees ($\beta=.124$; $p<.10$). These statistics mean that strategy process mode-1 (evolutionary) is more likely to exist in organisations where there is a consultative or decentralised management style, whereas strategy process mode-2 (opportunistic) is more likely to exist in large (in terms of revenue) organisations with mechanistic or hierarchical structures. Strategy process mode-3 (forced) is more likely to exist in large (in terms of the number of employees) organisations with bureaucratic or centralised management styles, as well as largely mechanistic or hierarchical organisation structures. These findings are largely consistent with those of the latest qualitative studies previously referred to in this paper.

In addressing the second research question, we first employed cluster analysis to identify 'process configurations', assuming that these process configurations represent the possible combinations of the three strategy process modes presented in this paper. The two-step clustering led to the identification of four clusters, each accounting for approximately 24%, 19%, 21%, and 36% of the sample, respectively.

 Insert Table 7 about here

As shown in Table 7, the four clusters exhibited distinct features in terms of how each of the three strategy process modes was prioritised and weighted. These results confirm that multiple configurations

of the three process modes do indeed exist in practice, and that the four process configurations are discernible. Therefore, it would be worthwhile to further explore the characteristics of those clusters to see in what ways these configurations differ and if the differences could be explained using the contextual factors identified earlier. As such, we next focus on the characteristics of those process configurations.

Insert Table 8 about here

Insert Table 9 about here

Table 8 provides the mean value of each demographic or organisational variable. One-way ANOVA shows that the configurations were significantly different from each other only in regard to Formalisation and Centralisation. Additional Chi-square analysis suggested that there was no significant difference among the four configurations concerning Number of Employees and Estimated Annual Sales. This means, these process configurations are not differentiated by the size of the organisation, but are more likely to be explained by the differences in the way organisations deal with strategic decisions – i.e. the characteristics of the internal organisational processes, which are driven by factors like organisation structure, culture and management style.

Finally, using Post Hoc multiple comparisons (Scheffe), we looked at Formalisation and Centralisation more closely in light of the ANOVA results. Between-Cluster differences on these two organisational variables can be found in Table 9. The results indicate that organisation structure and management style are two important parameters that differentiate the four clusters.

Overall, our statistical analysis confirmed the significance of the three alternative strategy process modes identified and the organisational contextual factors examined in the study, as applicable to the sample of organisations used. It also established, with the support of statistical evidence, the presence of multiple configurations of strategy processes, combining two or more of the distinctive process modes identified, and partially explained the relationship between the configurations of strategy processes and organisational conditions in which they occur. The inferences drawn from this analysis are as follows.

First, the factor analysis tested the presence of alternative strategy processes. The results showed that strategic decision processes in the oil and gas companies studied, did not always follow the dominant formal planning approach, as depicted in the 'opportunistic' mode presented in this paper. The regression analysis confirmed the relationship between the three strategy process models and selected organisational and environmental factors. One salient organisational factor associated with the formality of strategy processes is the size of the organisation. The operations strategy processes of larger organisations were more closely matched with the forced and opportunistic modes of strategy formation while those of the smaller firms were closely matched with evolutionary modes. These findings are highly consistent with the findings of previous studies – there is already wide ranging consensus among researchers on the relationship between the size of the organisation and the procedural rationality of strategy processes.

Finally, the results of cluster analysis confirmed the presence of multiple configurations of strategy process modes: that is, the four distinct clusters or sub-groups within the sample may represent combinations of the three modes of strategy formation depending on the organisational and environmental conditions applicable to each sub group. The analysis of variance between clusters revealed that although they can be differentiated based on the degree of centralisation and formalisation there were no significant differences between the clusters in relation to the size of the organisation, both in terms of the number of employees and annual sale revenue. This finding provides further insights in to strategy formation in practice, as it suggests that the presence of multiple process configurations are not necessarily influenced by size of the organisation.

CONCLUSIONS, LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

The empirical evidence drawn from the study confirmed that alternative forms of strategy development do indeed exist in practice and that the selected organisational and environmental factors did influence strategy processes. The relationship between the three strategy process modes proposed and the two key organisational contextual factors studied was found to be statistically significant. As such, it can be concluded that strategy processes in the evolutionary mode are more likely to be present in

organisations where there are consultative or decentralised management styles (irrespective of their size), whereas strategy processes in the opportunistic mode (closest match to the formal planning approach) are more likely to be present in large organisations with mechanistic or hierarchical structures. Strategy processes in the forced mode are more likely to exist in large organisations with bureaucratic or centralised management styles and largely mechanistic or hierarchical organisation structures. We believe these findings help advance our understanding of operations strategy processes and contribute to theory building, particularly what is known as ‘mid-range’ theory, because the evidence was built through the statistical analysis of a large sample of organisations. However, to be able to draw inferences that are useful for practice, we would need to establish the significance of these alternative processes in relation to operations performance – which we did not undertake to report in this paper.

The multiple process configurations identified through the analysis provided statistical evidence supporting the possibility of two or more of the three strategy process modes to co-exist, depending on the organisational conditions under which they occur. However, this study could not comprehensively explain the relationship between these process configurations and the organisational contextual factors. This evidence supports the findings of previous qualitative studies that asserted the presence of one or more alternative forms of strategy development alongside the dominant top down planning process (Swamidass et al., 2001) and the claims that operations strategy is formed in a process of managerial interpretation (Barnes, 2002) or as events of dialogue and action (Rytter et al., 2007). These findings further highlight the equivocal nature of strategy formation in complex and evolving contexts, and the challenges researchers face in conceptualising socio-technical phenomena such as strategy processes.

The above aspects could be further explored in future studies, preferably using mixed-methods and through synthesis of existing evidence. However, in future publications that are based on this study, the analysis will be extended to determine whether particular forms of operations strategy formation within specific organisational contexts are positively or negatively related to superior performance, including direct and/or moderating effects of such contextual factors.

REFERENCES

- Anderson, J. C., Cleveland, G. & Schroeder, R. G. 1989. Operations strategy: a literature review. *Journal of Operations Management*, 8(2): 133–58.
- Anderson, J. C., Schroeder, R. G. and Cleveland, G. (1991), The process of manufacturing strategy: some empirical observations and conclusions. *International Journal of Operations & Production Management*, 11 (3): 86 – 110.
- Barnes, D. 2002. The complexities of the manufacturing strategy formation process in practice. *International Journal of Operations & Production Management*, 22 (10): 1090–1111.
- Berry, W. L., Hill, T. & Klompmaker, J. E. 1999. Aligning marketing and manufacturing strategies with the market. *International Journal of Production Research*, 37(16): 3599–3618.
- Cagliano, R. & Spina, G. 2000. How improvement programs of manufacturing are selected: the role of strategic priorities and past experience. *International Journal of Operations & Production Management*, 20(7): 772–791.
- Cleveland, G., Schroeder, R. G. & Anderson, J. C. 1989. A theory of production competence. *Decision Sciences*, 20(4): 655–668.
- Dale, M. W. 2002. Issue-driven strategy formation. *Strategic Change*, 11(3): 131 – 142.
- Fine, C. H. & Hax, A. C. 1985. Manufacturing strategy: A methodology and an illustration. *Interfaces*, 15(6): 28–46.
- Garvin, D. A. 1993. Manufacturing strategic planning. *California Management Review*, 35(4): 85–106.
- Hayes, R. H. 1985. Strategic planning: forward in reverse? *Harvard Business Review*, 63(6): 111 – 119.
- Hill, T. 2005. **Operations Management**, United Kingdom: Palgrave Macmillan.
- Ho, C. 1996. A contingency theoretical model of manufacturing strategy. *International Journal of Operations & Production Management*, 16(5): 74–98.
- Kim, J. & Arnold, P. 1996. Operationalizing manufacturing strategy: an exploratory study of constructs and linkage. *International Journal of Operations & Production Management*, 16(12): 45–73.
- Kiridena, S., Hasan, M. & Kerr, R. 2009. Exploring deeper structures in manufacturing strategy formation processes: a qualitative inquiry. *International Journal of Operations and Production Management*, 29(4): 386 – 417.
- Leong, G. K., Snyder, D. L. & Ward, P. T. 1990. Research in the process and content of manufacturing strategy. *OMEGA International Journal of Management Science*, 18(2): 109–22.
- Mills, J., Platts, K. & Gregory, M. 1995. A framework for the design of manufacturing strategy processes. *International Journal of Operations & Production Management*, 15(4): 17–49.
- Mintzberg, H. 1978. Patterns in strategy formation. *Management Science*, 24(9): 934–948.
- Mintzberg, H., Raisinghani, D. & Theoret, A. 1976. The structure of un-structured decision processes. *Administrative Science Quarterly*, 21(2): 246 – 75.

- Papadakis, V. M., Lioukas, S. & Chambers, D. 1998. Strategic decision-making processes: the role of management and context. *Strategic Management Journal*, 19(2): 115–147.
- Platts, K. W. & Gregory, M. J. 1992. Manufacturing audit in the process of strategy formulation. *International Journal of Operations & Production Management*, 10(9): 5–26.
- Quintus, R. J. & George, J. M. 2005. Emergent strategies and their consequences: a process study of competition and complex decision making. *Advances in Strategic Management*, 22: 387–411.
- Rusjan, B. 2005. Modelling for manufacturing strategic decision making. *International Journal of Operations & Production Management*, 25(8): 740–761.
- Rytter, N. G., Boer, H. & Koch, C. 2007. Conceptualising operations strategy processes. *International Journal of Operations & Production Management*, 27(10): 1093–1114.
- Samson, D. & Whybark, D. C. 1998. Guest Editorial. *Journal of Operations Management*, 17(1): 3–5.
- Skinner, W. 1969. Manufacturing – missing link in corporate strategy. *Harvard Business Review*, 47(3): 136–145.
- Slevin, D. P. & Covin, J. G. 1997. Strategy formation patterns, performance and the significance of context. *Journal of Management*, 23(2): 189–209.
- Swamidass, P. M., Darlow, N. 2000. Manufacturing strategy. In Swamidass P. M. (edited), *The Encyclopaedia of Production and Manufacturing Management*, Kluwer Academic Press, Boston, Massachusetts. pp. 417–422.
- Swamidass, P. M., Darlow, N. & Baines, T. 2001. Evolving forms of manufacturing strategy development: evidence and implications. *International Journal of Operations & Production Management*, 21(10): 1289–1304.
- Swamidass, P. M. & Newell, W. T. 1987. Manufacturing strategy, environmental uncertainty and performance: a path analytical model. *Management Science*, 33(4): 509–524.
- Tan, K. H. & Platts, K. 2004. Operationalising strategy: mapping manufacturing variables. *International Journal of Production Economics*, 89(3): 379–393.
- Teece, D.J. 2010. Business models, business strategy and innovation. *Long Range Planning*, 43: 172 – 194.
- Ward, P. T. & Duray, R. 2000. Manufacturing strategy in context: environment, competitive strategy and manufacturing strategy. *Journal of Operations Management*, 18(2): 123–38.
- Wheelwright, S. C. 1984). Manufacturing strategy: defining the missing link. *Strategic Management Journal*, 5(1): 77–91.
- Williams, F. P., D’Souza, D. E., Rosenfeldt, M. E. & Kassaei, M. 1995. Manufacturing strategy, business strategy and firm performance in a mature industry. *Journal of Operations Management*, 13(1): 19–33.

FIGURES AND TABLES

Figure 1: Alternative Forms of Operations Strategy Formation

PROCESS	INITIATION	CONSOLIDATION	COMMITMENT	REALISATION
MODE-3	FORCED: Parent company directives Top managers' initiatives Reactions to competition Regulatory compliance	ENFORCED: Adaptation Charismatic influence Position power	AUTHORISATION: Based on formal authority	EXECUTION: Compliance
MODE-2	OPPORTUNISTIC: Event triggered Technology-driven Market or customer-driven Entrepreneurially driven	NEGOTIATED: Political manoeuvring Balance of forces Rational choice	AUTHORISATION: Confirmation of dominant view AFFIRMATION: Forced (circumstances)	IMPLEMENTATION: Interpretative process
MODE-1	EVOLUTIONARY: Growth-based Improvement needs Operational problems Intrapreneurial behaviour	CONSENSUS-BUILDING: Collective agreement Learning by doing	AFFIRMATION: Voluntary (aspirations)	ACTIONING: Cumulative effect

Figure 2: Organisational Context – Internal and External Contextual Factors

Organisational Context	Internal	Formalisation (organisation structure)	Mechanistic/Hierarchical
			Organic/Flattened
		Centralisation (managerial style)	Bureaucratic/centralised
			Consultative/distributed
	External	Industry competitiveness	Intense
			Moderate
		Market dynamism	Stable
			Volatile

No. of employees	% of respondents
Less than 30	14.2
30-150	12.0
151-450	16.7
More than 450	57.1

Table 1: Number of Employees within the Whole Organisation

Firm ownership type	% of respondents
Locally based-proprietary	25.7
Locally based-listed	15.2
Multinational-local subsidiary	27.8
Multinational-locally based	26.6
Other	4.6

Table 2: Firm Ownership Type

Measure/Item	Factor Loading		
	factor 1	factor 2	factor 3
<u>Process Mode-1: Evolutionary (Item=2)</u>			
Along least formal/loosely structured paths/routes at the discretion of line and/or junior managers based on common understanding/informal agreement among stakeholders (i.e. people involved or affected by).	.114	.814	-.158
Along less formal paths/routes under the guidance of managers but with formal approval of the higher authority	-.040	.849	-.004
<u>Process Mode-2: Opportunistic (Item=2)</u>			
Always sanctioned by senior management at a number of stages before being fully realised	-.017	.002	.824
Most of the time, proceed according to a pre-determined plan with formal progress monitoring/assessments carried out at progressive stages before they are finally realized/fully implemented	.108	-.148	.730
<u>Process Mode-3: Forced (Item=2)</u>			
Executed with little or no prior knowledge/consultation of workers and/or often end up in industrial tribunals	.869	.132	.030
Met with resistance from the employees but completed as planned/intended most of the time with some adjustments	.867	-.058	.067
Variance Explained	25.56 %	23.77 %	20.72 %

Table 3: Strategy Processes (Progression) – Factor Analysis Results

Measure/item	Factor Loading			
	factor1	factor2	factor3	factor4
Formalisation (alpha: Total =.728; Item=3)				
Highly structured channels of communication (1) / Open channels of communication throughout the organization (5)	.669	.347	-.095	.180
Strong emphasis on following formal rules and procedures (1) / Loose, informal control: heavy dependence on informal relationship (5)	.810	.048	.080	-.040
Strong emphasis on adherence to formal job descriptions (1) / Strong tendency to let the circumstances determine job requirements (5)	.822	.112	.000	-.067
Centralisation (alpha: Total =.650; Item=3)				
The most say in decision making stays with line managers (1) / Decision making based on expertise irrespective of line authority (5)	.373	.617	.051	-.106
Restricted access to financial/operating information (1) / Free access to and flow of financial/operating information (5)	-.075	.807	-.094	.023
Strong emphasis of top-down control/authority (1) / Emphasis on worker empowerment and team work (5)	.326	.763	.073	.117
Competition (Item=2)				
The failure rate of firms in the industry is very high (1) / The failure rate of firms in the industry is very low (5)	-.045	.109	.293	.617
There are no major barriers to entry in to the market (1) / Entry into this market is constrained by high	.033	-.056	-.071	.845
Dynamism (Item=2)				
Customers freely switch between competitor offerings (1) / Customers in the market always stay with the same product /firm (5)	.159	-.128	.746	.128
Market undergoes rapid fluctuations in demand (1) / Market is characterized by stable levels of demand (5)	-.127	.101	.830	.018
Variance Explained	20.76%	17.90%	13.69%	11.76%

Table 4: Organization Context – Factor Analysis Results

Variables	1	2	3	4	5	6	7	8	Mean	s.d.
1.Process mode-1	1								3.08	.88
2. Process mode-2	-.193**	1							3.57	.80
3. Process mode-3	.077	.098	1						2.22	.85
4. Years in business	-.027	-.022	.104	1					21.04	23.54
5. Formalisation	.131*	-.354**	-.197**	-.148*	1				3.22	.95
6. Centralisation	.196**	-.197**	-.249**	-.048	.407**	1			3.00	.89
7. Competition	-.082	.054	-.037	-.052	.048	.034	1		3.43	.89
8. Dynamism	.070	-.037	.034	-.036	-.012	.020	.149*	1	2.50	.94

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

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

Table 5: Descriptive Statistics and Correlations Among all Variables Used

Dependent Variable: Process 1(n=203)

Step No.	Independent Variable	R square	F-value	Beta	Sig.
1	Centralization	.040	8.326	.200*	.004

Dependent Variable: Process 2(n=202)

Step No.	Independent Variable	R square	F-value	Beta	Sig.
1	Formalisation	.105	23.19	-.324**	.001
2	Formalisation	.123	4.10	-.311**	.001
	Estimated annual sales			.136*	.039

Dependent Variable: Process 3(n=203)

Step No.	Independent Variable	R square	F-value	Beta	Sig.
1	Centralisation	.050	10.49	-.224**	.001
	Employee numbers			.124	.072
	Formalisation			-.126	.095

** The result is significant at the 0.01 level.

*The result is significant at the 0.05 level.

Table 6: Results of Stepwise Regression

	Clusters				ANOVA(F)	Sig.
	1	2	3	4		
Process 1	3.26	3.01	1.94	3.64	80.195	.001
Process 2	3.61	2.42	4.05	3.87	81.804	.001
Process 3	3.50	1.74	1.94	1.78	192.576	.001
Size	57	45	49	86		
%	24.1%	19.0%	20.7%	36.3%		

Scores of each cluster descriptor ranges from 1 to 5 (high-low level).

Table 7: Cluster Solution

	Clusters			Clusters			3	4	Sig.
	1	2	3	4	1	2			
<u>Cluster Variable</u>	<u>Mean</u>			<u>Std. Deviation</u>			<u>Sig.</u>		
Years in Business	24.58	20.48	22.11	18.69	25.93	24.01	25.48	20.55	.572
Formalisation	2.98	3.67	2.99	3.27	.997	.933	.886	.891	.001
Centralisation	2.66	3.36	2.82	3.15	.899	.893	.900	.793	.001
Competition	3.33	3.28	3.69	3.43	.898	.810	.929	.886	.104
Dynamism	2.42	2.64	2.32	2.60	.865	.979	.882	.991	.236

Table 8: One-way ANOVA Results of Clustering

Dependent Variables	Clusters	Mean Difference	Std. Error	Sig.
<u>Formalisation</u>	1-2	-.692*	.184	.003
	2-3	.681*	.188	.006
<u>Centralisation</u>	1-2	-.695*	.173	.001
	1-4	.490*	.147	.012
	2-3	.540*	.179	.003

*The mean difference is significant at the 0.05 level.

Table 9: Multiple Comparisons in Clusters