OPERATIONS MANAGEMENT STRATEGIES FOR HIGH VELOCITY, MATURE AND DECLINING INDUSTRIES: A COMPARISON BETWEEN DEVELOPED AND DEVELOPING COUNTRIES

Ian Hipkin[1] and David Bennett[2]

1 - School of Business and Economics, University of Exeter, Exeter, EX4 4PU, United Kingdom
Email: i.b.hipkin@exeter.ac.uk

2 - Aston Business School, Aston University, Birmingham B4 7ET, United Kingdom
Email: d.j.bennett@aston.ac.uk

ABSTRACT

Local conditions and industry characteristics impose a variety of constraints on firms in developed and developing countries. Difficulties for firms in the latter frequently mean that technology imported into developing countries is not effectively assimilated. A firm's activities and industry sector set a context that influences the choice of strategic and operational processes. The challenge is to establish parameters for competitive advantage in a particular industry environment. This paper studies the impact of an industry's stage of development in two countries (UK and South Africa), by comparing the functional strategies and operational approaches of case studies in an emerging and high velocity sector, in a mature environment, and in a declining industry. The study finds that country differences and the stage of development of an industry play a significant role in differentiating strategies and operational activities in similar firms, and that firms in developing countries may benefit from certain advantages.

Keywords: Operations, strategy, country differences

INTRODUCTION

A challenge for managers is to match a firm's strategy with its competencies and market position bearing in mind the characteristics of the industry in which it operates. Industry environments may be characterised in a number of ways: emerging, high velocity, mature, stagnant, declining, fragmented (Thompson and Strickland, 2003). Within each of these, firms may be a first mover or follower, and occupy a strong or crisis-ridden position. Firms may find themselves in a stagnant or declining industry environment as a result of history, technological developments, changes in demand patterns, and so on, but no one would actively seek a position of weakening fortunes. The literature suggests a number of

approaches to guide managers on a course of action that should lead firms in each environment to attain greater competitive advantage.

In an attempt to understand the impact of the phase of progression within an industry and the influence of a country's stage of development, this paper compares functional strategies and operational approaches of firms in a number of industry environments in a developed and developing country context. Broadly comparable firms in the UK and South Africa have been selected from emergent and high velocity firms, the mature sector, and declining industries. The methodological approach follows that of Meredith (1987) whereby postulates are derived from a review of the literature, and considered in the light of experiences in a number of case studies. The paper seeks to identify common elements and country differences in three sectors that will guide managers in establishing crucial concepts for operating in different industries and locations. The structure of the paper is as follows: the next section considers concepts from the literature pertaining to high velocity, mature and declining industries. This is followed by formulation of the postulates and a description of the 6 case studies, and a discussion of the cases in relation to the postulates. The paper ends with consideration of the implication for managers and a conclusion.

CONCEPTS FROM THE LITERATURE

Operations strategy incorporates policies relating to manufacturing (decisions about investments and capacities, technology, supplier networks, products and processes), organisational architecture (scope and responsibility), and management control (performance indicators, management information systems) (Barney, 1991; Fleury, 1999). Decision-making is not linear, and occurs as a series of clusters of interaction and integration necessitating a confluence of technology and corporate strategy (Xu et al, 1998). An essential issue in strategy implementation is the allocation of resources to develop products and processes as determinants of technological capability and core competencies (Virasa and Tang, 1999).

Firms in developed and developing countries are subject to a variety of constraints, which depend on industry characteristics and local conditions. Developing economies face a host of financial limitations, political considerations, deficient infrastructure, poorly developed markets, and an inadequately educated workforce. As a result, technology imported into developing countries is not necessarily assimilated or diffused. A policy of deskilling can be competitively disadvantageous where markets favour firms that offer frequent and intricate customisation changes to production processes (Williams, 1996). While automation may obviate the need for skilled operators and ensure consistently high quality, it is not always possible to capture all activities in procedures. The level of knowledge of a process should be taken into account when contemplating changes through proceduralisation and automation (Bohn, 1994).

Emerging and high velocity sectors are characterised by new and unproven markets (Thompson and Strickland, 2003). Marketing to first-time buyers involves inducing the initial purchase and overcoming customer concerns. Product life-cycles are typically short, and frequent competitive moves aim to respond to rapidly changing customer expectations. Firms strive to win the early race for industry leadership by seeking to create a dominant technology that will entrench first mover advantage and ensure quick response capabilities. This frequently requires collaboration with strategic partners.

De Wit and Meyer (2004) see the need for evolving a coherent plan of action through exploration and learning that will enable firms to react opportunistically to new conditions. In exploring the unknown firms hope to create knowledge and discover new product and process possibilities. Management teams must learn to learn, and learning comes through experimentation. Firms are not afforded the luxury of extensive research, study and analysis to generate a perfect plan (Govindarajan and Trimble, 2004).

Mature industries, with less scope for differentiation advantage, are characterised by carefully developed production methods, long-established markets, well-informed customers and rivals, widely used technologies, and tightly controlled working procedures. They seem to exhibit 'industrial era' characteristics with a narrow range of products and sustained mass-production operations, regularly subjected to productivity improvement programmes (Tracey et al, 1999).

Technology, strategy and competencies in operations and maintenance have direct influence on mature industries. With technological advantage difficult to attain and change infrequent, stable products and long-established quality standards introduce degrees of inertia that solidify existing arrangements that do not encourage alertness in responding to the need for change (Jelinek, 1996). Investments in new process technologies create potential advantages in offering the ability to do what was previously not possible. The difficulty for mature industries with established practices is overcoming uncertainty in terms of the relevance of new processes, how new technology blends into organisational structures, and the willingness of employees to change task behaviors (Zmud, 1984).

In declining industries, demand declines or grows more slowly than the economy as a whole, while competitive pressures intensify as rivals battle for market share. Firms are obliged to focus on their fastest growing market segments, and stress differentiation based on quality improvement or product innovation (Thomson and Strickland, 2003). Aggressive cost reduction dominates managerial thinking, while consolidation, reduction of capacity, productivity improvements and outsourcing receive considerable attention.

METHODOLOGY AND CASE STUDIES

The methodological approach in this study follows that of Meredith (1987) whereby postulates are derived from the literature and studied with reference to a number of case studies. The strategy and operations literature discussed in the previous section leads to the formulation of the following postulates:

Postulate 1: Emerging and high velocity industries move quickly to attain first mover advantage and dominate the technology.

Postulate 2: Mature industries seek cost reductions through limiting the product range, and emphasising process innovation.

Postulate 3: Declining industries stress quality improvement, product innovation and outsourcing to lower the costs of all activities.

Postulate 4: In a global environment, operational strategies are essentially the same in all industry sectors.

These are assessed in the next section with reference to experiences and activities in a number of case studies. The three UK and three South African cases selected in each of the three categories (emerging, mature, and declining) are described briefly in Table 1.

Table 1 - Summary of case organisations

	UK	South Africa
Emerging (Health-care informatics)	*MedUK*: a technology-based information company that designs and builds medical diagnostic equipment (health care informatics). Working with a South African firm to develop diagnostic equipment and knowledge repositories	*MedSA*: alliance partner with MedUK to provide healthcare diagnostics and establish a reputation as a manager of health information. Hardware and components sourced and assembled in South Africa, and shipped to UK customers
Mature (Paper)	*PaperUK*: produces speciality printing paper. To compete in international markets quality enhancements and flexibility sought using new coater technology	*PaperSA*: manufacturer of toilet tissue. Rewinders, core and log handling, and packing machines upgraded to meet quality and delivery requirements of international customers
Declining (Steel)	*SteelUK*: integrated steel mill suffering from low international steel prices, tariffs and dumping introduced cost cutting exercises, and sought operational efficiencies	*SteelSA*: competition from cheaper integrated steel works led to focus on specialised production of special grades of steel for international markets through new investment and plant upgrades

DISCUSSION OF CASES AND POSTULATES

This section discusses the experiences in the case studies and assesses the validity of each postulate.

Postulate 1: Emerging and high velocity industries move quickly to attain first mover advantage and dominate the technology

The strategy of MedUK and MedSA was to gain first mover competitive advantage. They regularly held discussions with doctors to establish which medical issues should be incorporated in their healthcare diagnostic equipment. Aggressive investment in R&D was a feature of the firms' strategy in order to perfect technology, and develop novel performance features and quick responses to customer requests. They were reluctant to form strategic alliances with technology partners because of the desire to keep the technology and developments secret. However, self-sufficiency proved too expensive, so technology suppliers and software developers were used in developing new systems.

Although the two organisations worked in parallel and shared information and knowledge, certain differences emerged, partly because of the structural issues in medical care in the two countries. The dominant position of the National Health Service (NHS) in the UK meant that MedUK dedicated much of its time to the NHS, whereas in South Africa MedSA did not involve the state health sector at all. The flexibility of being able to work with private medical doctors and hospitals enabled the South African firm to become far more innovative. The South Africans developed new user applications through using cutting-edge expertise despite operating in a new and unproven market. Both found it difficult to overcome technology barriers and past practices, as buyers (private doctors and hospitals in South Africa and the NHS in the UK) remained extremely cautious when confronted by new and unknown technology.

The evidence from the cases is that both firms sought to move quickly to attain first mover advantage and create the standard for the emerging technology. This strategy would therefore support the first postulate. In addition, the context plays a major role in that a controlled market environment limits the pace at which the firm can move (as was the case in the UK). Regulation also hindered the speedy implementation of new technology, and in this case all competitors in an industry are subject to the same restraints. However, the South African firm was able to develop, test and market new products far quicker than MedUK.

Postulate 2: Mature industries seek cost reductions through limiting the product range, and emphasising process innovation.

The literature suggests that in mature industries, efforts should be made to increase sales to existing customers and reduce costs through rationalisation of the product range. Although slowing demand was generating intense competition, particularly by international competitors and it was increasingly difficult to attract new customers, PaperUK was unable to reduce its product range as a significant competitive requirement for survival in this industry was the ability to meet demand for an expanding range of speciality paper products. This required flexibility to produce relatively small quantities. Overall volumes (tonnage) of paper output were not increasing.

PaperSA was able to export because of the relative weakness of the South African currency. However, exports also required an ability to produce a wide range of products for sophisticated international buyers. In both cases great emphasis was placed on cost, quality and service. Product innovation possibilities were difficult to achieve, so both firms had to concentrate on process innovation. PaperUK had acquired new coater technology to speed up product changes and improve quality. PaperSA had invested in a new process for processing and handling 'logs' in toilet roll production. Early attempts to automate the process completely were thwarted by inadequate knowledge of the process. One example of this was the amount of glue required to seal the end of each roll. Customer specifications varied to such a degree that the equipment was unable to meet all requirements. Protracted discussions with customers eventually led to a single quality standard.

PaperUK had adopted a strategy of taking over smaller competitors at 'bargain prices', but the costs of absorbing paper mills with different technologies and operating systems, and retrenching surplus workers had been much higher than anticipated. Further, improving quality had proved exceptionally difficult. Other strategies showed no distinctive features that distinguished PaperUK from its main competitors. PaperSA's strategy appeared to concentrate on price competition, and all managerial efforts (such as upgrading the log handling facilities) were directed at achieving this.

The differences between PaperUK and PaperSA seemed to lie in the latter's ability to rejuvenate its operations. Managers reported great resistance to innovation at PaperUK, as conventional thinking dominated all operational discussions. Speciality paper had always been viewed as the product range that depended on quality. Quality levels were frequently too high and therefore too expensive, but managers experienced great difficulties in changing the mindset of process staff who set quality standards, quality inspectors and production staff. PaperSA's export markets required various grades of quality, and the firm was able to be flexible in the quality of its output.

Postulate 3: Declining industries stress quality improvement, product innovation and outsourcing to lower the costs of all Activities.

Both SteelUK and SteelSA were obliged to meet global standardisation of product attributes and convergence of consumer demands, international competition and falling industry profitability. While mergers, closures of plants and limiting the product range in the UK had lowered costs, these were not proving sufficient, partly because SteelUK had been too slow in responding to price-cutting and reducing excess capacity. It had not adapted its competencies to changing customer expectations in terms of quality, flexibility and cost. Its moves to improve productivity consisted of limited refocusing, with belated attention paid to capacity considerations and employee productivity. SteelUK concentrated on short-term profitability rather than strengthening long-term competitiveness. A Six Sigma programme was introduced to address a number of perceived weaknesses, the first of which was prioritising processes with the highest priority for improvement, as this led to maximum leverage and customer satisfaction: providing consistent quality. The analysis phase of Six Sigma highlighted a number of sources of defect that had to be improved and controlled in order to address quality inconsistencies. Poor plant availability was a significant reason for inability to meet orders.

The challenges to SteelSA were to address excess capacity in its integrated steel mill, the lack of technical innovation which was manifested in poor new product offerings, old equipment and an aging labour force. The firm recognised that technology-based advantage was limited, so it saw no option other than launching new products to be marketed to entirely new export markets, and to compete locally with imported special grades of steel. The firm decided on a dual strategy: an aggressive programme to reduce excess capacity, and differentiated expansion through specialised steel manufacture. The former was part of a ruthless cost reduction policy that extended to the workforce and overheads. The latter required a substantial investment in R&D, and new plant and equipment.

Like PaperSA under the previous postulate, SteelSA had to embrace new technologies and novel approaches to dealing with demanding export markets. This was a great challenge as the local steel industry had been protected in various ways for decades, and employees were unfamiliar with the idea of building face-to-face relationships and meeting ambitious targets. While previous strategies had been directed towards process improvements and cost reduction, entry into new markets required a review of the product range. This required an enhancement of the role of, and moving strategic and operational decision making to, business-level managers. The emphasis on economies of scale on a large-scale production basis was replaced by increased responsiveness to customer requirements. This was achieved through encouraging teamwork and cooperation. Such activities were largely unknown until specialised steel production commenced. While the emphasis on cost efficiency remained, "the conditions for cost efficiency changed ... the requirements for dynamic efficiency (were) different from the requirements for static efficiency" (Grant, 2003: 380). "Dynamic efficiency" referred to a radical approach of entrusting staff at lower levels with responsiveness and flexibility decisions.

The main difference between the UK and South African firms was that SteelUK concentrated on its cost reduction programmes with a longer term commitment to specialise on quality that could not be achieved by developing country producers. SteelSA moved quickly to new products and new markets. Through its technological base and

ability to invest in new plant it was able to compete with global steel producers on price in specialised markets.

Neither firm was involved with much outsourcing, so there is no support for that aspect of the postulate. Quality improvement had become essential, but only in SteelSA did product innovation become a dominant characteristic of strategic and operational thinking.

Postulate 4: In a global environment, operational strategies are essentially the same in all industry sectors.

Grant (2003: 374) quotes research that states "It is the firm that matters, not the industry. The industry sets a context, not a prison for the firm. Not only can the creative firm achieve success within a hostile environment, it can transform its industry environment ... strategic innovation is the basis for competitive advantage in industries where the potential for competitive advantage seems limited ... the pursuit of strategic innovation requires an entrepreneurial organisation with freedom to experiment and the capacity to learn ... rejuvenation requires a sequence of strategic and organisational development ... in the new industrial order, it is the insurgents versus the incumbents".

These statements suggest that operational strategies rest on decisions made by individual firms. The case studies partially support this contention in that firms need to break with the 'conventional wisdom' that seems to apply to their industry. The South African firms were more easily able to free themselves from environmental constraints. The technology that enabled them to do so was imported from developed countries, so the challenge was to make best first mover use of technology developed elsewhere. MedSA was able to develop products because of a less regulated health environment. Lower cost structures enabled PaperSA and SteelSA to compete more easily in international markets. In the longer term, it will be interesting to assess how enhanced technological abilities in the UK firms allow them to regain and overtake the competitive positions of firms in developing countries.

IMPLICATIONS FOR MANAGERS

High velocity sectors on the one hand, and mature and declining industries on the other exhibit certain fundamentally different characteristics. Mature and declining industries differ in the degree to which they have carefully developed production methods. Both operate in long-established markets, with well-informed customers and rivals, and widely used technologies. Procedures are formalised under tightly controlled work programmes with regular reporting on variances from standard practice. They seem to exhibit 'industrial era' characteristics with a narrow range of products and sustained mass-production operations that are regularly subjected to productivity improvement initiatives. The paper and steel case organisations undertook a number of such interventions. Under these circumstances it is not easy to implement innovative technology-driven strategies. SteelSA's innovations only proved advantageous when they entered new markets.

At times mature industries faced the same challenges as those confronting high velocity firms in terms of rapid and discontinuous change, intense competition, new technology, and regulation. While demand may be slowing, and the number of industry rivals reducing through mergers and acquisitions, mature industries must also contend with international competitors and new, more sophisticated end users, but the danger is a failure to recognise frequent shifts in key areas of competition. The cost reduction policies of the paper and

steel firms were unexciting strategies with no distinctive features, and potentially left them 'stuck in the middle' with few options for improving their positions, and an obsolete skills and inaccurate information base. SteelSA acquired technological expertise and the ability to respond to new developments. To become competitive mature and declining industries would benefit from the agility, opportunism and resource flexibility that used to be the domain of the high velocity sector (Thompson and Strickland, 2003). It therefore appears that there are differences between the three sectoral categories, but they do exhibit some similarities.

New technology and innovations that enabled PaperSA and Steelco to enter new markets have not reversed the underlying trends confronting them, but to some extent their actions have retarded the processes of maturing and declining. Features such as agility and flexibility have become essential in all sectors. Mature and declining industries will suffer from slowing demand and strong competition, falling industry profitability, more sophisticated buyers, and a greater emphasis on cost and service. The challenge is to break the trends which the literature describes as "characteristic" of these firms: being slow to adapt competencies to changing customer expectations, being slow to respond to price-cutting, having too much excess capacity, overspending on marketing, and failing to pursue cost reductions aggressively (Thompson and Strickland, 2003). Achieving these will not make them "high velocity" firms, but the case studies have shown typical actions that can make firms more competitive.

The contribution of this study is threefold. Firstly, it identifies distinct strategic and operational characteristics pertaining to a number of industry environments. Secondly, it provides examples of changing strategic and operational actions that differentiate firms in the same sector, while demonstrating similarities with features of other sectors. Thirdly, it reveals differences in developed and developing countries that require contrasting management interventions in the same industry sector.

The findings confirm the first postulate. Emerging and high velocity industries seek first mover advantage through R&D investment to strengthen the quest for a leadership position. Improved quality and extensive performance features assist in expanding the customer base and establishing brand loyalty. Strategic alliances can broaden the technology base and develop fast response capabilities, but may lead to a diffusion of proprietary technology. The cases were reluctant to form alliances, but R&D costs and the need to reduce development time drove them to do so. Regulations retard the process of adapting competencies and creating new competitive capabilities that speed up the time for new products to reach the market, but such constraints affect all competitors.

The second postulate is supported in mature industries in that efforts seek to rationalise the product range and reduce costs. Attempts are made in process innovation but financial considerations may well preclude radical changes in industries were profitability and long-term growth prospects are low. When firms in the mature sector expand to serve international markets, the emphasis in new or upgraded plants is greater efficiency through process improvements, improved quality and flexibility.

The third postulate relating to declining and stagnant industries is supported in that all interventions are directed at cost reduction. These aim to rationalise marginal value chain activities, as the over-riding emphasis is on low-cost leadership. Measures include closing lines or plants, and dispensing with low profit or loss-making products, although inertia in the case organisations resulted in action being taken long after it should have been. There was little evidence of outsourcing as suggested in this postulate.

CONCLUSION

Although the first three postulates are generally supported in both the UK and South African firms, differences do emerge, and to that extent the fourth postulate is not fully supported by the case study findings. Emerging and high velocity firms in South Africa tend to rely on innovations from abroad. Although South African consumer market demands do not significantly lag behind those in the UK, South African firms are constrained by a less sophisticated workforce and financial limitations. In mature industries, less emphasis is placed on process innovation, as technological improvements are generally developed by the original equipment manufacturers in developed countries. The South African firms showed greater initiative in expanding markets, but this was partly because of their ability to export. Firms that are declining or stagnant in the UK may not necessarily have reached the same degree of stagnation in South Africa as lower cost structures may still provide longer-term sustainable cost advantage.

The study shows essential strategic and operational features in the three industry environments that apply to both a developed country (UK) and a developing country (South Africa). It also reveals important differences, which are invaluable for organisations pursuing strategies of international expansion or moving facilities to developing parts of the world.

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