Opportunity Capture and Growth Strategies for Regional Ports: A Modelling Approach

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Declaration of Originality

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university and, to the best of my knowledge and belief, the thesis contains no material previously published or written by another person, except where due reference is made in the text.

Mateus Magala

Melbourne, February 2, 2004

Dedication

I wonder why my late mother was fascinated with the idea of me doing a PhD even though she did not understand what it entailed.

As I think about it, only one thing could justify her fascination – the trust that whatever challenge I take it must be worth something, and that I will always do the best I possibly can to be up to the challenge. This is the woman who always believed in me and has inspired my imagination over the years.

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Abstract

Regional ports adjacent to capital city ports have often developed as bulk ports (Hilling and Hoyle 1984), but for most there is a recognition that they may be no longer able to rely solely on the benefits of exploiting bulk commodities and trades to sustain competitive advantage and growth. To attain growth and survival there is the perception and often the reality that they need to diversify their trade base or/and enter new markets – most of which are likely to be dominated by their capital city ports. But challenging the market dominance of established capital city ports is likely to be very difficult, especially given the rationalisation of shipping networks and the restructuring of supply chains at few suitable ports – most of which in Australia are likely to be capital city ports.

How will regional ports which are *in the shadow* of capital city ports and constantly face significant economic and competitive penalty manage to compete for growth and survival? How will regional ports manage to grow if the nature and scale of trades in their markets are severely restricted as commercial activities, mainly high-value container trades, are concentrated in the larger established capital city ports – even when there is a recognition that some container trades could be handled economically and cost-effectively in regional ports?

Simple observation of the economic health of many regional ports, often ill-devised and/or poorly implemented strategies set in place by regional port managers, and of unclear and less-than-adequate conceptual frameworks for the mechanisms of port growth as set out in the literature all suggest that there is 'strategy decay' (Hamel 2002) and the need for a clear understanding of port growth, and particularly of the dynamics and mechanisms of port growth for regional ports *in the shadow* of their capital city ports.

This study seeks to define the basis of and the mechanisms for regional port growth. The study identifies opportunity capture as the basis for defining effective growth strategies for a regional port; and argues that competition for opportunity share rather than competition for market share is the key for regional port growth.

The study offers a theoretical framework which regional port managers can use to effectively capture and increase the share of valuable opportunities in the quest for growth; and empirically investigates the perceptions of regional port managers about effective growth strategies for regional ports.

A detailed review of the relevant literature revealed a considerable range of factors and conditions underlying port growth; but to our knowledge, there has been no analytical testing of the proposition that opportunity capture is the appropriate mechanism for regional port growth nor has there been any rigorous attempt to define growth strategies for regional ports that are *in the shadow of capital city ports*. It was, therefore, necessary to collect data from port specialists in order to gain useful insights into regional port growth strategies and opportunity capture. The qualitative data collected were categorized in relevant dimensions – using content analysis – and then used to develop a more structured and formal Internet-based survey which sought to collect data from a much broader sample of regional port managers with the objective of testing their perceptions about effective regional port growth strategies; and to model opportunity choice – a critical process of opportunity capture. The determinants of opportunity choice were identified with discrete choice modelling which called for a stated choice experiment in order to investigate how regional port managers actually make opportunity selection decisions. Discrete choice modelling as used in this study to model executive judgment at strategic level is novel and constitutes an important departure from more traditional approaches.

A major conclusion of the study is that regional ports that have developed in the shadow of their capital city ports have the opportunity for growth if they can capture valuable opportunities over time; and that critical to opportunity capture is entrepreneurship and market-driven strategies that regional port managers can implement and orient to provide shippers and other regional port customers with superior access to markets in which they compete for competitive advantage and market dominance. Superior access to markets is provided through supply chains that are value driven; that is, supply chains that are integrated and focus on the end-to-end, cost-effective movement of freight. Such supply chains seek to deliver competitive advantage or value to shippers and to capture value for the port.

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CHAPTER 1

Introduction

1.1 The Research Problem

Ports grow because they can generate cargo and produce tradeable services that attract ships and shippers. They grow because they create advantage for, and deliver value to, the sellers of products and to the buyers of that product – and to third party service providers or logistics providers who intervene in the transaction (Robinson 2002, 2003). The broad proposition is simple and in general well accepted; but understanding how ports induce trade to generate growth is rather more complex. For ports that have developed in the shadow of a capital city port, and which must now cope with extensively restructuring port, shipping and logistics networks, the issue is even more complex.

Regional ports adjacent to capital city ports have often developed as bulk ports (Hilling and Hoyle 1984), but for most there is a recognition that they may be no longer able to rely solely on the benefits of exploiting bulk commodities and trades to sustain growth and competitive success. To attain growth and survival there is the perception and often the reality that they need to diversify their trade base or/and enter new markets – most of which are likely to be dominated by their capital city ports.

There is a perception that regional ports that are near capital city ports have opportunities for growth by retaining their existing advantage mostly in bulk trades and by exploiting temporal and spatial inefficiencies in the market and the diseconomies of scale, congestion, externalities and transport network integrity of the adjacent capital city ports (Miyajima and Kwak 1989; Haynes *et al*. 1997; Lundy 1982; Notteboom and Winkelmans 2001). Gluck and Kaufman (1980) for instance, maintain that a valuable strategy may involve avoiding direct competition by exploiting opportunities that have been overlooked by the competitor port. Challenging the market dominance of established capital city ports is likely to be, however, a very difficult task, especially given the rationalisation of shipping networks and the restructuring of supply chains at a few suitable ports – most of which in Australia are likely to be capital city ports.

How then will regional ports that are in the shadow of capital city ports manage to exploit opportunities for growth if they constantly face significant economic and competitive penalty from their adjacent capital city ports? How will major regional ports manage to grow if the nature and scale of trade in their markets is severely restricted as commercial activities, mainly high-value container trades, are concentrated around the larger established capital city ports even when there is a recognition that some container business, for example, could be handled economically and cost-effectively in regional ports?

These issues are relevant and indeed often pressing. They have significant implications for infrastructure investment, freight costs and management policies. Certainly, this is the case in Australia, where the major regional ports of Newcastle, Port Kembla, Geelong and Bunbury are struggling to define effective strategies for growth; but the problem is by no means unique to Australia.

The research problem that focuses this study is, then, how a major regional port which has developed in the shadow of a capital city port manages to grow and survive over time. More, specifically, the study seeks to define strategies for growth that are appropriate for a regional port which is adjacent to a capital city port and competes for growth in a period of turbulent changes in the shipping industry and restructuring port networks.

1.2 Background to the Problem

Simple observation of the economic health of many regional ports in the shadow of metropolitan ports, often ill-devised and/or poorly implemented strategies set in place by regional port managers, and of unclear and less-than-adequate conceptual frameworks for the mechanisms of port growth as set out in the literature all suggest the need for a clear understanding of port growth, and in particular of the dynamics and mechanisms of port growth, for regional ports in the shadow of their metropolitan neighbours.

In this context, attention is drawn to two of the more pervasive aspects of the context of regional ports which through the 1980s and 1990s have created particular pressures for growth. The first is the relatively rapid restructuring of the shipping industry, and by association, the port sector; and the second relates to what Hamel (2002) has recently referred to as 'strategy decay' – in the case of regional ports (and indeed most ports) the increasing inadequacy of strategies for growth that may have in earlier periods been appropriate.

1.2.1 Restructuring shipping, ports and logistics frameworks

Traditionally, the port competed to achieve control of its hinterland – the region over which it had more or less exclusive dominance. However, with the introduction of containerisation and its ability to promote end-to-end intermodal opportunities, significant changes in international trade flows have occurred. These changes greatly affect not only port operation and port structure, but also the role of the ports (Sletmo 1999; Notteboom and Winkelmans 2001; Goss 1990a; Goss 1990b; Goss 1990c; Goss 1990d).

Containerisation has made it possible for goods to be transported seamlessly from the point of production to the point of consumption. This movement has been facilitated by third party service providers which offer a total logistics service from the point of origin to the final destination on a sustainable basis (Kuby and Reid 1992). Shippers are increasingly choosing a port as an element embedded in their end-to-end chains, not as a 'destination' *per se*. Captive markets which were the traditional domain of the port are now subject to penetration by other ports (Slack 1985); and the hinterland, defined as cohesive and 'dominated' space has become a less useful if not an irrelevant notion to define markets in which a port is likely to possess competitive advantage or pursue opportunities for growth. Competing inland logistics networks are deliberately focusing cargoes on a particular port, irrespective of whether it is the closest port or not. In this sense, inter-port competition has intensified to an unprecedented degree and the total logistics pathway costs and value in moving freight from one end to another determine which logistics pathway is used.

For regional ports to be able to attract substantial container trades a significant investment is required even though there is no assurance that the major shipping lines will call at these ports. On the other hand, the port can be certain that unless there is a container handling facility, there will be virtually no container traffic. As Slack (1993) notes 'this is somewhat analogous to a lottery, where only those who purchase tickets have a chance of winning, however small those odds may be'.

In response to progressive globalisation and containerisation, shipping lines have sought to restructure their business in order to compete more effectively as global entities. Three trends are of particular importance, not only for the shipping industry and trade patterns but also for port choice and inter-port competition (Martin and Thomas 2001; Heaver 1995). The first, rationalisation of shipping operations to reduce costs, achieve considerable economies of scale and improve competitiveness, has been especially marked (Fleming and Baird 1999; Sletmo 1999). Few ports are called because shipping lines are reluctant to commit their vessels to long voyages and small volumes (Brooks 1995, 2000; Martin and Thomas 2001); and lines are concentrating their activities on those ports that are embedded in quality logistics chains that offer sufficient volumes. In South and East-Asia a new port hierarchy is emerging in response to the changing conditions (Robinson 1998). Rationalisation of ports of call is accompanied by rationalisation of shippers and creates concentration of market power in the hands of port customers who are now focusing their supply chains on those ports that can offer an end-to-end logistics service. In a sense shipping lines and shippers have become sophisticated buyers who bid for and choose those ports that can meet their needs (Slack *et al*. 2002; Haralambides 2002). This consistent pattern is imposing a permanent challenge to the port's ability to influence the trade flows.

A second important trend has been the transformation of shipping lines into global logistics megacarriers. The emergence of megacarriers such as the three major Japanese carriers Nippon Yusen Kaisha (NYK), Mitsui OSK-Lines (MOL) and Kawasaki Kisen Kaisha (K-Line) who see themselves as global logistics service providers operating high value-added, fully integrated door-to-door logistics service means that we are witnessing the emergence of a new form of industrial organisation and new levels of market power and industry concentration.

To compete effectively as suppliers of global logistics services, shipping lines have moved towards both vertically and horizontally integrated structures. In the pursuit of vertical integration shipping lines are becoming more involved in inland operations in order to exert greater control over their customer base and to assure that savings at sea are not being wasted or lost altogether on landside operations (Notteboom and Winkelmans 2001). They are investing in land-based infrastructure such as terminals and inland transportation systems as they attempt to bypass the freight forwarders and develop direct relationships with the shippers (Hayuth and Fleming 1994). The significance of inland costs in the overall cost structure has increased. Notteboom and Winkelmans (2001) report that inland transport costs account for about 42 to 70 percent of the overall transport costs. But more importantly, the largest shipping lines are developing complex supply chains that integrate logistics functions of a broad range of economic agents involved in the movement of freight from the point of production to the point of distribution or consumption on a door-to-door basis.

The trend towards megacarriers has been reinforced by a series of alliances and mergers as forms of horizontal integration involving some of the largest carriers – as, for example, Maersk and Sealand, Hyundai Merchant Marine, APL and Mitsui OSK, Maersk and P&O, American President, MOL, OOCL, the Tricon group (DRS Senator Line and Cho Yang) and Hanjin Shipping, Nedlloyd and MISC and between Hapag, Lloyd, NYK and NOL. Importantly, even the largest megacarriers continue to seek to maintain or to strengthen their market position through continual formation of new alliances and mergers with other carriers and more recently with some ports (Brooks *et al*. 1993; Brooks 1998; Notteboom and Winkelmans 2001).

In this contest for market dominance, the critical issue for ports and their survival is their integration into these global supply chains. Ports that continue to compete as stand-alone entities risk becoming 'pawns in the game' (Slack 1993) or else, being played one against the other by their powerful customers (Drewe and Janssen 1998).

Within this perspective, an important issue for ports is whether they can develop their own mergers and horizontal systems or whether their best chance of survival is by integration into vertical systems, most of which are controlled by powerful shipping megacarriers.

A third, though not surprising trend, has been the deployment of increasingly larger vessels in their trades – so that on major trans-Pacific routes, for example, container vessels exceed 6000 TEUs and 4500 TEU vessels are routinely used on round-the-world services. Such vessels may not require significantly deeper drafts or larger berths than current vessels but their extra width and greater capacity will limit use in the short run to a few ports with the ability to service them. In Australian long haul international trades progressive adoption of vessels exceeding 4000 TEUs will occur; but port calls will continue to be restricted to metropolitan ports or perhaps to purpose-built ports.

1.2.2 Strategy decay

Hamel (2002) has usefully underlined the notion that a firm's growth strategy will likely require constant redefinition in the light of changing conditions, that the firm will need to constantly review its functionality and its positioning to ensure effective growth. The notion is as relevant for ports – and for regional ports in the shadow of a metropolitan neighbour port – as it is for a 'private sector firm'.

In Australia, as elsewhere, it is possible to recognise a number of broad and generic strategies for regional port growth.

- **The 'diversify or perish' approach to strategy**

Regional ports, have not unusually, seen diversification – usually from a bulk exports dominance – as the key to sustainable growth. Three broad reasons are apparent. First, diversification has been pursued as a response to specific market opportunities. For example, the strong growth in container traffic (Amoako 2002; Kozan and Wong 2002) has driven the port of Newcastle, Port Kembla and Bunbury to attempt to enter this profitable yet very competitive and capital-intensive business. Second, diversification has been adopted as a solution to specific problems that have been created by unfavourable movements in demand conditions such as the decline of coal in Port

Kembla, the closure of steelworks in Newcastle, the loss of manufactured and rural products to containerised trades served from metropolitan ports. The third reason for diversification across the major regional ports is the perception that diversification is a good strategy; the rationale for which is that it will protect the organisation as a whole against foreseen and unforeseen changes in demand conditions which might adversely affect individual trades in which the port is involved.

The notion that diversification is the most effective 'hedging' mechanism against all kinds of adverse changes, and therefore the most appropriate strategy for offsetting the vulnerability of the firm to such changes, is widespread. But there are significant dangers, for the completely diversified firm is almost as vulnerable as the completely specialised one in the face of intense competition, especially when the competition is associated with rapid innovation (Zweig 1998; Campbell 1992; Washington 1997; Byrd *et al*. 1997).

Regional port growth prospects are not necessarily enhanced by simply diversifying into new markets. The real opportunities for growth through diversification exist only where the port sees a number of possible uses of its unique resources and capabilities to make profit with reference to the 'opportunity cost' of its resources, that is, with reference to other available alternatives. Slack (1993) for instance, suggests that some of the land under the control of the port authority may be more profitable if used for activities other than cargo handling – the port of Boston for example, has vigorously pursued non-port-use land-development options and many other ports in developed countries are exploring the expansion of more profitable ancillary businesses including land development.

Markides (1997) cautions that before diversifying, managers must think not about what their organisation does but what it does better than its competitors because the latter determines their chance of succeeding in new markets. Furthermore, excelling in existing businesses need not be a guarantee of success in a new or related business. Dutton (1997), in a study of diversification strategies for firms, found that the most consistently profitable organisations are those that diversify around their core competences. When firms have no special advantages which will ease their entry into new markets they must, like any new and not particularly well-endowed entrepreneur, look for opportunities where entry is easy and no special skills are required. In addition, when entering any new market, a regional port must consider not only the rate of return it might expect on its new investment but also whether or not its resources are likely to be sufficient for the maintenance of the rate of investment that will be required to keep up with competitors' innovations and expansion in its existing markets as well as in the new ones. Even when a port enters a new trade on the basis of some particular innovation and is able to ward off competition with its distinctive capabilities and other barriers, it must expect that in time it will be overtaken if it fails to continue to develop its competitive advantage.

- **The 'more efficient' approach to strategy**

Internally driven strategies have been pursued by port management teams that place strong emphasis on internal organisational factors, such as operational excellence, internal processes, asset utilisation, costs, and service development but pay little attention to market dynamics. These are common strategies for many regional ports and, indeed, for capital city ports. Superior port performance and growth are often seen as outcomes of the efficiency a port can achieve. The main justification is that if a port is more efficient than others it will have a cost advantage which will be reflected in a healthy bottom line. Although it has been common to measure port performance in terms of partial productivity or 'efficiency' measures of various kinds, the approach is hardly satisfactory; port performance is, in fact, a reflection of both its operational efficiency and its strategic positioning or effectiveness (Robinson 2002).

There is a widespread view that firms should be defined by what they are capable of doing, rather than by the needs they seek to satisfy (Day and Nedungadi 1994); but it is the ability of the business to use its capabilities to exploit opportunities and deliver value to its customers that is the key.

Numerous regional ports in Australia and elsewhere have wrongly assumed that the ownership of container facilities would be sufficient to attract liner shipping. But the provision of efficient infrastructure alone will not bring cargo to the wharf nor will the adoption of world best practices or cost cutting or improvements in internal processes.

This is because operational efficiency, though important, only tells us how well a port produces services but not whether the service it produces is the one that shippers demand. It is the port's ability to offer a competitive service that is valued by the shipper that becomes the guiding force in determining what to improve to achieve competitive advantage and growth. Today a port cannot be sure that investing in efficient infrastructure alone will produce any benefit at all (Slack 1993). The key to competition is to understand what market forces operate and how customers' needs change over time; and to be responsive and flexible and adapt quickly to changing opportunities.

- **The 'do whatever the customer wants' approach to strategy**

In the pursuit of growth, many ports tend to be internally driven in the sense that they respond to the competitive environment predominantly by exploiting advantages derived from port asset utilisation and improvements in internal efficiencies (Slack 1993). More often, however, ports claim that they are successful because they are close to their customers; they conduct market research on a systematic basis to understand what customers want and then based on the articulated needs they align their activities to provide the products and services desired. Performance evaluation is based on customer judgments of the relative product/service utility and satisfaction. To all intents and purposes they endeavour to do whatever the customers want – in essence, they are customer compelled.

Hamel and Prahalad (1994:108) note that 'it is much in vogue to be customer-led. From their bully pulpits which today are likely to be worldwide satellite hook-ups, CEOs tell the troops that everything begins with the customer'. But it is rarely possible, for firms or for ports, to do whatever the shippers or customers want – to be everything to everyone. In many instances customers (shippers) are notoriously lacking in foresight (Hamel and Prahalad 1994) and while they may suggest valuable actions, those actions are not actionable at all if they are not feasible or profitable.

Ports pursuing these strategies fail to understand that the key issue is not simply to be led by shippers' expressed needs; being responsive and flexible to shippers is not enough; learning from customers should complement learning about customers; and driving customers is better than simply being driven by customers (Lorange 2001).

Ports that have better prospects of development are those that serve current shippers needs exceptionally well, but also anticipate and fulfill unarticulated shipper needs. These are ports that, rather than merely preserving market share in existing trades, ensure that new market opportunities are discovered and exploited.

- **The 'beat the competitor' approach to strategy**

A competitor-focused approach to competition is another strategy that port managers use to deal with a complex and fluid competitive environment and to attempt to compete as to achieve both competitive advantage and growth (Day and Nedungadi 1994; Day and Wensley 1988; Narver and Slater 1990). Since customers and rivals are the two most salient features of a competitive market, some port managers focus on comparison with their competitors as the basis for defining competitive advantage (Panayides 2003).

Regional ports competing on the basis of these strategies place strong emphasis on direct comparisons with capital city ports since the latter are perceived to influence the regional port's performance. Regional port responses are dictated by the actions and reactions of the capital city ports. The regional port tracks the capital city port's moves and market shares on a trade-by-trade basis with the emphasis on finding those activities that the regional port can do better than its rival capital city port. Most of such advantages are in bulk, where regional ports may have advantage. There may be limited competition on some 'contestable' break-bulk cargoes such as motorvehicles for example; but in container trades it has been difficult, and often impossible to emulate the capital city port's advantage.

Competitor-oriented ports rely on management judgment of strengths and weakness, comparisons of resource commitments and capabilities, value chain comparisons of relative costs, and market share and relative profitability. Catching up, 'beating the competition' and taking away market share from competitors is at the heart of these strategies, which may be useful in the short-run but not in the long-run.

Benchmarking strategies are reactive in nature rather than proactive in substance and suitable for those who want to preserve their *status quo* but not for those who seek growth and industry leadership (Hamel and Prahalad 1994). These strategies have proven hard to implement for ports that are in the shadow of larger and dominant capital city ports, particularly in the high-value container business.

Identifying the distinctive competences of rival ports and then attempting to match them may not deliver the desirable competitive outcome because a firm can have a distinctive competence without gaining competitive advantage if what it does best is relatively unimportant to customers. Likewise, the competitor-centered approach to competition more often triggers price wars in which the outcome is a *zero-sum-game* (Brealey and Mayers 1996).

Responding to competitor moves and benchmarking may limit the regional port's ability to see beyond the capital city port's value chain for opportunities not yet obvious to the competition. It may prevent the port developing an independent view of how best to exploit market opportunities by virtue of pre-emptive and consistent capability building, which competitors cannot keep up with. The real competition is not about matching competitors' capabilities and market offering; effective competition means providing products or services that the competitor has not yet been able to create.

Effective strategies for the growth of regional ports in the shadow of metropolitan ports are based on opportunities for exploiting weaknesses and temporal and spatial inefficiencies in the marketplace. Regional ports need to position themselves to adapt quickly and focus on selected target markets and niches for which they can deliver competitive advantage to shippers and other port users.

1.3 A Conceptual and Methodological Framework

1.3.1 Opportunity capture as the basis for regional port growth

A static approach to cost-leadership and market share, a sole focus on inherited factor advantages or a too simplistic reliance on capacity and level of sophistication of new infrastructure as a means to retain existing trades or to attract new traffic flows are no longer sufficient to guarantee competitive success much less growth. In the new market environment, regional ports are required to consider new and better ways of competing for growth and survival.

The key proposition of this study is that a major regional port which has developed in the shadow of a capital city port *has the opportunity to grow if it can capture valuable opportunities over time; and that to capture growth opportunities, the port must deliver competitive advantage to shippers and their ancillary service providers (or third party service providers) involved in the end-to-end movement of freight*. This is so because a port's advantage is derived from the advantage created for shipper and the third party service providers who, when faced with the choice of which port to use, choose a port which offers superior value on a sustainable basis (Brooks 1995).

In this context, Figure 1.1 suggests that opportunity capture is the basis for defining strategies for regional port growth. Further, it shows that opportunity capture is implemented through five interdependent processes that include the understanding of the opportunity 'context', the identification of opportunities, the evaluation of opportunities, the choice of and the implementation of valuable opportunities.

Critical to opportunity capture and growth is how a regional port creates competitive advantage. Following Porter, Robinson (2002) argues that a firm creates competitive advantage by perceiving or discovering new and better ways of creating new market offerings that can be sold profitably in markets in which the firm competes to maintain or strengthen its competitive position. Moreover, in a competitive environment the regional port will focus on market-driven strategies and in particular on those strategies that are concerned with the search for unmet needs and the discovery and exploitation of opportunities for which new services can be created, made available and sold in competitive markets at prices higher than the cost of creating them (Casson 1982; Weinzimmer *et al*. 1996).

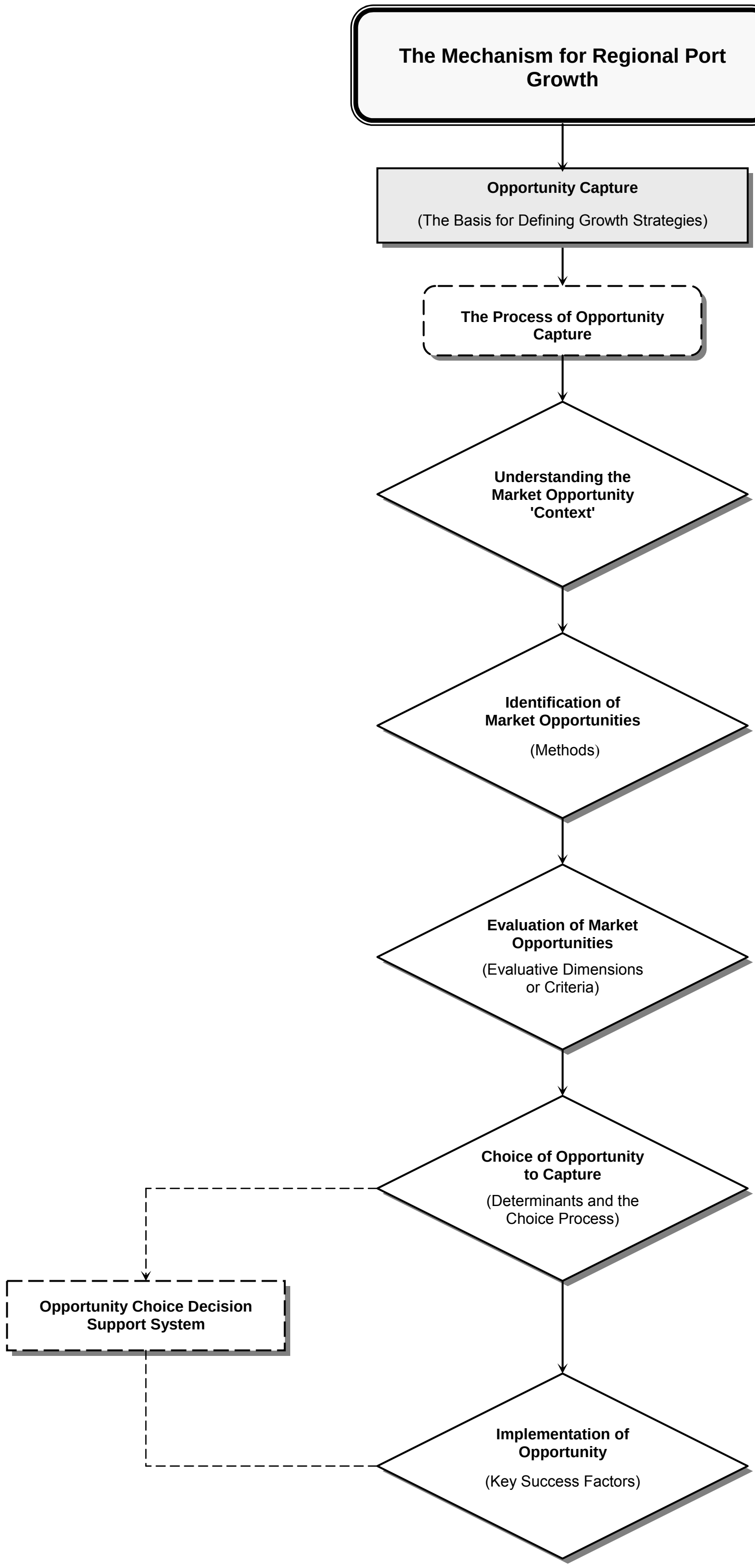


Figure 1.1 Opportunity capture and port growth: the mechanism

In the real world, a business grows by capturing market opportunities that are valuable and the environment affords over time (Ireland *et al*. 2001); and Hamel and Prahalad (1994) underline the importance of *competition for opportunity share as the basis of growth*. In fact, Penrose in her much earlier work in 1959 on the theory of the growth of the firm noted that as long as there existed opportunities for profitable investment there are opportunities for the growth of a firm; and that *the growth of the firm is only limited by opportunities that its entrepreneurs can see, are willing to act upon or are able to respond to.*

This study builds on the notions of opportunity capture, of market-driven entrepreneurial strategies and competitive advantage. Indeed, it argues that the extent to which the port can capture opportunities over time and the limits on the potential of the port to grow are dependent on the effectiveness of a port in delivering competitive advantage to its shippers and third party port service providers.

1.3.2 Opportunity capture and regional port growth: testing the relationship

This study argues that competing for and capturing opportunity share as the basis for defining a growth strategy for regional ports, and particularly for regional ports in the shadow of metropolitan neighbour ports, comprise five interdependent processes as shown in Figure 1.1:

(i) understanding the opportunity 'context';
(ii) the identification of opportunities;
(iii) the evaluation of opportunities;
(iv) the choice of valuable opportunities; and
(v) the implementation of valuable opportunities.

Each of these processes was examined with respect to key success factors, criteria and mechanisms. A survey of some segments of the *port community* that includes shippers, port authorities and port service providers was conducted in order to gather relevant information on attitudes and behaviour of key decision-makers involved in the process of discovery and exploitation of valuable opportunities to promote regional port growth.

The data collected from the survey in the form of nominal, ordinal and interval scales were analysed using standard statistical techniques.

In order to examine the complexity, sophistication and importance of the process of the choice of valuable opportunities (noted as (iv) above) in which the actual decision or commitment to the opportunity is made, a novel and more promising approach to model executive judgment premised on *stated preference techniques* and *discrete choice modelling approach* (Louviere *et al*. 2000) was used.

Traditional techniques for studying managerial behaviour have focused on examining decision-maker preferences. The rationale for the use of preferences is that they mimic well how people are likely to act in a specific decision situation. Often, however, when people are faced with real situations they make different choices that conflict, in fact, with their preferences because preferences measure attitudes and not behaviour. In this situation, a suitable technique that integrates both the behavioural theory of decision-making and choice behaviour is discrete choice modelling (DCM) premised on a stated preference and it is used in this study to model opportunity capture and competition for opportunity share to analyse, in fact, how port managers choose growth opportunities. The assumption made is that the selection of opportunities to pursue is a choice exercise and choices can be modelled using discrete choice models.

DCM is concerned with the actual choice or decisions people make in a given context. It is premised on random utility theory (RUT) – economic theory which posits the existence of a latent construct called 'utility' or satisfaction, pleasure, usefulness or well-being – that exists in an individual's head and cannot be observed by the researcher because he or she is unable to 'peep into an individual decision-maker's head' and accurately observe the set of attributes which define the expected level of alternatives on offer (Louviere *et al*. 2000). That is, individuals have utilities for choice alternatives and these can only be inferred. In essence, RUT describes how people make choices. It predicts that when faced with choice among available alternatives, people choose or select those alternatives that give them most satisfaction, net-benefits or utility (Ben-Akiva and Lerman 1985; Louviere 2000). Utility is derived from the characteristics or features which goods or, in the present study, the existing opportunities possess.

The absence of revealed preference data with respect to key decision factors on opportunity selection opened an avenue to collect and use stated preference (SP) data to model the process of opportunity choice that is critical to competition for opportunity share. SP techniques call for an experimental design where theoretical choice sets are created and presented to respondents for them to evaluate alternatives as combinations of factors at different levels. The challenge in SP techniques is to make the choice context as realistic as possible – i.e., the choices must be feasible, logical and representative of the choice algorithm that managers would go through in their opportunity selection exercise. Designing the SP experiments and collecting response data is only one part of the discrete choice modelling exercise. An econometric model – a multinomial logit model – of opportunity choice has to be specified and estimated using SP data.

To lend the study practical usefulness for port managers and to provide further insights to theorists on the complexity and structure of decision-making patterns, the data collected on stated preferences is further used to develop a decision-support system based on non-parametric pattern recognition classification tree techniques (Breiman *et al*. 1984; Steinberg and Colla 1998). The decision support system which exposes the pattern of the decision-making process could be used by regional port managers to improve the effectiveness of their decisions in determining which opportunities are valuable and should be pursued to attain profitable growth.

Port growth is determined by the way in which the port competes for available opportunities and by its ability to capture opportunities. The port with the largest share of profitable opportunities is more likely to grow faster than others because there is a positive relationship between the share of profitable opportunities and organisational growth (Davidson 1991; Hamel and Prahalad 1994; Brealey and Myers 1996).

1.4 Outline of the Thesis

This introductory chapter has delimited the problem of the thesis and has underlined the background to problem formulation. It has defined the elements of a conceptual framework within which to examine the research problem and outlined a methodological framework to test key propositions.

Chapter 2 suggests that while issues of port growth have been long discussed in the spatial, regional economic growth and a broadly-defined maritime economics literature there has been only limited application of insights from what might be loosely defined as the 'management' or 'business' literature. To the extent, however, that port growth is a managed process this study argues for a more adequate understanding and application of management and business concepts to the process of regional port growth.

Chapter 3 identifies the ability of a port to capture valuable opportunities over time as the key for regional port growth. Essentially, the chapter argues that opportunity capture is the basis for defining growth strategies; and that it offers a theoretical framework on how regional port managers capture valuable opportunities in the quest for growth. The chapter also explains the approach adopted to investigate the strategies that regional port managers use to compete for and capture valuable opportunity for growth in the shadow of their neighbour capital city ports.

Chapter 4 explains the interviews conducted with port experts and presents the results of a preliminary analysis of their perceptions about suitable strategies for regional port growth. In the absence of revealed data on regional port growth strategies, it was necessary to collect data from port experts on perceptions of regional port growth.

Chapter 5 takes the results of Chapter 4 as inputs and implements a more structured and formal Internet-based survey with the objective of collecting data from a much broader sample of regional port managers in order to establish the statistical significance of the perceptions regional port managers have about regional port growth; and the relevance of opportunity capture as a basis for defining growth strategies for growth of regional ports that are in the shadow of capital city ports.

Chapter 6 extends the analysis of significance of strategies that regional port managers use to compete for growth; but its focus is on modelling opportunity choice as the most critical process of opportunity capture in which suitable regional port growth strategies should be defined. The chapter presents the determinants of opportunity choice based on a number of criteria and market contexts in which regional port managers seek valuable opportunities for growth.

Chapter 7 complements Chapter 6 in that it exposes the complex patterns and the structure of opportunity choice decisions that regional port managers enact. It develops and presents a non-parametric classification tree as a decision support system that can assist regional port managers make effective opportunity selection decisions in the quest for opportunity capture and share.

Chapter 8, the concluding chapter, argues the importance of the study and reports the main findings, the implications of the results for policy and practice, and suggests some directions for future research.

CHAPTER 2

Why Ports Grow: Contributions from the Literature

2.1 Introduction

A number of studies published in the regional science, economics and management literature which attempt to explain why an organisation needs to grow if it is to prosper and survive offer useful insights about port growth (Cukrowski and Fischer 2000; Tirole 1989; Shapiro 1989; Taylor and Cosenza 1997; Porter 1998, 1996, 1985, 1980; Hamel and Prahalad 1994; Barker and Gimpl 1988; Trott 1998; Davidsson 1991; Weinzimmer *et al*. 1998; Weinzimmer 2000; Traù 1996, McKiernan 1992; Evans 1987).

For the purpose of this study, however, it is useful to recognise three broad perspectives. The first (Mersha and Adlakha 1991; Illeris and Philippe 1993; Perroux 1955) focuses on the role of spatial factors in organisational growth and views the growth of an organisation as an outcome of its comparative advantage in factor endowments. In this context, port infrastructure, natural resources and location-related factors for example are seen to determine the performance and the level of growth a port can attain (Hilling and Hoyle 1984). Industry located close to resources and markets, it was argued in the early literature, will enjoy considerable transport cost savings when positioning its products in the marketplace. The realised cost savings would then be translated into economic gains (Hotelling 1929). But it is clear that emphasis on resource endowment, proximity to resources and to markets is unlikely to provide sufficient answers as to why and how a port grows. A broader and more complex set of factors is at work.

A second group of studies (Solow 1956; Romer 1996; Dowling and Summer 1997), most of which are from the economic literature, regards the growth of an organisation as a function of the production functions that a firm as an economic entity is capable of implementing in the marketplace and on the productive efficiencies and market power it can generate to exert market dominance and outperform competitors.

But especially important insights are provided by the management literature which views the growth of the firm as resulting from the strategies the firm enacts and the behaviour of the firm in the marketplace or how its managers make strategic decisions and strategic choices (Porter 1996). In essence this view regards the growth of an organisation as a function of its competitive advantage – of the way in which it differentiates itself from other competitor firms and implements strategies to satisfy customers and marketplace needs (Hamel and Prahalad 1994; Woodruff 1997; Hunt 1997; Hunt and Morgan 1995; Peteraf 1993; Day and Nedungadi 1994; Day 1994; Day and Wensley 1988; Woodruff and Burns 1992; Butz and Goodstein 1997). Port growth, from this perspective, is seen to occur not because the port is endowed with particular resources but most notably because its management can bring into play superior strategies that outperform its competitors. In the quest for value and competitive advantage, port customers demand more service from a port they perceive as offering them the opportunity to generate revenue in excess of cost.

In the sections that follow we explore these three perspectives.

2.2 The Spatial Factors in Port Growth

2.2.1 Location, distance and costs

Early location theory, and earlier studies of port growth, often suggested a crude locational determinism. Locational advantage arises, it was often argued, when firms such as ports were located near the sources of raw materials or near the markets (Mersha and Adlakha 1991). By locating close to the sources of inputs or near markets, firms can substantially reduce access and transportation costs – which represent a large proportion of the total cost – and hence improve their competitiveness and profitability.

If the cost shippers incur varies linearly with their distance to the port of shipment as the Hotelling (1929) model, for example, would predict and if transportation costs are the key for competitive advantage, shippers would not defy the penalty imposed by inland transport costs to ship their cargo through distant ports as they often do.

It should be apparent that, in competitive markets, it is neither the proximity nor the comparative cost advantage *per se* that matters but rather the accessibility to markets and the net benefits or competitive advantage a port can create and deliver to shippers. Competitive advantage includes but is not limited to or determined by cost savings and favourable physical location of a port. Competitive advantage is created through the ability of a port to capture opportunities for trade. Regardless of a port's specific location, for it to capture opportunities it must offer acceptable value to shippers; it must provide better access to markets to the shippers who are on the lookout for attractive opportunities for easy spatial interaction with other economic agents in the quest for competitive advantage.

As the focus of inter-port competition shifts from competition between individual ports to competition between supply chains in which a port is a critical functional element (Robinson 2003), the role and significance of location also shifts.

In value-driven supply chains which operate highly complex and cost-effective logistics systems that integrate shipping and inland networks to effect the movement of freight from one end of the market to another, the locational advantage of a port should be defined in terms of its relative position within supply chain networks. This means that a port will have locational advantage if the position within the supply chain networks in which the port is embedded is the most valuable. A competitive port will attempt to find a strategic location within the existing networks and will also configure its activities in such a way as to be regarded as an attractive and critical value-adding element.

Now shippers and more often carriers evaluate and choose ports that have favourable location within these complex logistics network. Shippers move their cargo over routes or logistics pathways which offer best outcomes in terms of overall service provision and focus on total logistics costs to determine the quality and effectiveness of a market offering. Specific port choice as Hayuth and Fleming (1994) argue is in a sense becoming a secondary concern as carriers are more concerned with selecting an efficient and marketable logistics supply chain in which a port is just an element. Therefore, finding a favourable location – a location that is critical to the supply chain's performance and value delivery and appropriation – within this complex network is central to a port's growth, profitability and survival.

2.2.2 Location within regions and port growth

It is clear that some locations within a region offer more favourable conditions than others to promote port activities and port growth. Identifying such specific locations is, however, a serious challenge.

Central place theory (Illeris and Philippe 1993), for example, suggests that the growth of a port reflects the size of its hinterland and the income power of the economic agents and the population within the hinterland. In this view, ports which are located in extended hinterlands with sizeable income will grow faster than those located and servicing smaller hinterlands because bigger and richer hinterlands offer extensive opportunities for trade.

A different view which is embodied in the notion of growth pole or growth centres (Perroux 1955; Myrdal 1957; Hirschman 1958), suggests that opportunities for port growth exist if the port is located where there is a concentration of dominant industries or firms. In such places growth is fostered by high levels of productivity, entrepreneurial activity and innovation and the continual response to the tensions of alternating high and low levels of supply that the strategies of different firms are capable of providing. Generally, it is toward such places that other firms tend to gravitate or are attracted and their subsequent growth is induced mainly as a result of industry spin-off and multiplier effects (Lloyd and Dicken 1997; Higgins and Savoie 1995).

When ports are located in growth poles they have significant opportunity to capture trade. The output of firms in growth poles becomes a captive market for the port and the source of its permanent growth.

More recently, Porter (1998) has argued that agglomerations (Weber 1929) by themselves do not provide competitive advantage nor do they sponsor sustained growth. In Porter's view the critical issue is not the location of firms near one another or within the sphere of influence of dominant firms but instead the ability of the firm to cluster or interact and establish working relationships with customers and suppliers and with other organisations with which the firm is related by technology, skills or economic activity. In this context clusters (Porter 1998) and not agglomerations grow because of the concentration of highly specialised knowledge, inputs, and institutions; the motivational benefits of local competition; and more often the presence of sophisticated demand for products and services (Porter 1998). It is towards favourable port-related clusters that ports should locate if their aim is to grow because it is there where competition and intensive interaction between customers and suppliers take place in order to create deliverable value.

In the real world for a port to grow the issue is not whether a port is located in a bigger or smaller hinterland or in a growth centre but rather whether within the region in which it operates it can compete for opportunities to trade and it can capture positions of advantage – whether it can interact with both port customers and port-related industries and establish effective linkages or working relationships such that enable it to create and deliver value to shippers and also to capture value for itself.

With deregulation and 'reregulation' of both domestic and international markets, with the improvements in transport networks and with the integration of transport systems, competition for cargo has extended beyond the natural hinterlands regardless of their sizes. Hinterlands are now overlapped, intertwined and diffused in such a way that the number of market access options available to shippers and the extent of competition between ports have markedly increased. Demand for port services originates in a much broader competitive landscape and hinterlands are now subject to penetration by other ports and third party service providers which may be located within or in distant regions. In a competitive environment captive markets and captive hinterlands are virtually non-existent or, if they exist, they only represent temporary inefficiencies in the markets.

Now shippers and more often carriers evaluate and choose ports that are located within their complex logistics network. Shippers move their cargo over routes or logistics networks which offer best outcomes in terms of overall service provision (Robinson

2003). Also shippers and carriers favour ports that are well located within their logistics networks. Specific port choice, as Hayuth and Fleming (1994) argue, is in a sense becoming a secondary concern as carriers are more concerned with selecting an efficient and marketable logistics supply chain in which ports are just elements. Therefore, finding a favourable location within this complex of networks is central to port growth and survival.

2.3 The Growth of Firms in Marketplaces

Existing economic theories do not provide adequate answers as to what drives the growth of a firm such as a port. A major drawback with such theories results essentially from the omission of the firm as the unit of analysis.

Industrial organisation economics theorists (Tirole 1989; Conner 1991; Shapiro 1989; and Bain 1951) have long acknowledged this limitation and argued for the need of a theory of the firm within which the production process and the growth of the firm could be satisfactorily explained and understood.

How, then, do firms grow? We note a number of views that may shed some light on the process of growth of the firm, in this case the growth of a regional port.

2.3.1 The theory of perfect competition

It has been recognised that the model of perfect competition is incapable of explaining how firms grow because its assumptions are rather unrealistic; they do not reflect the real world and the business practice (Hunt and Morgan 1995; and Conner 1991). Nevertheless, perfect competition is a useful normative model.

The key premises of perfect competition are well known and are summarised in the Table 2.1 (Hunt and Morgan 1995).

Table 2.1. Summary of key foundations of perfect competition

Key Dimensions	Neoclassical Theory
1. Demand	Homogeneous within industries
2. Consumer Information	Perfect and costless
3. Human Motivation	Self-interest maximisation
4. Firm's objectives	Profit maximisation
5. Firm's information	Perfect and costless
6. Resources	Physical capital, labour, and sometimes land
7. Resource characteristics	Homogeneous, perfectly mobile
8. Role of Management	Determine quantity and implement production functions
9. Role of environment	Totally determines conduct and performance
10. Competition	Quantity adjustment

Source: Adapted from Hunt and Morgan (1995:3) The Comparative Advantage Theory of Competition, Journal of Marketing 59 (April):1-15.

Essentially, perfect competition predicts that the growth of a firm such as the port will result from economies of scale which in the long run can be achieved through access to and use of complete and costless information about the best production technology that is available and the right inputs that are needed to minimize the cost of producing the profit-maximizing output. In a sense the changes in the environment determine the conduct of the firm and superior performance is dependent on the ability to maximize profit or to minimize cost.

The recognition that the information is available to all firms and can be acquired at no cost implies that firms look alike and therefore the industry is the level of aggregation on which the analysis should be conducted. Also, it means that the role of management teams is restricted to determining the quantity of products or services that should be produced. Competition for customers is determined by price and not quality or value of a market offering because customers which also have access to complete and costless information end up converging in tastes and preferences when searching for satisfactory goods or services. Given that satisfactory goods or services have been identified then low prices allow firms to sell more output while high prices result in a firm having to sell low levels of output. Firms that are capable of achieving economies of scale can sell large quantities of their products or services since they are also low-price suppliers and the large quantities sold stimulate growth.

It is easy to appreciate the weakness of the perfect competition and at least reject the proposition that in the real world all market participants possess similar information. However, perfect competition conveys an important message to port managers. It underlines the importance of information as a factor input in competition as well as the fact that the economies of scale which are generally achieved through efficiency, productivity, learning and innovation can help improve the port's competitiveness by making it a low cost supplier. But being a low cost supplier is just one aspect of the whole process of differentiation and competitive advantage (Day and Wensley 1988). The value to shippers through which the port can attain growth is much broader; it includes tangible and intangible benefits such as better access to markets and good relationships with customers and other suppliers which are members of value driven chains in which the port is part.

2.3.2 The Bain-type industrial organisation framework

In contrast to perfect competition in which firms compete to make at lower cost a market offering that consumers prefer and thus attain growth through economies of scale, Bain (1948, 1951) argues that deterrence and control of competition by firms with market power is central to growth (Conner 1991). For Bain (1948, 1951) firms grow from monopolistic competition, as they use their market power to restrain productive output and drive up the market prices. Firms are eager to increase their monopoly power and prevent other firms from gaining monopoly control to ensure that they continue to maintain their market dominance and increased market share.

Bain's recognition of monopolies adds more realism to the behaviour of the firms and markets than does perfect competition. It admits that in real markets firms compete with imperfect information which is generally expensive to acquire. It also acknowledges that firms are different in configuration, resource endowments and strategic orientation and that these differences are reflected in individual performance. More importantly, it recognises that market power plays a substantive role in the process of competition for positions of market dominance. But Bain's view is also limited. For instance, even if we concede that ports which to a certain extent can be regarded as spatial monopolies do set in place arrangements to achieve and use their market power to limit competition, it should be clear that competition extends beyond monopoly incentives particularly when port markets are contestable and competition is encouraged by both governments and market realities.

In such an environment, sustainable profits are not derived from price fixing strategies often used by monopolies or firms with manifest market power. Most of the profits come from product/service innovation, i.e., from activities that create and deliver superior value to customers. Critically, ports will create and sustain competitive advantage not from using their spatial monopoly position but from the benefits delivered to customers and the value captured by the port through supply chains in which they are embedded.

Strategies that are motivated by the simple desire to prevent other firms from entering the market, or gaining monopoly power cannot be sustainable in the long-run. For example, market share strategies that once were the dominating approach to competition are now showing serious weaknesses. Low market share organisations which concentrate on improving their marketing and management effectiveness have been attracting customers through their ability to offer marketable value propositions and remain market focused (Taylor and Cosenza 1997; Narver and Slater 1990; Hamel and Prahalad 1994; Hunt and Morgan 1995).

2.3.3 Schumpeter's contribution

Porter (1999) contends that firm growth is not set by factor endowments, but by value appropriation that results from strategic choices and new ways of competing. The role of strategic choice in creating wealth was the subject of Schumpeter's work more than forty-five years ago. Using his *creative destruction* metaphor, Schumpeter (1950) suggested that a firm could grow by constantly creating and adopting innovations that allow it to take advantage of available opportunities. By *creative destruction* he meant the process through which innovations and positions of advantage make rivals' positions obsolete. Schumpeter stressed that to lead innovation it would be essential for organisations to promote entrepreneurs and entrepreneurial activities and behaviour.

Schumpeter's recognition that competing for opportunities was the most effective way for firms to build positions of advantage was a significant departure from other contributions. It was also a promising direction to a powerful enlightenment of the processes through which the growth of a firm is attained. Unfortunately Schumpeter's contribution fell short of reaching its potential because it suffered from at least one major deficiency. Schumpeter regarded monopoly practices as central to entrepreneurship. In his view, since innovations are risky and require a considerable amount of resources, monopoly practices may well be justified to alleviate temporary difficulties. Hence, predatory behaviour, collusive agreements and output restrictions are simply unavoidable incidents of the long-term growth they promote rather than impede; and given that *ex ante* market power provides the firm with the financial resources needed to innovate and raises barriers to entry, the potential of *ex post* market power acts as a powerful incentive to make this investment happen.

In reality, feasibility of new ways of competing does not rest on monopolistic practices but essentially on the quality of management, the management strategic choices and managerial attitudes. It is not difficult to appreciate the point being made. The power of innovation and entrepreneurship is capable of shifting market position and that innovation is not born only out of monopoly power though it may create it. Also, innovation need not to be only technological. Leading innovation is essentially a consequence of managerial strategies, vision, organisational structures and marketing. It is here that Schumpeter's contribution is of great value to our understanding of how ports grow over time. It points to entrepreneurship and innovation as the fundamental mechanisms and processes through which port managers can promote port growth. Entrepreneurship defines port behaviour that focuses on the search and exploitation of valuable market opportunities over time (Shane 2000). It is the accumulation of profitable opportunities that will ensure that the growth of a regional port or any other port is achieved.

2.3.4 The Chicago School view

The Chicago contribution essentially addressed some of the Bain-type industrial organisation deficiencies. The view promoted by the School was that the central role of the firm is to uphold efficiency in production and distribution (Conner 1991; Hunt and Morgan 1995). Within this perspective the growth of the firm is determined by efficiency gains – in other words, a firm will grow if it can achieve and preserve productive and distributive efficiencies because only efficient firms can sustain competition and are capable of producing and selling more output than their inefficient rivals. Likewise, a firm will not survive as the competition erodes this very source of competitive advantage.

The Chicago School (Stigler 1966) also rejects the view that monopoly incentives and collusive arrangements are central to profit maximisation. For the school, monopoly incentives and collusive arrangements are temporary market anomalies which cannot be sustained in the long-run because the costs of monitoring and enforcing such agreements are prohibitive. Consequently, the observed, above-normal profits if persistent can only be justified on efficiency grounds.

Efficiency in ports, particularly efficiency in supply chains, is critical to a port's superior performance and competitive advantage but as the sole measure of port performance is incomplete and incapable of providing a satisfactory explanation of how some ports and not others achieve superior overall performance and sustain growth. It must be recognised by port managers that efficiency as such is a necessary but not sufficient condition of superior performance (Porter 1996) and port growth. Port growth is dependent not only on the efficiency but also on the effectiveness of a port. The latter is determined by the ability of a port to capture trade. Capturing trade is a function of competitive strategies that are market-driven and are focused on the delivery of key benefits to shippers who seek services from ports which are able to help them attain competitive advantage over their competitors.

For effective formulation of market-focused strategies, port managers need to possess quality information which allows them to exploit effectively the possibilities that their tangible and intangible resources provide. In this regard, the Chicago School also emphasized the role of information as an important source of competitive advantage. As Stigler put it 'one should hardly have to tell academicians that information is a valuable resource: knowledge *is* power. And yet it occupies a slum dwelling in the town of economics…I hope to show that some important aspects of economic organisation take on a new meaning when they are considered from the viewpoint of the search for information…[J]ust as an analysis of man's shelter and apparel would be somewhat incomplete if cold weather is ignored, so also our understanding of economic life will be incomplete if we do not systematically take account of the cold winds of ignorance' (Conner 1991:129).

For Chicago School scholars information and knowledge were factor inputs and for ports it could be argued that the performance of ports will differ to the extent port managers possess and use the information acquired to improve the efficiency in production and distribution. But the role of information should not be restricted to that of improving efficiency. It should be extended to improve the decision-making and strategic choices; to help managers make effective choices of what to do and what not to do to compete for positions of advantage and growth. Information should be used by port managers to create differentiation in the services a port offers to shippers relative to competing ports.

2.4 Strategy and the Growth of Firms: A Management Perspective

Understanding how effective strategies emerge or are deliberately conceived and implemented is critical to identifying the sources of a permanent competitive advantage (Mintzberg and Walters 1982, 1985) and in this section special reference is made to a range of management literature.

There is a rich literature that focuses on the relationships between strategies and the growth of firms and our treatment will be, of necessity, selective with a view to strategy definition for regional ports. In the following paragraphs we note:

- the notions embraced in market-share based strategies;
- the work of Michael Porter, and particularly his views on strategy outlined in 1990 and his *Harvard Business Review* paper in 1996;
- the resource-based view of strategy;
- the competence-based approach to strategy;
- 'coopetition' as a manifestation of growth strategy, and
- corporate entrepreneurship strategy as strategy for firm growth.

2.4.1 Market-share based strategies and the growth of the firm

Strategies that focus on capturing market share are very popular in almost every industry including the port sector. What makes them so popular is the perception that there is a direct causal relationship between market share and profitability of a business (Buzzell *et al*. 1975). A major tool that has been used to operationalise such strategies is the growth-share matrix also known as the 'Boston Box' after its developers, the Boston Consulting Group (McKiernan 1992; Kotler 1994; Haezendonck 2001). The matrix suggests that competitive success and growth are determined by the level of growth rates prevailing in the market and the relative market share a firm can command. In other words, the growth hinges on the ability of the firm to capture higher market share relative to the competitors in markets which are experiencing fast growth. This view is not unusually agreed (Szymanski *et al*. 1993; Woo and Cooper 1981, 1982; Rumelt and Wensley 1980; Jacobson and Aaker 1985) but the market share strategies and their underlying foundations have found their way into the corporate world.

Managers who base their strategies on the 'Boston Box' argue that markets with high growth rates are more attractive than mature or declining markets because they offer substantial opportunity for growth (Aaker and Day 1986). In the case of ports, investing in high growth markets such as container trades is perceived to be a good strategy because in such markets it is easier to gain market share as more opportunities are created from new business being attracted to the port. Further, it is argued that even if some firms do experience market share erosion, competition in high-growth markets is unlikely to be intense because trade eventually grows at a satisfactory rate and firms pay little attention to competitors' gains because they are busy coping with their own growth.

How realistic this argument is, is debatable. For instance, it is known that for regional ports to attract container trades is difficult and involves considerable amounts of investment without assurance that they will ultimately succeed. The assumption that competitors will react softly to their market share erosion is flawed because it fails to incorporate their expectations. As Wensley (1982) pointed out competitors may react just as aggressively in a high-growth market as they would in a low-growth market if their expectations are not met. In the world of competition it is the difference between expectations of future sales and actual sales level attained that dictates competitors' behaviour and reaction.

There is no doubt that for ports the rewards from opportunities presented by high-growth markets are considerable; but this makes sense only if the port can compete across markets and capture and sustain market share gains. But even if that was possible, the port would still need to take into account the risks inherent in the uncertainties and competitive response mainly from its adjacent capital city port. Numerous firms have entered growth situations only to endure years of painful loss and ultimately an embarrassing, costly and sometimes fatal exit during a traumatic shakeout phase in which they are less likely to have planned upfront an 'exit strategy'.

A market is neither inherently attractive nor unattractive just because it is experiencing high growth. The real test is whether the port, for instance, can capture the opportunities presented by market growth in such a way as to gain a competitive advantage and attain growth. In this context, then, market share should be seen as an effect and not the cause of superior performance and profitability. Higher market share and high ROI, are an indication that management has been implementing strategies, whether by design or by chance that have proved to be successful. Strategies which focus only on accumulating market share may be myopic and inconsistent with longer-term horizons. Focusing solely on market share can stifle and suffocate the consideration of superior alternative strategies such as those oriented to capture opportunities which are available to the port. In fact, situations could exist where a decline in market share may actually be an indication of good management. There is no shortage of commentary in the management literature on how smaller share competitors achieve high returns without competing on the basis of market share.

Hamermesh *et al*. (1978) and Woo and Cooper (1981, 1982) offer a comprehensive discussion of the factors and circumstances in which low market share businesses compete successfully and achieve high returns. They attributed the superior performance to superior ways in which they compete. Specifically, successful low market share firms tend to focus on profitable niches and they highly differentiate their products/services as they conservatively but efficiently use research and development as a basis for innovation (Porter 1985; Kotler 1994; Hall 1980; Thompson and Strickland 1992). They compete in market segments where their strengths are highly valued and where their larger competitors are less likely to compete or to possess competitive advantage. Management of such organisations spends time identifying and exploiting valuable opportunities rather than making broad assaults on entire industries or entire market segments. Being a small market share business is not necessarily a handicap; it can be a significant advantage that enables a company to compete in ways that are unavailable to its larger rivals. Certainly, as Hamel and Prahalad (1994) suggested, the measures of market influence and profitability have to extend beyond the traditional measures of market share to include other measures such as the measures of opportunity share because regardless of whether the market growth rate and relative market share are higher or lower some marketplace positions are more profitable than others.

It can, therefore, be argued that for a regional port which seeks growth in the shadow of its capital city port, competing for opportunity share is superior and more effective to competing for market share. Port management should view market share as a desirable outcome of the accumulation of opportunities the port is able to capture.

There are many compelling reasons why this approach is appropriate, but we restrict our justification to a few. First, competition for market share is limited because in general it is conducted within the existing markets and tends to focus on strategies that allow the firm to build up its market share mostly by taking away competitors' current market share. In a sense the focus of competition for market share has been on the redistribution of the 'pie' and less on how to make the 'pie' bigger so that all parts involved can benefit. In this context, it is obvious that competing for share of an existing market is likely to attract intense competition which often triggers price wars and as the rivalry amounts the prospects of success are likely to be slim.

If a regional port pursues market share in non-traditional regional port markets such as containers it may find it difficult to compete because of considerable financial and technical resources that may be required but lie beyond the regional port's capabilities. Weinzimmer (1996) argues that most small firms fail to compete for high market share because they have limited resources needed to succeed. Like small businesses, regional ports often lack resources to invest in port infrastructure or to support commercial activities to change the existing trade patterns or introduce new ones to sustain their competition for a share of container business.

Another compelling reason against focusing competition for market share is that it is a strategy that may not provide a secure foundation for long-term profitability and growth. Scheer (1974) for instance argues that success in creating and adopting new products and process technologies is more important to long-term profitability than is exploiting economies of scale that a higher market share position may allow. The point being made here is that the relationship between market share and profitability is neither causal nor strong enough to justify the pursuit of market share as a universal strategy for regional port growth.

Regional ports need not focus competition on market share *per se*. They can develop new trades and enter new markets where opportunities are available and can be exploited without attracting strong competition or requiring considerable resources. Of course, the advantage of this strategy is that it broadens the scope of competition to markets and trades that are likely to be underserved and therefore less difficult to penetrate. By identifying valuable opportunities and exploiting them ahead of competition, regional ports can build a first-mover advantage. Porter (1998) and Kotler (1994) contend that in general, first-movers enjoy some competitive advantage because they initiate actions which face virtually no competition and in the short term they may be able to survive even though they may have scarce resources and limited efficiencies

(Covin and Slevin 1991). However, as Jacobson (1988) cautions, firms that are more efficient and offer superior value, grow larger and more profitable than others.

2.4.2 Strategy as operational effectiveness and strategic positioning: the work of Michael Porter

Michael Porter is properly recognised as a leading thinker on strategy and competitive strategy and has been writing on it for some considerable time (Porter 1985, 1990, 1996, 1999). Two of his more recent publications are of particular importance – his 1990 book, *The Competitive Advantage of Nations* outlined the key elements of a conceptual framework on how firms create and sustain competitive advantage; and his 1996 *Harvard Business Review* paper clarified and modified some of his early thinking. We note briefly his contribution and its significance to port competition and port growth.

In the *Competitive Advantage of Nations*, Porter argued that firms create and sustain competitive advantage through competitive strategies that are unique to the firm and superior to competitors. The strategies that firms use to neutralise competition and move to positions of marketplace dominance to derive rents and attain growth can be grouped into three generic strategies. For Porter, a firm can either compete for overall cost leadership, or differentiation, or it can focus on specific market segments for positions of cost leadership or differentiation, or both.

A cost leadership strategy rests on the firm being able to produce at lower cost than the competitors and therefore charge a lower price which attracts substantial demand for its products or services. In many industries where firms have an expansion or growth goal this strategy has been widely adopted. The key element of this strategy is the pursuit of economies of scale which are dependent on the ability of the firm to produce and market a comparable product or service more efficiently than its competitors. Differentiation on the other hand, is based on the provision of a unique market offering configuration that delivers superior value to customers relative to competitors. A firm aiming at differentiation sells its products/services at a premium because of their perceived superiority in terms of quality, features and value. Differentiation allows the firm to create barriers to rivals by instilling a sense of loyalty in its consumers. Differentiation is often supported by continuous innovation that is difficult to emulate (Porter 1985).

Firms can also create and sustain competitive advantage by focusing on specific segments in which they can either compete as low-cost providers or as providers of differentiated market offerings, or both – though Porter (1985) argues that competing with one generic strategy is likely to be more effective than competing with two. Focusing strategy enables a firm to mobilize required resources to serve its narrow but strategically important market segment more efficiently and effectively than competitors who are competing more broadly (Porter 1985). Panayides (2003) contends that a small firm may be able to compete and achieve strong performance with a growth-seeking strategy that focuses on modifying the promotion of undifferentiated products or services in carefully selected market segments.

The generic strategies developed by Porter are powerful competitive weapons but clearly they are context dependent. They depend on the specific industry, the level of competition and the capabilities of the firm to position itself in the marketplace. For example, it may not be appropriate for a regional port to attempt to compete with its adjacent capital city port for positions of cost leadership in container trades since to attain economies of scale would require resources that lie beyond the regional port's resources. On the other hand, a regional port may well gain some advantages if it focuses on specific market segments such as bulk markets and some container and break-bulk niches that the capital city port is not serving effectively because it is competing more broadly. When the competitive scope is broad, the implication is that there are segments in the market that are vulnerable customer because needs are not being well served by the incumbent. Also there are inefficiencies in the market that arise and can be exploited profitably. The real challenge for a regional port is to identify these opportunities and be able to offer a valid value proposition to specific market segments.

In any case for a regional port to be able to compete for a position of advantage and growth the critical issue in strategy definition is how to achieve both operational effectiveness and a favourable strategic positioning. In other words, a regional port needs to achieve and extend the best practices at the same time that it creates a unique and sustainable position based on the choice of the way in which it creates differentiated value from an appropriate configuration of interrelated activities. This is in essence the key argument that Porter was developing in his 1996 paper, 'What is Strategy?' and it is critical to our understanding of how a port achieves superior performance that supports its growth motives and strategy. Essentially, Porter was arguing that the key to superior performance and growth lies in the ability of the firm to discover new and better ways to compete in an industry and by bringing them to the marketplace, i.e., superior performance is determined by both operational effectiveness and strategic positioning.

Competitive advantage grows out of the way a port organises and performs a set of interlinked and self-reinforcing activities to deliver value to customers. A port can achieve superior performance by performing activities that are distinct from its rivals or it can perform the same activities as competitors but in a different, innovative and more effective way. For the regional port, the provision of efficient infrastructure alone will not bring cargo to the wharf nor will the adoption of world best practices or cost reduction strategies or improvements in internal processes. This is because operational effectiveness, though important to the overall performance, only indicates how well a port produces services but not which service it should produce or whether the service it produces is the one that shippers demand. In the end it is the port's ability to offer a competitive service that is valued by the shippers which counts. Within this perspective, the value which shippers seek become the guiding element in determining what to offer or to improve in order to achieve both competitive advantage and growth within a framework based on both operational effectiveness and strategic positioning.

2.4.3 The resource-based view of strategy

The resource-based approach is an emerging framework to strategy definition (Mahoney and Pandian 1992). The key proposition underlying the resource-based framework is that a firm's strategy should focus on the assortment of heterogeneous and imperfectly mobile resources (tangible and intangible) that are unique to the firm in order to create and sustain positions of competitive advantage (Panayides and Gray 1999). For a resource to be relevant to competitive advantage or to lead to superior performance and high returns over a long period of time it needs to be valuable, rare, imperfectly imitable and difficult to substitute. In other words, it must constitute a barrier to rivals' attempts at resource acquisition, imitation or substitution (Barney 1991). The view is supported by empirical evidence which suggests that idiosyncratic firm factors, not industry factors, explain most of the variance in firm performance (Persoon and Virum 2001; Sanchez *et al*. 1996; Rumelt 1991; Mauri and Michaels 1998); or in Hunt's (2000) words, industry is the 'tail'; and the firm the 'dog' which wags the tail.

In practice, resources and not factor endowments are never by themselves inputs to the production process; the real inputs are the services they render (Penrose 1959; Gregori 1987). It follows from this observation that the growth of a firm is largely determined by the opportunities that exist for the firm to use the productive services of its resources to create a market offering that is valuable to specific market segments and it is profitable to sustain.

What are the implications of this view for regional ports? The resource-based approach suggests that the strategies which a regional port can pursue and are more likely to be successful should focus on the use of resources (such as better logistics, good transport network and intermodal arrangements, vacant land, skilled labour, efficient cargo handling and storage facilities, effective configuration of supply chains, and managerial talent which are unique to the regional port and valuable to port customers) to seek marketplace positions of competitive superiority and to contest for growth. An effective approach to competing on resources should then incorporate the identification and classification of port resources, the identification of port capabilities in terms of what the port can do more efficiently and effectively than its rivals. This should also include the appraisal of the rent-generating potential of resources and capabilities in terms of their potential for sustainable competitive advantage and the appropriateness of their returns. Only after this assessment has been made should port managers select a strategy that enables them to exploit effectively the resources of the port relative to external opportunities and competition.

A useful tool that can assist port managers to determine the competitive position that the port's unique resources can provide to the regional port is the competitive position matrix proposed by Hunt (2000) and presented in Figure 2.1.

Relative Resource-Produced Value

Relative Resources Costs	Lower	Parity	Superior
Lower	Intermediate Position	Competitive Advantage (Efficiency Advantage)	Competitive Advantage (Relative Advantage)
Parity Costs	Competitive Disadvantage	Parity Position	Competitive Advantage (Effectiveness Advantage)
High	Competitive Disadvantage	Competitive Disadvantage	Intermediate Position

Source: Adapted with from Hunt, S.D. (2000: 137) A general theory of competition, Sage.

Figure 2.1 Competitive position matrix

The matrix suggests that the potential of port resources to create competitive advantage can be assessed against the net relative value the resource is capable of generating which is based on the judgment of the two key dimensions – the relative cost of the resources and the relative value that the resources can produce. In this framework, competitive advantage is possible in three ways. First, a port can have an efficiency advantage, which arises when its lower resource costs produce a market offering of similar value as that provided by the competing ports. Second, a port can attain an effectiveness advantage because its resource parity costs produce superior value relative to competing alternatives. A relative competitive advantage which is associated with superior financial returns is achievable when both the efficiency and effectiveness advantages are materialised; a goal never easy to accomplish; nevertheless worth pursuing because the potential benefits are additive.

When a port has no advantage in either dimension relative to rivals the likely outcome is competitive inferiority. Likewise, when a port has neither disadvantage nor advantage in either dimension, competitive parity may occur. A more complex situation occurs when a port has advantage in one dimension but inferiority in another dimension. In this case the competitive outcome is contextual and hard to define. Depending on the perception of the relative importance of each dimension, a port can temporarily enjoy a position of competitive advantage, competitive parity or competitive disadvantage.

However, as with any competitive advantage that is created, sustaining it requires the ability of the port to continually erect barriers to competition to avoid the loss of advantage created over time. Heterogeneous and immobile resources alone will not guarantee a sustainable competitive advantage. Sustainability will occur only when rivals find it difficult to both imitate the competitive advantage-generating resources and develop or acquire strategic substitutes for them. More importantly it is the ability of the port to upgrade its resources and enhance its position by finding new and better ways to produce more efficiently what is most desired by the shippers.

2.4.4 Competence-based approach to strategy

Like the resource-based view, the competence-based approach posits that a competitive strategy should be defined by factors internal to the firm. However, this approach considers that the factors internal to the firm that are of relevance to competitive advantage are not the resources by themselves but the firm's competences (Prahalad and Hamel 1990; Prahalad 1993; Hamel and Prahalad 1989, 1994; Hamel and Heene 1994; Heene and Sanchez 1996; Sanchez *et al*. 1996). A firm may earn rents not because it has better resources, but rather because the firm's distinctive competences or skills allow it to make better use of its resources.

As noted in the early discussion, it is not the resource *per se* that is the object of interest for competitive advantage; but instead the productive services that the resource provides. For the firm to be able to produce a market offering that has value for some market segments, many resources must be combined or bundled into distinctive interrelated and self-reinforcing activities or competences that lead to a competitive advantage (Porter 1997; Winter 2000; Collis and Montgomery 1995, 1998). It is the resource combination or competences which ultimately explain why market offerings of some firms are superior and more attractive to customers than others and why some firms are able to outperform their rivals. It can be said that competence-based strategy is an extension and a complement to resource-based approach to competition. As Figure 2.2 suggests, in order to contribute to competitive advantage, resources that are unique must be aligned with core competences and integrated into the firm's capabilities or complex patterns of coordination between people and between people and resources to perform specific value added activities.

For a competence to be core Hamel and Prahalad (1994) argued it should provide a distinctive bundle of skills and technologies that enables a firm 'to provide a particular benefit to customers' – it must make a fundamental contribution to the customer's perception of benefits and long-term profitability and also be difficult for rivals to imitate. Basically, a core competence defines a firm's key business and business success (Hamel and Prahalad 1994). Competences which are necessary but not sufficient to allow a firm to produce a differentiated market offering that confers an advantage over the competition are called threshold competences.

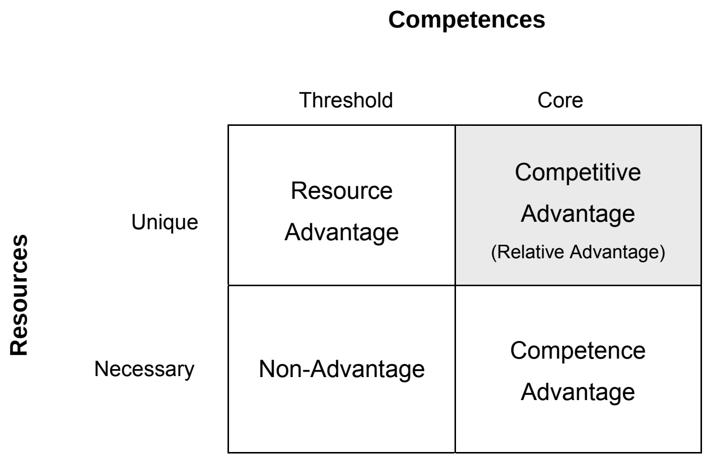


Figure 2.2 Capability-based competitive position matrix

Given the apparent potential of competences to lead to positions of competitive advantage, the relevant question to be asked is what kind of competences should a regional port, for instance possess in order to compete successfully in the shadow of its adjacent capital city port for marketplace positions of competitive advantage and growth?

Haezendonck (2001) has identified a number of core competences that she regards as the determinants of competitive advantage of the port of Antwerp. She argues that the hinterland distribution capabilities embedded in highly efficient supply chains and intermodal arrangements, the superior access to markets offered by the port, the higher flexibility of its labour force, the superior ability to coordinate network relationships and information and the superiority in execution of port core activities are but a few competences that sustain the competitive success of the port of Antwerp.

It is important to stress that each regional port in Australia and elsewhere is likely to require different competences; or it may need to develop new competences; or even dismantle the existing ones depending on the market environment in which it competes and the required sources of competitive advantage. Competences are dynamic; they evolve with time and can appreciate as well as depreciate depending on market requirements, the intensity of competition and the rate of innovation in the market. The real challenge for port managers is not to assemble a comprehensive list of prescribed competences and then decide which to pursue, but to identify for a specific situation, the resources, human skills and organisational processes that must be assembled and organised into capabilities to take advantage of emerging market opportunities.

In a turbulent competitive environment responding quickly to evolving customer needs provides the foundation on which enduring shipper-port relationships are built; but it is the ability to anticipate evolving shipper needs and to generate new value-creating capabilities that create the more enduring competitive advantage. Building competences to address new opportunities is critical to capturing rents from innovation.

2.4.5 'Coopetition' as a manifestation of growth strategy

The idea of cooperating to compete or 'coopetition' as it is now known is not new (Hamel *et al*. 1989; Ohmae 1989, 1992), though admittedly it has been slow to be accepted as genuine in the port environment. Understandably, until recently most ports were seen as spatial monopolies and institutional authorities and local politicians were often parochial and antagonistic. But as port reform continues to take place worldwide and competition for cargo between ports increases, ports realize that to compete globally and in scope they need resources that may lie well beyond their possibilities. In this context the idea of combining resources and sharing with others to create competitive advantage is being accepted and is gaining momentum as a competitive strategy through which the port can achieve growth.

'Coopetition' (Bengtsson and Kock 2000) or cooperation with competitors is a way of competing through collaboration (Song 2003; Hamel *et al*. 1989). 'Coopetition' is a strategy that can be used selectively to enhance efficiency and improve service quality in areas where the port alone does not have sufficient resources to compete effectively.

There is a possibility of mutual benefits if formal mechanisms of cooperation between capital city port and their adjacent regional ports were established. Since these ports may have common hinterlands and shared interests in regional growth, full employment and industrial competitiveness, it can be argued that some of the capital city port activities particularly those that require land for expansion and often prompt ports to relocate activities to far locations or to reclaim land at a very high cost can be handled cost-effectively in the adjacent regional ports. Such cooperation could avoid mutually destructive competition among the ports. A strategic alliance can strengthen both partners against outsiders, even as it may weaken one partner against the other (Kanter 1994).

Some industry observers have suggested that in Australia a State-based approach to port development which would incorporate cooperation and alignment of strategies between metropolitan ports and their adjacent regional ports may be desirable particularly to rationalize and optimize infrastructure investment decisions. The practical arguments for such an approach is that cooperation between these ports would avoid duplication of effort and conserve expensive and scarce resources such as land and capital and improve the competitive advantage of the region. Also, cooperation between the two can help offset carrier power, particularly when traffic flows towards the shared hinterland of the neighbouring ports are involved.

Many shipping lines are now involved in some sort of strategic alliances to strengthen their market power and diminish the influence of individual ports. They are content to see each port standing alone and to play one port against another because increased competition among ports allow shipping lines to extract market benefits most of which manifest in form of depressed rates (Fleming 1993).

Avery (2002) suggests the formation of strategic alliances between adjacent ports – port strategic alliances – as a counter-strategy against their shipping lines counterpart, in order to survive the ever-increasing competitive business environment. Several European ports have enacted initiatives of cooperation among neighbouring ports. For example, the Belgian ports Antwerp, Zeebrugge and Ghent evolve towards a Flemish port network. In the Netherlands, Rotterdam formed a strategic alliance with the port of Flushing a few years ago, aiming at the joint development zone in the port of Flushing. Sharp (1987) and Frunio (1988) have suggested that firms should join networks of coalitions and learn how to manage relationships, rather than just compete with others alone. Some economists have admitted that in a competitive and unregulated economy, as a consequence of profit-seeking behaviour, cooperation between firms is a normal form of business organisation. In any case cooperation is valid where its benefits outweigh those of competition.

2.4.6 Corporate entrepreneurship as strategy for firm growth

In our view, Penrose's views of 'enterprising management' (Penrose 1957:7) offer special insights to the growth and performance of firms – and, in this context, of ports. She noted that '.... for so long as there exist opportunities for profitable investment there are opportunities for the growth of firms'; and added that '... for a firm, enterprising management is the one identifiable condition without which continued growth is precluded – this is one necessary (though not sufficient) condition for continued growth'.

If Penrose's contention is correct, then the primary concern of regional port managers should be to identify profitable market opportunities and mobilize resources to capture opportunities. Entrepreneurial strategies achieve this; they incorporate a set of actions by which managers – either on their own or inside organisations – pursue opportunities regardless of resources they currently control (Stevenson *et al*. 1989; Stevenson and Jarillo 1990). In a rapidly changing world, organisations need to identify continually new opportunities beyond existing resources and competences if they are to survive. In this case, the *opportunity* and not resources, drives the strategy.

Until recently entrepreneurship was seen as the domain of start-ups, new venture creation and small firms that wanted to grow (Covin and Slevin 1991; Ferreira 1996; Stevenson and Jarillo 1990; Barringer and Bluedorn 1999; Hitt *et al*. 2001; Brown *et al*. 2001). Entrepreneurship was always associated with visionary individuals with entrepreneurial flare who generally pursued opportunities outside the firm's existence. This situation is now changing as more organisations are involved in both opportunity seeking (entrepreneurship) and advantage seeking (strategic management) activities to create wealth (Ireland *et al*. 2001). In practice corporate entrepreneurship has become not only a reality but also a matter of strategic necessity; and as Shane and Venkataraman (2000) argue entrepreneurship does not require, but can include, the creation of new organisations. Entrepreneurship can and does occur within an existing organisation.

For a regional port which operates in an uncertain environment where competition is increasing and flexibility is required, entrepreneurial strategies are certainly the most appropriate contest tools to enable it to achieve its growth objectives. Unfortunately, regional ports have not yet been able to take full advantage of entrepreneurial strategies. The problem is that the process through which profitable market opportunities are effectively exploited is not well understood even though the relationship between profitable opportunity and firm growth is well established (Ottoo 2000; Amram and Kulatilaka 1999a, 1999b; Brealey and Myers 1996).

Competing with entrepreneurial strategies requires an organisation to be fully committed and involved in the process of identification and exploitation of valuable market opportunities to achieve business growth and long-term survival (Hitt *et al*. 2001). It entails actions directed at creating new resources or combining the existing resources to develop market offerings that are superior to those of competitors and are at the same time the most desired by customers. Basically, an entrepreneurial approach focuses strategy on value creation through the understanding of the 'context' of market opportunities, the identification, evaluation, selection and implementation of market opportunities. The last two involve strategic choices and the commitment of valuable resources (Shane and Venkataraman 2000).

Entrepreneurial strategy is not prescriptive in the sense that ports and individual entrepreneurs within the port do not prescribe what strategy should be applied to each context or situation; rather they articulate the need to combine a broad range of strategic options and pursue strategies that are most effective in exploiting and capturing market opportunities. Entrepreneurial strategy draws heavily on resource-based and competence-based strategies in that it recognises the role of resources and competences in determining the market opportunities a firm may exploit, and the levels of profits it may expect; but unlike the two, its reach is not limited by the resources and competences that the organisation currently holds (Shane 2000); some resources are mobilized or created along with the process of opportunity exploitation.

At this stage, it suffices to stress that entrepreneurial strategies offer the ideal platform on which the growth of a regional port which has developed in the shadow of a capital city port can be pursued and achieved. Focusing on entrepreneurship is an important strategic decision and it is the result of how decisions are made within the organisation and what actions are favoured – an issue that is addressed in the following section.

2.5 Decision-Making and Strategic Choices: A Behavioural View of Port Growth

Who makes strategic decisions? How are they made? Are some strategic decisions better than others? It is well to remember that firms, and ports, are managed by people, by management teams. Is it likely that actions will always be rational, that the choice of a particular strategy is mechanistic and rational? In our view it is imperative not only to understand the nature of strategy but also to understand the process of strategic decision-making; and in the following paragraphs we explore a more behaviour-oriented view of decision-making in firms and the likely implications that this view might have for the growth of firms and of ports.

2.5.1 Behaviour-oriented decision-making

The neo-classical economic literature on decision-making sees firms as units that continually strive to maximise some objective function such as profits (Mansfield 1979). Behavioural theory on the other hand rejects the economic concept of the rational decision-maker (Cyert and March 1963). Instead it directs that the analyst should look at how managers act and by what processes they reach decisions. Machlup (1979) asserts that the behavioural theory of the firm with respect to determination of a firm's actions runs in terms of a 'quasi-resolution of conflict' within the organisation, an 'adaptively rational, multi-objective process' with responses to 'short-run feedback on performance' and continuous organisational learning. The behaviouralists use agency theory to point out that while owners of the firm may run their businesses with a view to maximise money profits, managers may run the firm with supplementary and partly competing goals in mind subject to 'satisfactory' profit levels.

The behavioural theory of the firm is a characterisation of vested interests in the business enterprise. The relevance of the theory lies in the fact that the strategies that will be pursued by the port will in part be a reflection of the power politics in that port. The choice of specific opportunities to pursue may be conditioned by the reality that some individuals or functional area executives wield more influence in the organisation than others. In this context, behavioural theory examines the inherent conflict between the goals of individuals and sub-groups within the organisation and suggests that organisational objectives and hence strategic choices grow out of the interaction among these individuals and sub-groups. Admittedly, a CEO is subject to influence from dominant members of the organisation because she or he relies on them to implement strategic decisions. Eventually, the overall corporate goal becomes a product of a compromise between the managers – 'satisfactory level' targets are set. This is called *satisficing* behaviour as opposed to maximising behaviour of the traditional theory. It is also called bounded rationality. The inter-group rivalry may not overly threaten the existence of the organisation because organisational slack provides a pool of emergency resources which permit managers to meet their goals when the economic environment becomes hostile.

The behavioural perspective of decision-making also highlights the central role of internal communications, particularly in large organisations. It points out that decision-making is distributed throughout the organisation rather than just concentrated at the apex of the organisation pyramid. This happens because lower level managers do not just execute orders of those at the top, they exercise initiative in detailed planning within broad limits set by senior management, summarising and synthesising information to be passed to senior management for decision-making. The lines of communication mean that senior managers may not impose their objectives on the organisation *willy-nilly*. There is the important influence of trade unions. In the Australian maritime industry, the power of unions is quite pronounced.

As an adjunct to the behavioural view of the firm, corporate finance theorists have looked at management typologies in terms of their attitudes to risk (Brealey and Myers 1996). Managers are divided into three groups – those that are risk takers, those who are risk neutral and those who are risk averse. The attitude of managers to risk is important because it is likely to determine the type of strategies they may pursue. More importantly, the risk profile of a management team may determine what kind of opportunities it will pursue and the level of resources it will commit to capturing those opportunities.

Competitive strategy concerns choice between competing alternatives. Behaviour-oriented decision-making gives credence to the idea that individual managers in firms may influence the strategic choices that firms make and emphasises the importance of risk reducing information before strategic decisions are made. Individuals in firms therefore have a central role in strategic decision-making and strategic choice and the strategic choices they make and implement are not the result of a purely rational process, but rather of power struggle and politics within the organisation in which coalitions are formed, lobbying is common, the withholding and control of agendas is carried out and the preferences of the most powerful triumph (Eisenhardt and Zbaracki 1992).

2.5.2 Strategic choices and decompositional methods

The decision to capture an opportunity for growth is a multistep, complex process which is guided by a variety of economic and non-economic issues, and by quasi-rational assessment of economic costs and benefits that are also filtered through behavioural processes of perception and interpretation. Not all choices are an outcome of an explicit decision-making process; the decision-maker can for instance assume some form of conventional behaviour or follow intuition (Allison *et al*. 2000; Khatri and Ng 2000). The purely rational model of choice behaviour which views choice as a product of a sequential decision-making process including the definition of the choice problem, the generation of alternatives, the evaluation of attributes of the alternatives, the actual choice, and finally the implementation (Ben-Akiva and Lerman 1985: 32), can be modified to take into account the lack of information about the set of factors that the analyst would otherwise consider to be in the universal set. This entails bounded rationality on the part of the decision-maker who is affected by his or her own past experience and learned responses. The presence of coalition politics in organisations also influences the choices being made. The stronger coalitions will select certain opportunities ahead of others even if the pure economic benefits of the selected opportunities do not necessarily outweigh the alternatives.

Priem (1992) asserts that managerial judgments and strategic choices can be analysed with decompositional and compositional methods. Each compositional method involves presenting an executive with combinations of different levels of salient strategy variables and assessing the executive's preference judgment in response to each composition. The goal is to develop a representation of the judgment policy employed by executives for the strategy variables. Each compositional method involves 'talking through' or 'walking through' a decision situation. The goal is to gain insight into the processes used and the variables considered in making the choice decision.

Decompositional methods for exploring managerial judgments and choices require executives to rank or rate expected firm performance for many different 'profiles' consisting of different combinations of levels of strategy variables. Axiomatic conjoint analysis, nonmetric conjoint analysis, metric conjoint analysis and policy capturing each use a variant of regression to *decompose* an executive's judgments into a weighted linear or multilinear equation summarising judgment policy and strategic choice (Rude 1991).

The decompositional methods assume that the relevant judgment attributes are known *a priori.* Therefore, an important decision for researchers is the choice of strategy variables and their levels in the judgment stimuli. The substantive nature of those variables must come from existing strategy theory, or from previous process-based elicitation studies. Therefore, the decompositional methods have the greatest utility when a body of existing theory and evidence, such as that from strategy content and process research, is available. All of the decompositional methods can be classified as judgment tasks (Louviere 1988; Louviere *et al*. 2000). The tasks seek to obtain the maximum amount of information from a small number of subjects. Each decompositional method can be used as the basis of an in-depth, *quantitative* analysis of an *individual* executive's judgment policy.

Following Priem (1992), this study uses stated choice techniques to model opportunity capture in regional ports. The stated choice techniques used to model managerial choice in this study are a part of the decompositional approach to measuring strategic judgments and choices. However, stated choice techniques are more advanced than the naive preference elicitation approach (Louviere 2000). In this case, managers are asked to make choices rather than just indicate preferences. In real life, executives have to make choices rather than rank or rate strategic alternatives (Louviere 1996). Priem (1992: 152) notes that the methods offer promise for exploring strategic judgments more so because 'few other research techniques combine these idiographic and quantitative virtues, allowing statistical tests of the relative importance of the different strategy, structure and environment variables in an executive's perceptual field'.

Discrete choice modelling is premised on the economic dictum of utility maximisation. In a strict sense the utility maximisation specification in discrete choice models is unconstrained utility maximisation with observed and unobserved effects, since the analyst does not impose any constraint on utility maximisation unless they limit the choice set exogenously (Hensher 1994). In this study the choice set is constrained in that the respondents are not offered the null choice set. This makes for bounded rationality. Additionally, the inclusion of unobserved effects in the choice model specification implicitly acknowledges that there is an 'irrational' aspect in choice behaviour, or at least an element that the analyst cannot explain rationally. Additionally, Ben-Akiva and Lerman (1985) point out that the rationality concept in choice theory does not strictly refer to the omniscient individual who can process prodigious amounts of information and perform complex calculations. Rather, the concept is used to describe a decision-maker with consistent and transitive preferences.

2.5.3 Implications of behaviour-oriented decision-making for regional port growth

Understanding why a regional port grows requires an understanding of how strategies are formulated and how strategic choices are made and by whom. Behaviour-oriented decision-making suggests that the growth of a regional port is an outcome of 'clever' strategies that its managers define and are able to implement. These strategies are not always formulated through rational process, but rather they are determined by the preferences of powerful coalitions of port managers which triumph in power struggle and politics. Hence, the decision-maker within the port is of special interest and is the key to understanding why some ports and not others are able to develop and implement superior strategies which seek and achieve growth. The profile of the decision-maker influences and determines in part the conduct of the port in the marketplace.

There is another dimension of strategic choices and this relates to the risk profile of port managers. Pursuing growth opportunities is risky because it involves commitment of resources without assurance of positive returns. Generally very risky opportunities are associated with high returns but the decision to pursue such opportunities will be determined by managers' perceptions and tolerance to risk. Again, the ultimate course of action will be determined by power struggle and politics in which the perceptions of the most powerful coalitions will prevail. This observation indicates that for a regional port to be able to implement successful strategies its management team must comprise capable managers and entrepreneurs who are willing to take risk when required. The impact of the risk can be reduced with the use of quality and relevant information to support the decisions being made. Furthermore, management teams whose members that have less variability in risk tolerance and preferences will move faster to making key decisions and taking actions than those fragmented by the presence of a small number of coalitions. High variability in preferences and high fragmentation of management teams reduce the speed and efficiency of decision-making and can be a source of competitive disadvantage.

2.6 Summary

This chapter has provided an extensive review of the literature relevant to port growth. The spatial and economic literature offers useful insights about the factors that sponsor port growth. It was argued that location and port efficiency are critical to port growth but are not sufficient to explain why some ports manage to grow while others fail. A broader and more complex set of factors seems to be in place. However, these factors can only be well understood if we examine the strategies that senior managers define and implement, and the process by which strategic decisions and strategic choices are made. In our view, then the nature of strategy and the profile of the decision-maker are key issues in regional port growth. The following chapters reflect this view.

CHAPTER 3

Capturing Opportunity: A Framework for Defining Regional Port Growth Strategies

3.1 Introduction

Intuitively, and conceptually, unexploited opportunities are available in the marketspace; but not all managers of firms – or of regional ports – are able to identify or are capable of identifying meaningful or valuable opportunities. Nor are they able or capable of capturing or exploiting those opportunities. Why is it so? Why is it that some managers and management teams successfully exploit opportunities and develop and implement valuable growth strategies but others cannot? Is it luck or foresight as Hamel (2002) questions?

'Luck or foresight? Where do radical new business concepts come from? The answer is this: new business concepts are always, always the product of lucky foresight...the essential insight doesn't come out of any dirigiste planning process; it comes from some cocktail of happenstance, desire, curiosity, ambition and need. But at the end of the day, there has to be a degree of foresight – a sense of where new niches lie. So radical innovation is always one part fortuity and one part clear-headed vision' (Hamel 2002: 25).

This chapter is concerned with these issues and proposes and develops a conceptual framework that can be used to provide insights into how regional ports may capture valuable opportunities for growth. The framework draws on earlier and current thinking in the business and management literature; but neither in this literature nor in the port-related literature has there been any attempt to conceptualise and model opportunity capture.

The first part of the chapter describes the essential elements of a conceptual framework for opportunity capture; the second part underlines the particular data needs of the framework and identifies briefly a research methodology to allow adequate data resources.

3.2 Capturing Opportunities: The Elements of a Conceptual Framework

How can regional ports define opportunities for growth? Is there some framework within which it is possible to deal with '...one part fortuity and one part clear-headed vision'? (Hamel 2002: 25). Is there a framework which allows the recognition of random or stochastic events but at the same time allows also for a *stepwise way of thinking* about *capturing opportunities* as a basis for defining effective strategies for port growth?

This study argues that it is possible to recognise, both intuitively and conceptually, the elements of a framework that provide a meaningful and useful way of thinking about opportunity capture and exploitation. The study further argues that there are five processes that define the capture and exploitation of valuable opportunities. These processes are depicted in Figure 3.1 as follows:

(I) Understanding the opportunity *'context'*
(II) The *identification* of opportunities
(III) The *evaluation* of opportunities
(IV) The *choice* of valuable opportunities
(V) The *implementation* of valuable opportunities

These sequential processes are critical in determining what opportunities are available for the port and which opportunities have the potential to offer key benefits to the shippers and the regional port. The same processes streamline the decision-making framework about opportunities for which regional ports can create and mobilize essential resources to seize.

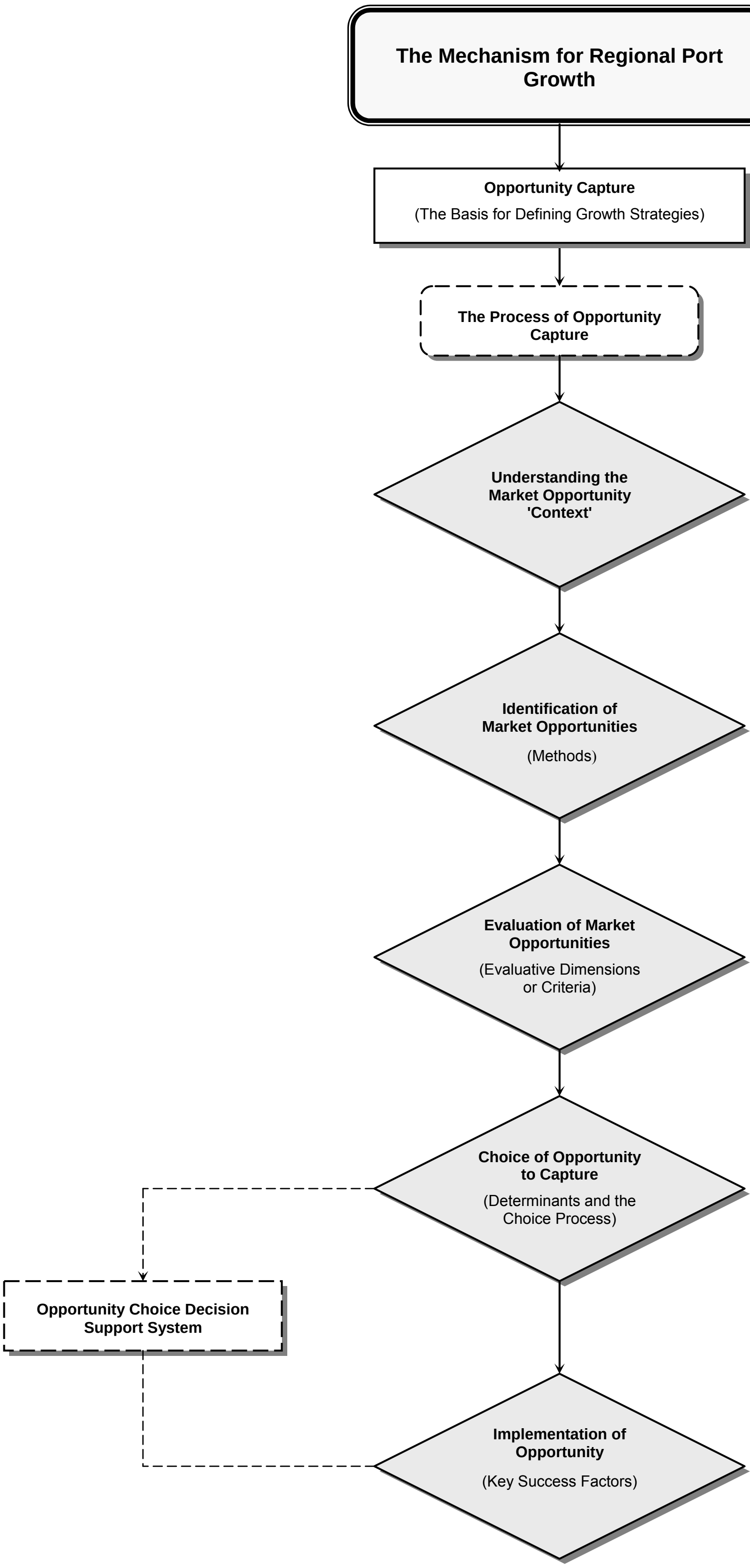
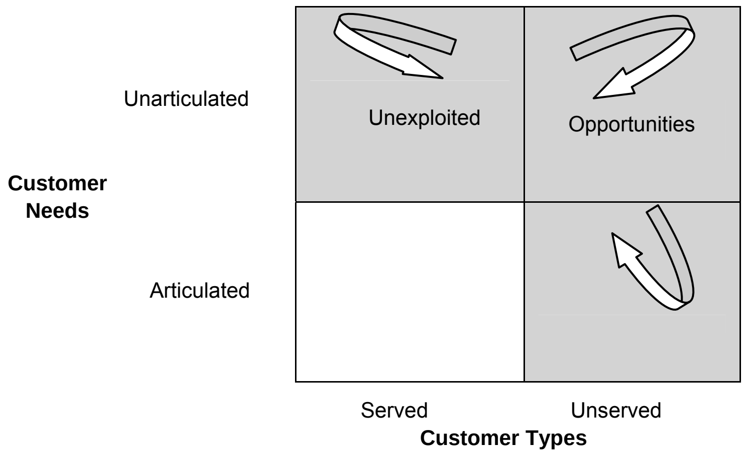


Figure 3.1 Opportunity capture and port growth: the mechanism

3.2.1 Understanding the opportunity 'context'

The ability to recognize opportunities appears trivial; but in reality it is a complex issue and is critical to the whole process of exploiting market opportunities because no organisation or individual will commit resources or effort to pursue something that they believe does not exist. Moreover, by failing to recognise that marketable opportunities do exist in the marketspace, an organisation may forgo the possibility of profiting from valuable strategies that it can develop to exploit needs that have been overlooked and remain unexploited.

Hamel and Prahalad (1994) suggest a generic framework which defines the context of opportunity. The frame depicted in Figure 3.2 suggests that an important source of valuable opportunities is the customer whose expressed and latent needs create demand for specific market offerings.



Source: Adapted from Hamel and Prahalad *(1994:112) Competing for the Future, Harvard Business School Press.*

Figure 3.2 The context in which market opportunities exist

Shane (2000) argues that opportunities exist primarily because markets are imperfect, customer needs are systematically overlooked or not being served well, information is unevenly distributed among market participants, and market participants have different beliefs and value judgments about the relative value and usefulness of resources they possess. He further argues that because people possess different levels of experience, skills, intuition, and are not equally lucky, they tend to make different assumptions about what markets seek and what is the best value to provide (Kirzner 1997). The differences in assumptions and actions undertaken by suppliers to satisfy the market means that some decisions will be correct while others will not and resources may not be put to their best use, thus opening a window for a range of alternative uses of resources and market offerings that can be developed and supplied to markets.

Market-driven port managers recognise that the supply mechanism often fails to provide shippers and other port customers with services they desire because on the one hand customers' needs are diverse, complex and dynamic and on the other hand no port possesses or can coordinate all resources required to satisfy all the needs. In addition, even where the technology to service customer needs exists it may not be available to all or it may lag in effectively fulfilling the needs that have not been articulated but are pressing.

Knowing what customers want and how to satisfy needs better than the competitors is an information intensive activity which is costly and requires continuous learning and experimentation (Woodruff and Gardial 1996). Some organisations have the incentive and resources to acquire and process the information needed to make quality decisions on how best to configure a specific market offering to provide superior value to customers but others do not. It is this gap between the needs and the capabilities, including the knowledge of how to satisfy them, that creates opportunities. These can be exploited by those who are motivated to look for profitable actions that the organisation can develop in order to deliver a value that is aligned with customer requirements.

Opportunities can also result from the reaction to shifts in the relative costs and benefits of alternative uses of resources. The lack of land in capital city ports to accommodate the growing container traffic, for example, has increased the value of land and created opportunities for most regional ports that possess vacant land. Another source of opportunities may be linked to advances in technology such as the emergence of supply chain and intermodal systems. Technology and innovation tend to create discontinuities that generally enhance or destroy the existing competences (Prahalad 1998) and open opportunities for the most creative players to introduce new and better services that can be sold profitably in the marketplace.

3.2.2 Identification of opportunities

Recognising that opportunities exist and emerge over time is a necessary condition for exploitation of opportunities to take place. However, before opportunities can be exploited they need to be identified. Shane and Venkataraman (2000) maintain that despite the fact that opportunities exist, an organisation can earn profit only if it identifies opportunities and commits itself to those opportunities that are valuable to pursue.

The process of discovery is of fundamental relevance for competitive advantage. It determines the quantity and quality of opportunities that can be supplied to an organisation by its managers. Those organisations that discover most valuable opportunities will enjoy a higher share of opportunities and potential advantages that come with it compared to organisations that see few or cannot find any. However, for the process of discovery to be effective, it is paramount that we understand why some managers but not others discover specific market opportunities.

The literature on entrepreneurship and strategic management (Shane 2000; Krueger 2000; Weinzimmer *et al*. 1996; Shane and Venkatataman 2000; Barringer and Bluedorn 1999; McCline *et al*. 2000; Krueger and Brazeal 1994; Shepherd and Krueger 2002), the observation of business practices and the insights drawn from port managers, shippers and port experts suggest that there are three broad sets of factors which may explain why some port managers discover opportunities that are not obvious to others. These factors are related to the search for opportunities, the recognition of opportunities and the role of chance or simply luck! Figure 3.2 depicts the process of opportunity identification and its relationship to underlying factors.

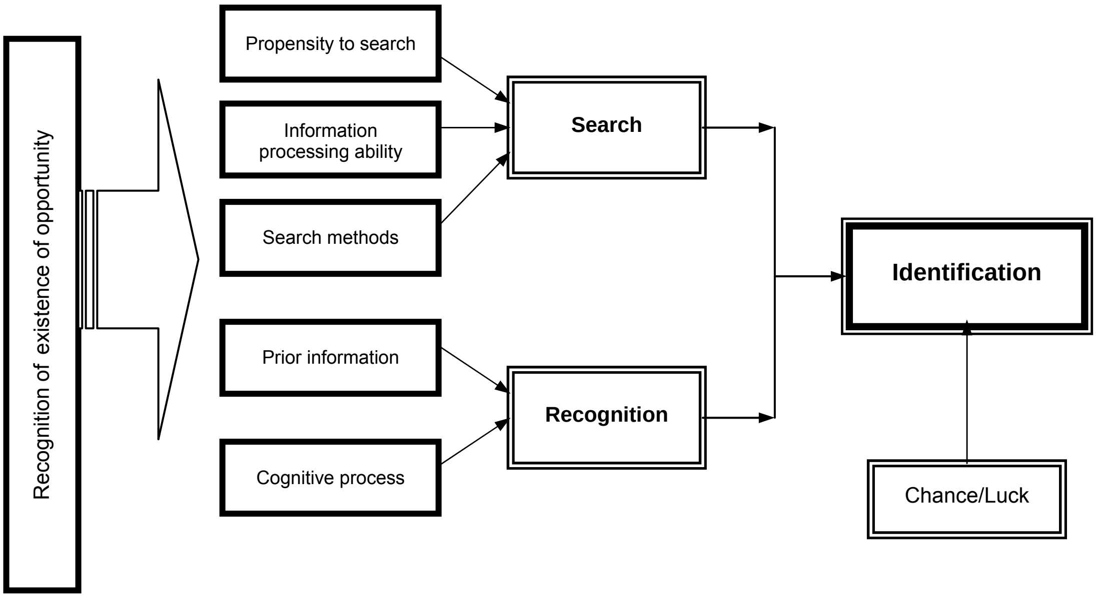


Figure 3.3 Theoretical process of opportunity identification

Figure 3.3 shows that a major reason why some organisations are likely to identify opportunities is because they search the competitive environment for unmet needs which can be profitably exploited by the firm. The search of the environment is dependent on the willingness or the propensity of an organisation to commit resources to scan the broad market environment, the ability to process collected information in a meaningful way and the search techniques used. The more willing an organisation is to learn about events and trends in its relevant environments the more likely it will discover unexploited opportunities (Barringer and Bluedorn 1999; O'Brien and Fadem 1999; Weinzimmer *et al*. 1996; Pearce II *et al*. 1982; Smeltzer *et al*. 1988).

The willingness of an organisation and its entrepreneurs to search the environment for opportunities has been linked to strategic motives, tolerance to risk, perceived collective and individual ability, competitive pressures and the existence of planning formalities within the organisation – though intuition has been also recognised as a factor input. The effectiveness of search activities, however, lies in the ability of the organisation to collect and process relevant information using different and appropriate methods and techniques.

In an attempt to discover opportunities through search, regional ports can collect data and analyse shifts in demographics, technology, shipper preferences, competitor value chains and regulations. Shifts are often an indication that new needs arise and need to be satisfied. Useful techniques to collect data and methods to uncover patterns of emerging behaviour that the port can anticipate and act upon include trend analysis, market research, social networks, industry studies and government reports.

In any case the identification of opportunities through search is possible only if the organisation knows what it is searching for; in other words, if its entrepreneurs are not conducting blind searches – if they can recognise an opportunity when they see one. As Shane (2000) noted, although opportunities are objective they do not come in a prepackaged form that is obvious to everybody (Venkataraman 1997). Hence the ability to recognise an opportunity is central to the whole process of opportunity identification. The recognition of an opportunity is generally facilitated by the existence of prior information and the cognitive properties necessary to value an opportunity. Three major dimensions of prior knowledge are relevant to the process of opportunity identification: prior knowledge of markets, prior knowledge of ways to serve markets, and prior knowledge of customer problems. It can be argued for example, that port managers who possess superior information about the container market and considerable experience about how to serve this market are also more likely to possess a deep understanding about the problems shippers face in this market. They are also able to relate the knowledge they possess to the new information that is available in such a way that they can see patterns of emerging opportunities.

Opportunities may also become apparent to those who are able to relate the means to the ends through cognitive processes. Even if a port manager possesses information about specific shipper needs he or she may fail to discover an opportunity if they cannot recognise the value of this information; that is to say if she or he cannot see how to relate the information on that specific customer need to a potential market offering which will mitigate the problem the shipper faces. The ability to relate means to ends is what defines the cognitive approach to opportunity recognition and identification.

Finally, managers may discover opportunities just because they are lucky, they happen to be in the right place at the right time. Porter (1998), Hamel (2002) and others have argued about the importance of *luck* in business. Accordingly, chance events often lie outside the organisation's control but they can create shifts in competitive position if they are meaningful and the organisation is able to take full advantage of them. But even in these circumstances, the propensity to search and the ability to recognise an opportunity are critical; and *luck* seems to favour prepared minds (Krueger and Brazeal 1994).

In terms of actual competition for opportunity share it has been argued that a formal process for searching for opportunities is necessary to be established in organisations because it imposes managerial discipline and improves the chances that opportunity can be systematically found (Hamilton 1974; Barringer and Bluedorn 1999). Hence, in the context of regional port competition for opportunity share the actual process of search for valuable opportunities can be described by Figure 3.4 and we note the following step processes.

- **Identify customer segments**

The identification of valuable opportunities that can be exploited by a regional port begins with the identification of key customers to which it can offer the same or better value than its metropolitan neighbour port. Clearly, shippers are diverse in nature and not all shippers value the same things. For instance, bulk shippers have different sets of values from non-bulk shippers. In addition, regional ports do not have sufficient resources to serve all shippers. Therefore, it is important that the port management decides at the beginning of the process of opportunity identification about which shippers it should serve because it is able to offer a valid *value proposition*. The common procedure that port managers have used to identify target customers relies on traditional marketing research techniques which segment customers (shippers) on the basis of demographic, geographic and behavioural characteristics (Woodruff 1997).

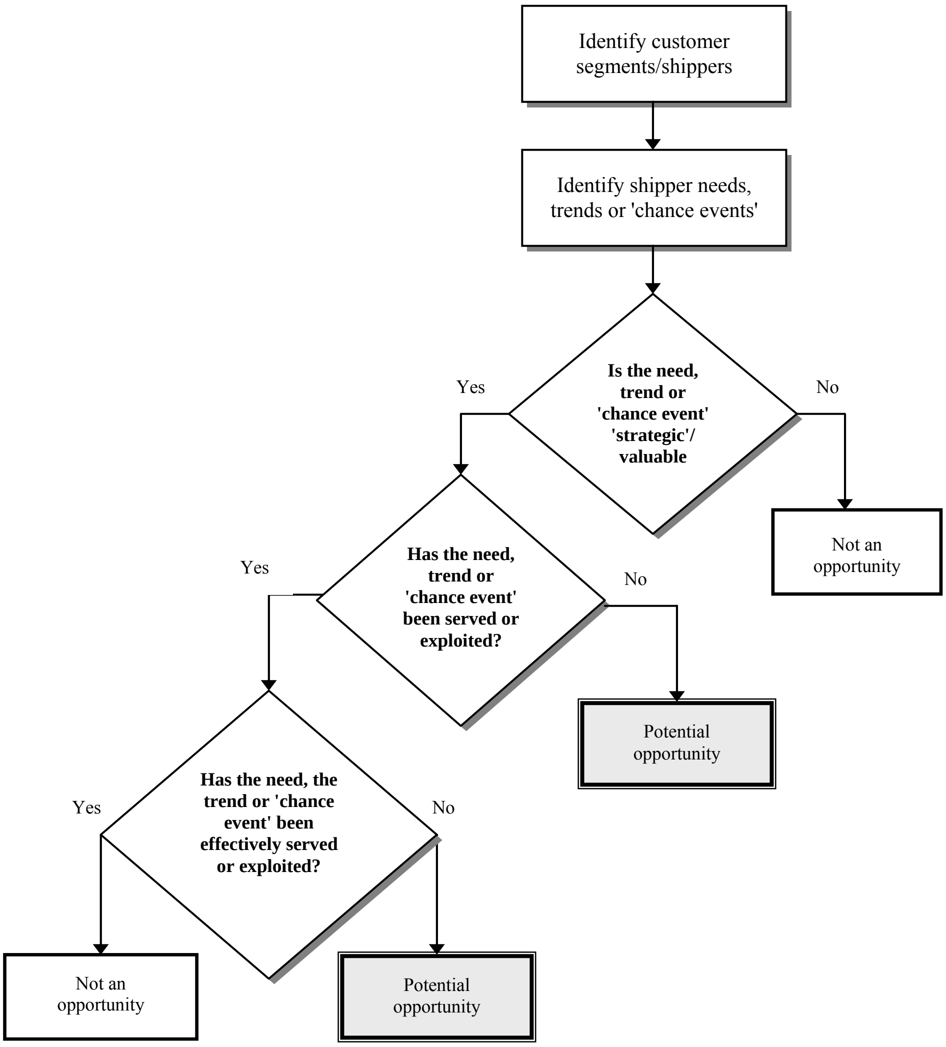


Figure 3.4 The actual process of search for valuable opportunities

Following Phillips (1987), however, it is more useful to segment shippers on the basis of value proposition (Phillips 1987) – a statement of key net benefits each segment seeks from the port service offering. Within this perspective three key market segments can be identified – the single point bulk shippers, the distributed bulk shippers, and the non-bulk shippers.

Single point shippers are mostly bulk shippers whose cargo is destined to or originated from a single plant or facility, which is located in close proximity to the port. In general, these shippers are captive for that particular port and tend to have simple logistics pathways associated with them. Distributed bulk shippers on the other hand are those which are located over a broad area of hinterland and are linked through a network of logistics options. Primary distributors of bulk grain and fertilizers, for instance are examples of this type of shipper but the same rule may apply to others.

For non-bulk shippers, we can distinguish between those involved in neo-bulk cargoes and those involved in what could be called genuine non-bulk cargo. In Geelong for example, ingot exports are commodities that might be produced in sufficient quantities to justify a direct call of a multi-purpose ship. These neo-bulk cargoes are often closely associated with a single point and share some similarities with bulk cargoes such as high volumes and single commodity. In contrast, genuine non-bulk cargo shippers service cargoes that may be handled in comparatively small volumes on individual vessels for which container transportation is an appropriate option – cargoes which may be unserved unless a port develops some container handling capability.

In short, in working out marketing strategies for regional ports, it might prove useful to think of markets and segments in terms of these categories because by taking this view it is obvious that there are some areas for which regional ports can develop competitive advantage against their metropolitan ports. Also each of these categories is likely to represent markets and segments with specific opportunities. Fortunately, techniques for identifying markets and segments with specific needs or opportunities are well known and widely used. Most market research organisations can assist regional port managers to design specific research programs to uncover profitable market segments that attract less competition from metropolitan ports.

- **Identify shipper needs, trends or 'chance events'**

Once target customers have been identified, the next challenge facing regional port managers is to identify the sources of opportunities. The most important source of such opportunities is the unmet needs of shippers. Most opportunities originate with shippers – the end users whose needs create demand for port services. Understanding shipper needs is central to determining what value a regional port can create for shippers.

There are many ways in which shipper needs can be identified. A common approach is to examine shipper activity systems (Porter 1996) – activities through which shippers create value or competitive advantage. Understanding how shippers create value for themselves and determining where the inefficiencies are located within activity systems represents an effective way of identifying shipper needs or potential opportunities, but it is not the only one. Regional ports too can look into their own activity systems to identify areas of service that need to be improved in order to deliver superior value to shippers. Such areas represent unserved shipper needs, which are in essence potential opportunities. Another way of identifying shipper needs or opportunities is to examine the activity systems of the adjacent metropolitan ports. Again, inefficiencies in these systems can be interpreted as actionable needs or opportunities for regional ports. It is important to note that to identify shipper needs requires that regional port managers interact closely with shippers trying to understand who they are, what they want, where the inefficiencies in getting products to market are, how they define competitive advantage and therefore what value they expect from port service offerings.

Market research and market experiments can help the process of learning about shipper needs but other effective ways are also available (Woodruff and Gardial 1996). These include port management involvement with business development councils, government agencies and chambers of commerce and industry, major exporting and importing bodies, which are likely to have some influence along shipper supply chain. Generally these organisations keep considerable amounts of useful data on shippers and are often involved in the process of shipper needs determination to effect investment decisions.

Other sources of opportunities are; socio-economic, demographic, regulatory, technological, and market trends. Some trends have profound implication for a shipper's competitive advantage; they impact on what shippers value and on the way shippers define competitive advantage thus creating needs that can be profitably exploited by regional ports. For example, the lack of vacant land for further developments within metropolitan ports and the growing congestion around the port of Sydney are trends that may suggest that the shipper needs for effective storage facilities and efficient intermodal transport that provide superior access to markets are not being met. Trends when identified correctly may present regional ports with the opportunity to exploit the diseconomies of metropolitan ports to achieve competitive advantage.

Statistical techniques for trend analysis are available and well developed but the activities involved are data intensive and require that port management acquire both qualitative and quantitative analytical skills to render the process effective.

Some opportunities may come from 'chance events'. Chance events may offer profitable opportunities that a regional port can exploit but it should be stressed that the reliance on 'chance events' alone does not maximise the effectiveness of the search for and identification of new opportunities. Experience and intuition will be instrumental to the process of identifying opportunities brought about by 'chance events', but the likelihood of finding such events will increase with the propensity of regional port management to search for opportunities. This in turn, is dependent on managerial strategic motives and the willingness of management to take risks.

In summary, the ability to identify shipper needs and trends and react quickly to 'chance events' is an important step in the process of identifying opportunities but it is the ability to 'see' potential opportunities not yet obvious to the adjacent metropolitan port that constitutes a major competitive advantage (Lorange 2001).

- **Determine whether the need, trend or 'chance event' is 'strategic'**

Shippers will likely place multiple demands on a port. Their needs can be as diverse as requiring a cost-effective logistics service, a total logistics package, an efficient cargo handling operation and facilities, the availability of offshore storage facilities, the existence of an efficient transport network, a flexible service, an intermodal service or an efficient shipping service. In addition, many trends and events are likely to be identified as they emerge.

It is absolutely essential that port managers understand that not all these needs, trends or events have the same impact or strategic importance for an individual shipper's competitive advantage. Moreover, resources that would be required to deliver on all would certainly be prohibitive. It is important that at this stage of the process of identifying opportunities regional port managers implement a screening process to determine which needs, trends or events identified in the previous stage are 'strategic' or valuable. At the heart of this activity are the criteria that regional port managements use to guide this screening. The entire screening activity is only as good as the criteria employed. Successful regional port managers base their screening of opportunities for 'strategic' importance mostly on the criterion that 'strategic' opportunities are those that exert greatest influence along shipper supply chains. Such opportunities are likely to affect a shipper's decision as to which port to buy services from. In short, 'strategic' opportunities are opportunities with potential to deliver competitive advantage to shippers and create benefits to the port.

In general, metropolitan ports and their shadow ports will differ significantly in their ability to deliver value on 'strategic' opportunities. It is important for this reality to be recognised, for it affects how shippers evaluate and behave towards a port market offering.

- **Determine whether the need, trend or 'chance event' has been served or exploited**

Potential opportunities that regional ports should consider are those strategic needs, trends and 'chance events' that have not been served or exploited or if they are being exploited the exploitation is neither efficient nor effective. This, however, raises the question of how one recognises whether a need, trend or event has been served or exploited, and if so how well?

There are at least three effective ways to address this issue. First, regional port managers can approach shippers directly and ask about their perceptions of the value being delivered by the port and the competitors. Second, they can implement market research programs or conduct customer satisfaction surveys to explore the reason for high and low satisfaction with the value being delivered (Howard and Goodstein 1996). Finally, they can conduct analysis of competing supply chains including the shipper value chain to glean insights on whether strategic needs, trends and events are being exploited effectively.

Resources are scarce and expensive. Key differentiating resources should be allocated only to those untapped opportunities that regional ports can exploit more efficiently and effectively than the metropolitan ports. Detecting new opportunities does not automatically guarantee success. To this end, opportunities need to be evaluated and selected based on their attractiveness or strategic importance and on the degree of implementability or likelihood of success.

3.2.3 Evaluation of opportunities

Venkattaman (1997) argues that it is one thing to be aware that profitable opportunities exist, but a significantly different matter to know how to exploit these opportunities. How then does regional port management determine which opportunity to seize? Or how does port management decide which opportunity to commit resources and time to?

Typically, port managers are presented with a range of opportunities, each of which has its own strengths and weaknesses. The real challenge is to ensure that the most valuable opportunities - opportunities that are aligned with shippers' desired value and the port's objectives and for which a regional port can mobilize key differentiating resources and capabilities – are selected and implemented.

At this point it is fair to say that the critical task for port managers is to evaluate or assess the identified opportunities in terms of their desirability or attractiveness and feasibility or implementability. Keh *et al*. (2002) contends that the evaluation is the key to differentiate an idea from an opportunity (Hills and Shrader 1998) and as such it is important to understand how entrepreneur managers evaluate the alternatives presented to them.

The evaluation of opportunities is important for another reason often referred to in the literature as the 'risk of missing the boat' and the 'risk of sinking the boat' (Dickson and Gigluerano 1986; Das and Teng 1997). By failing to perceive a profitable opportunity a business may forgo the opportunity to invest in a profitable venture; and as Chaneski (1996) suggests 'every opportunity that is not recognised by the company is one that is available to a competitor'. On the other hand evaluating an opportunity as valuable while in reality it is not may lead the organisation to commit valuable resources to costly and loss-making actions. Both cases are important but industry observers argue that missing an opportunity or losing it to competitor might in the long term affect the performance and profitability of the businesses of the firm.

Previous behavioural research on intentions to exploit opportunities have suggested that perceived desirability and perceived feasibility enhance the perception that an opportunity is viable or credible (Krueger 2000). Therefore, perceived desirability and perceived feasibility are the two most important dimensions on which the opportunity should be assessed.

The perceived desirability of a specific opportunity is determined by its nature; and the individual, social or organisational belief that the opportunity is desirable and that the expected value from the opportunity will be large enough to compensate for the opportunity cost of other alternatives. On the other hand the perceived feasibility is determined by the perceived collective and individual ability and the magnitude of constraint that the business environment may impose on the practicality of the opportunity.

Although opportunities within bulk and non-bulk business might be different in scope and architecture, they share some desirable generic characteristics that influence their expected value and that regional port managers would look at before deciding which opportunity to select and seize. For example, all opportunities incorporate some level of economic benefits and risk or require some sort of financial and technical resources to be implemented.

Figure 3.5 suggests that the process that successful regional ports use to discern and systematically evaluate valuable opportunities includes the following steps:

(1) determination of key evaluative dimensions;
(2) determination of generic criteria;
(3) identification of factors underlying each generic criterion;
(4) formation of opportunity profiles;
(5) evaluation of performance of each generic criterion and its underlying factors;
(6) determination of the overall performance of each opportunity based on all generic criteria.

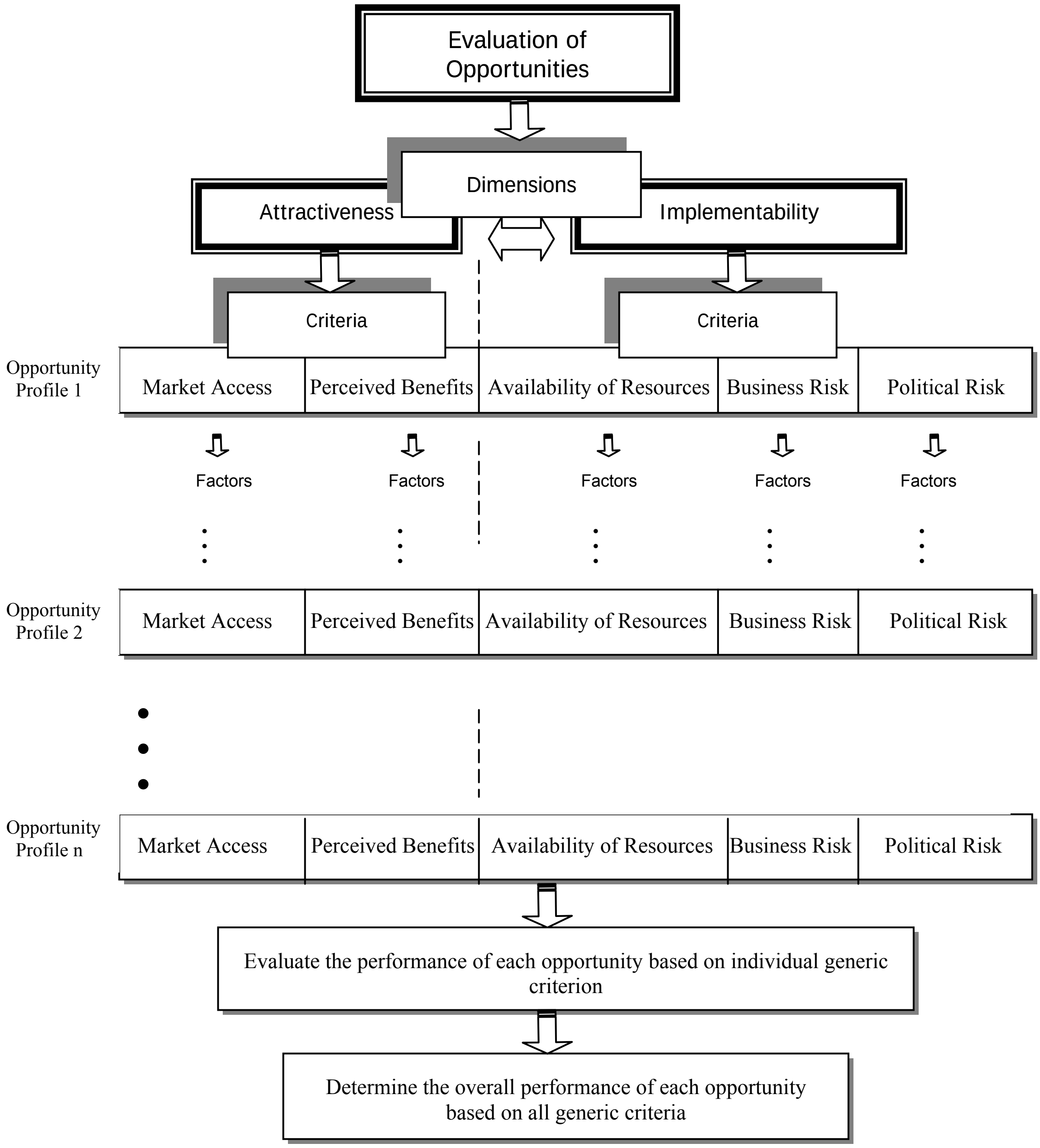


Figure 3.5 Process of evaluation of market opportunities

The main focus of the key evaluative dimensions is on the attractiveness or desirability and implementability or likelihood of success of an opportunity. The economic and business literature and the survey of port managers and port experts suggest that the generic criteria focus on economic and non-economic benefits for the shippers and the port and include accessibility to the markets and economic benefits on the attractiveness side. On the implementation side the focus is on resources and risks and include the availability of resources, and the business and political risk.

The attractiveness aspect of an opportunity is related to potential benefits that a given opportunity promises to deliver not only to the shippers but also to the port. Conversely, the implementability side is related to the costs of exploiting the opportunity. In the context of regional port competition, attractive opportunities are seen as those that have the potential to provide shippers with superior access to markets through the provision of adequate cargo handling facilities, storage facilities, efficient land transport, and efficient shipping service; in sum, these are opportunities with potential to provide a cost-effective logistics service. Such opportunities have the potential to deliver enormous economic and non-economic benefits including business growth, financial, environmental and social returns to the port (Martellato and Nijkamp 1998; Reggiani 1998).

By the some token, opportunities are regarded as implementable if they are aligned with the value propositions of the shippers and the regional port and if the technical and financial resources they require in order to be actionable can be mobilized or developed within a desired time frame. Such strategic opportunities are also likely to earn government and community support and commitment. This last aspect is critical – for many opportunities fail to be exploited simply because they are seen by communities and the government as having some detrimental effects on economic and social welfare and for this reason often they attract strong opposition.

It is important to stress that the assessment of opportunities against the two key dimensions is essential, since it is perfectly possible, for instance, to find an opportunity which is attractive and which also has clear benefits and yet is extremely difficult to exploit. Conversely, it is possible that an opportunity may be relatively easy to implement but, not particularly attractive or beneficial in the sense that it does not deliver the sought benefits or because it has been exploited effectively by a competing metropolitan port. In general, the most desirable opportunities have been those that are very attractive and relatively easy to implement. But, such opportunities tend to be very competitive. For this reason, it is important that regional port managers develop a strong ability to 'see' and exploit valuable opportunities ahead of metropolitan ports.

3.2.4 Choice of valuable opportunities

The processes of evaluation and choice of opportunities are intertwined and often occur simultaneously, which makes it hard to separate them, but, because they are different, it may be useful to study them independently and later establish their relationships. In the evaluation process, preferences for different opportunity profiles are formed but it is only during the selection process that the actual choice and decision to commit resources is made.

Figure 3.6 provides a graphical simplification of the overall process by which managers come to be aware that options exist and the subsequent actions that go through *en route* to the actual choice of a specific opportunity.

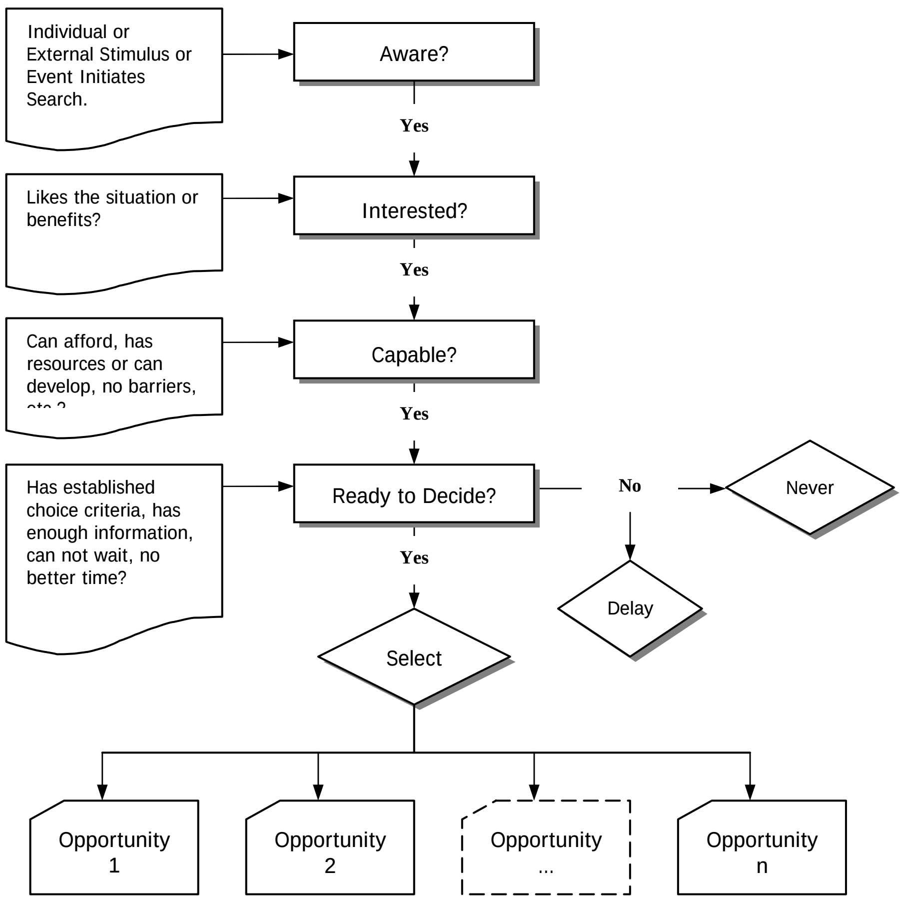


Figure 3.6 Process of selection of valuable market opportunities

In practice, which opportunity will be seized is contextual. It depends on its desirability and feasibility and the choices that result from power struggles and politics within the organisation (Eisenhardt and Zbaracki 1992; Pfeffer 1992). However, successful port managers arrive at a final selection of a valuable opportunity based on comparisons they make on competing alternatives in terms of their credibility – or their overall attractiveness and implementability which was established as the key decision criterion (Magala 2002).

Each opportunity is characterised in terms of its attributes and each attribute is given a weight – it has a relative importance attached to it. The weighting mechanism is clearly subjective and should represent the best judgments of the managers of the firm. Then, for each opportunity profile the weights of its individual attributes are combined into an overall weighted score. This score which represents the perceived utility or net benefit of a particular opportunity profile is then compared with the scores of other profiles and the opportunity that yields the highest possible utility or that best meets the criterion established for judging alternative profiles is chosen or has the highest probability of being chosen.

This process of selection of opportunities is consistent with the theory of random utility maximisation which states that in a specific constrained context given a number of competing alternatives individuals choose the alternative that gives them the highest satisfaction or net benefits. The alternatives available for choice are described by their features or attributes and individuals perceive the usefulness of a particular alternative through the benefits and costs that the features represent. There are situations in which no choice is made because none of the alternatives is credible enough to warrant special preference and selection. In other situations more than one choice can be made simultaneously because the perceived desirability is very high and the required resources are within the possibilities of the firm. In the present study, however, these two situations were considered marginal or special cases for at least two reasons. First, by assuming that a choice will be made from a set of available alternatives, managers are intuitively forced to submit their preferences to actual choices. Verma and Pullman (1998) argued that while many studies on choices are based on understanding preferences, preferences and actual choices are different. Many examples of situations in which managerial preferences were not materialised when it came to commit resources to a course of action support Verma and Pullman's argument. Preferences are attitudes but choices represent behaviour. Depending on the context, preferences may replicate or fail to emulate the actual marketplace behaviour.

Understanding how managers actually make choices should be the focus of behavioural studies on decision-making. Louviere *et al*. (2000) have suggested that forced choices (situations in which no choice is not an option) yield results that are consistent with managerial practice.

Second, by examining how a specific choice is made at the time, we can arrive at the same understanding of how multiple choices are made because in each decision situation managers seem to favour one alternative that they perceive as superior to others. If the choice exercise is repeated with the remaining alternatives that were not chosen in the first situation, again the economic agents will choose the one they perceive as yielding the highest utility among competing alternatives. This way the choices can be aggregated and we would end up in a situation where we have multiple alternatives chosen.

In summary, opportunities are selected on the general assumption that an opportunity is valuable only if it has the potential to deliver competitive advantage to the shippers and the regional port. An entrepreneur is able to make an effective decision because s/he restricts each alternative to two choice outcomes – to choose or not to choose – and then picks the choice he perceives as yielding the highest possible utility. Although opportunities in a given environment may exist, the quality of opportunity actually selected is contingent upon the manager's ability to recognise a valuable opportunity.

3.2.5 Implementation of valuable opportunities

Generally the decision to exploit a given market opportunity is dictated by management's perception of its potential contribution to value. In this context value is the measure of desire for the service the opportunity creates and delivers.

Although the identification of an opportunity is a necessary condition for exploiting opportunities, it is not a sufficient condition (Shane and Venkataraman 2000). Once opportunities have been identified, evaluated and selected they must be implemented or brought to fruition often through practical initiatives or projects. The actions that achieve the delivery of superior shipper value are similar to those suggested by Phillips (1987) and include the creation, delivery, communication and assessment of shipper delivered value. Although implementation has not received adequate attention in the management literature, it is critical to the success of exploiting opportunities.

In reality not all opportunities are exploited. At this point it is pertinent to ask why it is that some opportunities and not others are exploited? *An intuitive answer is that the decision to seize or not to seize an opportunity is dependent on the characteristics of a given opportunity which influences its expected value, the characteristics of the managers in charge of the opportunity, the firm's objectives and the nature of the relevant resources that are required to successfully implement a given opportunity within a given time frame* (Das and Tang 1997; Slevin and Covin 1998). In other circumstances certain seemingly insurmountable problems that may lie within or outside the firm such as changes of ownership and leadership or global recession might prevent the company from formulating and executing an effective strategy designed to exploit a specific growth opportunity (Varadarajan 1983).

By and large, port managers decide to pursue those actions that provide clear evidence that they will maximise the use of resources, produce acceptable returns, and contribute to the strategic direction of the organisation. As the new initiative or project evolves there will be a constant requirement to monitor and respond to a wide range of internal and external factors. These may include regulatory, environmental, political and new strategic elements such as changes in shippers' desired value, or change in importance of key value dimensions. These often emerge during the development phase of a new initiative because the initiative in itself can generate a series of internal and external influences. The role of management can therefore develop a new responsibility during the evolution of an initiative's implementation. Woodruff (1997) cautions that customer value changes over time and therefore competitive advantage will also come from discovering new and better ways to meet the ever changing shippers' needs and desired value dimensions.

It is important to note that the seizure of an opportunity does not complete the cycle because an initiative or project, once operational, will be subject to performance measurements and other requirements. Customer satisfaction surveys can help to assess how shippers perceive the value that is being delivered. These actions may lead to the identification of new opportunities making it possible for the whole process of value creation and delivery to begin again.

As a practical matter, the specific opportunity implementation strategies are contextual and not prescriptive because they are based on required flexibility and resources commitment needed to turn a given opportunity into a successful venture. However, strategies based on a firm's unique resources and competences are more likely to facilitate the success in implementing opportunities. But even in this case it should be clear that the opportunity may fail to produce the desirable results. Amram and Kulatilaka (1999a, 1999b) in a new approach to valuation of growth opportunities called *real options*, demonstrate that abandoning an initiative or postponing it for a future time is a valuable *real option* that managers should exercise to respond to unfolding events in the face of uncertainty.

3.3 The Approach to Empirical Investigation

To meet the objectives of the study a methodology for collecting essential data and test the perceptions of regional port managers about regional port growth was developed and implemented. The dearth of literature and published data on strategies which regional port managers use to pursue growth and exploit market opportunities meant that we had to approach the research task in two-stages. In the first-stage – the exploratory stage – interviews were conducted with port experts to study the perceptions of regional port managers about port growth. The results of the interviews were used as inputs to the second stage of the research in which the significance of the perceptions about regional port growth and opportunity capture were tested with descriptive statistics and discrete choice modelling – thus allowing for the conceptual framework and the key proposition of the study to be validated and the research findings derived.

3.3.1 Stage One: A preliminary analysis of port managers' perceptions of regional port growth

The first-stage was exploratory in nature. Such research is particularly useful when much about the problem is not known and relevant information can be obtained from primary sources such as the respondents (Cooper and Emory 1995; Kinnear *et al*. 1994). Exploratory research is beneficial for gaining perspective regarding the breadth of variables operating in a situation and to developing a more precise formulation of relevant factors involved in a specific decision-making situation. The immediate purpose of the exploratory study was to develop research questions which were further refined, categorised and investigated through a more formal survey based on internet interviewing; and which included a stated choice experiment designed specifically to collect choice data in order to investigate how regional port managers actually choose valuable opportunities.

For the first stage of the research it was decided that face-to-face personal interviews with port experts was the most appropriate methodology to gain deep insights and collect relevant qualitative data on regional port strategies and the processes by which regional port managers capture valuable market opportunities. It was important to learn from the key decision-makers about their perceptions, attitudes, tactics and strategies and then compare this information with the available literature to establish effective patterns of decision-making in the process of competition for growth in the shadow of capital city ports. This exploratory approach has been recommended for descriptive studies which are concerned with discovering the relevant factors involved in decision-making and determining the degree to which the factors are associated and how and why certain decisions are made (Cooper and Emory 1995). Kinnear *et al*. (1994) contend that when the information needs of a study require data about respondent's attitudes, perceptions, motivations, knowledge and intended behaviour, asking people questions is essential. Depth interviews use extensive questioning of respondents individually to explore the reasons underlying attitudes and behaviour.

For the interviews conducted, no formal questionnaire was developed or provided; instead a semi-structured interview guideline form was used. The use of semi-structured or loosely structured interviews has recognised advantages (Kinnear *et al.* 1994). First, it allows all respondents to be submitted to the same set of questions while still keeping the open-ended nature that is inherent to interviews. Open-ended questions allow the researcher to use extensive probing to get the respondent to talk freely and to express detailed beliefs and feelings on the topic. Furthermore, in a semi-structured interview the researcher can establish upfront the most relevant issues to be asked while still preserving flexibility to allow the respondents to move from one topic to another when there is a need to do so. Second, the use of a semi-structured interview makes it easier for the interviewer to move from one topic to another within a pre-established schedule and time frame. Third, the semi-structured interview offers an organising framework within which the main interview issues are categorised, recorded and latter edited for subsequent analysis.

A last but important issue that was taken into consideration was the definition of the sample of respondents from whom relevant data could be collected. The port experts selected for interviews were considered knowledgeable as they had considerable experience in the industry and also were the key decision-makers or were to some degree involved in port strategy development and strategic choices.

3.3.2 Stage Two: Testing the perceptions of regional port managers about port growth

The second-stage of the research which is covered comprehensively in Chapters 5, 6 and 7 used the findings of the first-stage to develop a more formal and structured survey with clear investigative questions that were categorised, pre-tested and later incorporated in a questionnaire which was then administrated through the Internet to a selected sample of port managers from both regional port authorities and regional port service providers. All the relevant questions that were asked were in line with the research objectives. They were derived from the following sources:

- a comprehensive literature review;
- observations of business practices; and

- the in-depth interviews conducted in the first-stage.

Especially, the in-depth interviews offered the opportunity to uncover a number of major dimensions, relevant criteria and factors that senior port managers believe explain how and why a regional port successfully competes in the shadow of its capital city port, in particular how regional port managers capture valuable opportunities in the quest for growth and survival.

The objective of the second-stage of the research was to take the qualitative data gathered in the interviews and transform them into data that could be quantified easily so as to allow us to collect quantitative responses and apply more sophisticated methods of data analysis such as discrete choice modelling and non-parametric classification and regression trees to model opportunity choice and develop a decision support system for opportunity selection. The survey used in the second-stage of the empirical investigation adopted the established scales and measures of attitudes and preferences (Kinnear *et al*. 1994) to collect data on a number of statements that explored the strategies that regional ports use to compete with capital city ports as well as the process of opportunity capture.

A major interest of the study was to model the choice of a valuable opportunity in the quest for growth. Therefore, the Internet survey used in this stage contained a section with a choice experiment designed specifically to allow the collection of stated preference data for use in discrete choice modelling (Louviere *et al*. 2000) to model opportunity choice. In the absence of revealed preference data, it has been shown that the stated preference surveys are reliable and produce data consistent with economic theory from which econometric models can be estimated which are indistinguishable from their revealed preference data counterparts (Louviere *et al*. 2000). Stated preference data augment the scope of revealed preference data in that they allow investigation not only of what the economic agents and markets actually do – *ex post facto* – but also what they will potentially do given a combination of a number of factors – *ex ante* behaviour (Bradley and Kroes 1990).

Hensher (1994) provides a review of the use of experimental data in various disciplines. Stated preference (SP) techniques are based on information integration theory in psychology (Anderson 1981), random utility theory in economics, and econometric specifications of discrete choice models (Hensher and Johnson 1981). Hensher (1994: 108) asserts that:

> Stated preference experiments are now the most popular form of SP method in transportation and are growing in popularity in other areas such as marketing, geography, regional science and tourism.

In the absence of useable revealed preference data, there is strong justification for SP techniques. Even if the former data were available, Hensher and Bradley (1993), Bradley and Daly (1991) and Hensher (1994) have shown that revealed preference data could be enriched by combining it with stated preference data. Besides, port managers would be more interested in the strategic intentions of the port management teams than in the revealed choices of current strategies and market opportunity investments. The information content of the latter, whilst useful, is historical and may not necessarily be a pointer to future strategies likely to be adopted by regional ports.

Stated choice modelling is based on respondents' statements rather than on actual behaviour, but this type of preference information relates to an explicit choice context customised to reflect (to the extent possible) actual alternatives and constraints. Here, the statements indicate not just preferences, but also expected behavioural actions embedded in statements such as e.g. 'which of these alternatives would you choose?'

Utility maximisation as a measure used to discriminate preferences for alternatives and predict choices is unique compared with the more commonly used Likert-scale approach, because it requires respondents to make trade-offs among a set of mutually exclusive and exhaustive alternatives as defined by attribute levels. It appears to approximate choice behaviour more closely than traditionally used scale items, since respondents choose alternatives rather than simply provide evaluative response. Here, it is assumed that the decision-maker chooses the alternative with highest utility, desirability or value among the set of alternatives.

Once the Internet survey was implemented and the data collected, the perceptions of regional port managers about regional port growth were analysed with descriptive statistics and the opportunity choice was modelled with discrete choice modelling.

Further, the choice data was used to develop a decision support system that could assist regional port managers to improve the effectiveness of their opportunity choice decisions. The decision support system is based on non-parametric classification and regression tree (CART) methodology whose fundamentals and implementation are explained comprehensively in Chapter 6.

3.4 Summary

This chapter has argued that appropriate strategies for regional port growth focus on capturing valuable opportunities over time. Further, it has suggested and discussed the key elements of a framework that underlines opportunity capture as a strategy for regional port growth. In addition, the chapter suggested a methodology to apply in the subsequent empirical analysis in order to test the validity of the proposed framework on opportunity capture.

CHAPTER 4

Perceptions of Regional Port Growth: A Preliminary Analysis of Decision-Maker Responses

4.1 Introduction

We have argued that effective strategies for port growth focus on capturing valuable opportunities and opportunity share. But although a detailed literature review revealed a considerable range of growth-inducing factors and conditions there has been, to our knowledge, no analytical testing of the proposition that opportunity capture is the key to understanding regional port growth. Nor has there been, as a first step, any rigorous attempt to define with any precision just what opportunity capture means in the context of regional port growth – or probably more accurately, the management of port growth and growth strategies.

This chapter addresses this issue and takes the view that the perceptions and understanding and experience of key decision-makers in and around ports may provide useful insights into opportunity capture and into the exploitation of opportunities for growth.

The chapter reports on the structuring and application of an interview-based survey; on the use of content analysis and categorisation to extract meaning from the qualitative output; on the results of the interview process and particularly on the process of opportunity capture. (It should be noted that the chapter makes no attempt to assess the statistical significance of factors and constructs, a task that is undertaken in the following chapter).

4.2 Establishing insights into regional port growth: an interview-based survey

4.2.1 Interview format and question design

A semi-structured interview format was determined as the appropriate mechanism for obtaining insights into the perceptions of key decision-makers involved in the management and development of regional ports.

Open-ended questions allowed the respondents to freely express their views and sets of questions were grouped into three parts in the interview survey document (Appendix 2). The first part (A) posed questions around the general theme of the strategies already adopted in Australia to achieve regional port growth. Part B included a number of questions around the theme of the value sought by shippers from a regional port. The responses were expected to shed light on potential market opportunities. The third part of the survey focused interest on how regional ports captured opportunities for growth, given the presence of a metropolitan neigbour port. Essentially, the questions invited the respondents to comment on the way in which regional port managers actually identify valuable market opportunities, on the criteria used to evaluate and select market opportunities to capture and on the factors that determine success in implementing market opportunities.

In general all questions were designed for an in-depth personal interview in line with the research objectives; and were a refinement of earlier discussions with a broad range of individuals involved with ports and of the insights from the review of the relevant literature. The specification of the questions followed the recommendations of Dillman (2000) and Woodruff and Gardial (1996) who advocate simple, general form, yet relevant questions, progressing from broadly specified to more specific questions. Questions posed in this way tend to be easier to follow and record; and often in the initial stage of the interview they work to build rapport and respondent confidence.

The validity of the content of the questions was assured through early discussions, comments and suggestions made by five senior port managers, three port consultants and two academics who were regarded as authorities in the port industry. Content validity is a critical issue in research design (Cooper and Emory 1995; Kinnear *et al*.

1994; Frazer and Lawley 2000) and validation ensures that the question being asked is relevant and effective in addressing the research needs. Content validation also comes from the theoretical underpinnings developed through the literature review. Bagozzi (1994) and Cos (1996) argue that when research is guided by an existing theoretical framework the objectives are generally consistent with the questions being asked, and the questions themselves encourage answers which help illuminate the complex structure of the problem.

Note also that the extensive support from the company which sponsored this study and the systematic involvement in discussions with its senior managers were a major input to defining the research questions relevant to the understanding of regional port growth. The company was also able to create a network of contacts within the industry. These proved to be very beneficial in the whole process of the research, providing opportunities for further discussions and clarification.

4.2.2 The sampling frame

The sample of respondents that participated in the face-to-face interviews was drawn from members of the port community that were regarded as experts in their field. These included individuals from port authorities of both regional and capital city ports, shippers, port service providers, shipping companies, port regulators, port and shipping consulting firms and academics with significant expertise and experience in port development issues.

The selection of participants was based on a subjective nonprobability judgment sampling procedure recommended by Cooper and Emory (1995) and Kinnear *et al.* (1994) for this kind of study. Judgment sampling is a nonprobability sampling technique in which only respondents that satisfy some pre-established criteria in a given population are selected. Kinnear *et al.* (1994) report that about 42 percent of US businesses use this method. An alternative sampling procedure, unrestricted probability sampling or random sampling which admits the possibility of each element having a known chance of being selected from the study population, was not suitable because only port experts were required.

Two selection criteria were used. One required that the respondents be part of the port community in Australia involved in regional port activities. The other was that respondents hold senior management positions in their organisations, and were involved in strategy development and implementation. Khatri and Ng (2000) maintain that the inclusion of senior management teams in the study sample is justified by the influences that the dominant members of the organisation have on strategic decision-making and implementation.

Subsequently, a list of 166 potential respondents was assembled from the database of the study sponsor company, the 2002 *Melbourne Sea Freight User Guide*, the 2001 *Lloyd DCN Directory of Australia Shipping and Transport*, and from contacts given by the members of the port network. Importantly, the port network that the sponsor company helped create in the early stage of the research was critical in providing potential respondents. The importance of social networks in proving opportunity for coordinating and sharing resources and knowledge has been noted by a number of researchers (Gulati *et al*. 2000; Lechner and Dowling 2003).

The sample was reduced from 166 potential respondents to 40 respondents by either discharging those who did not satisfy the established criteria or by leaving out others to be used later in a much broader and structured survey that provided the input data for the later statistical analysis of the significance to be attached to decision-maker perceptions.

The regional ports covered in the interviews were located in New South Wales and Victoria. One major factor in this decision was the cost involved in reaching respondents located in other States; but a key factor was that the focus of the study was on major regional ports that have developed in the shadow of the capital city ports in Australia. The most important and established regional ports are located in New South Wales (Port Kembla and Newcastle) and Victoria (Geelong and Portland). In Western Australia, Queensland, South Australia and Tasmania, the ports of Bunbury, Geraldton, Gladstone, Flinders Ports, Launceston, Devonport and Burnie were identified as being in the shadow of their capital city ports but it was recognised that the degree of local competition was much lower than in Victoria and New South Wales and their markets were small.

Invitation letters were sent to 40 potential respondents (Appendix 2), most of whom had been briefed ahead by the sponsor company about the occurrence of this study. This had the important effect of improving the respondents' receptiveness and responsiveness to the survey. The invitation letter was personalised and sent to each individual's email address via the Internet. Later, contacts by telephone confirmed receipt of the invitation letter – an approach which helped to produce a response rate of 95 percent (38 individuals were finally interviewed). This compares more than favourably with many other studies related to ports and other fields in which response rates have been lower than 35 percent (Cerit 2000, 2002; Panayides and Cullinane 2002; Barringer and Bluedorn 1999; Jiang and Kein 1999; Lambert *et al*. 1993).

4.2.3 The interview process

Interviews were conducted in Sydney, Newcastle, Port Kembla, Wollongong, Dubbo, Melbourne and Geelong and were carried out in February and March 2002. Interviews lasted on average 1 hour with the shortest taking 45 minutes and the longest 2 hours. Woodruff and Gardial (1996) suggest that in a personal in-depth interview the best information can be gathered if the respondent commits between 1 to 2 hours of his of her time for the interview. The University of Michigan Survey Research Centre finds that a 75-minutes interview is feasible with the personal interview (Kinnear *et al*. 1994). Most interviews were held at the respondent's offices.

After general comments the interview progressed focusing on the issues involved. As the interview continued, the interviewer limited his role to probing and moving the respondent along topics of interest while at the same time allowing a free flow of issues. Essentially, the interviewer let the respondent lead the interview to issues the respondent felt were important. All the interviews were recorded with the permission of interviewees into two audio-recorders and written notes were taken. Establishing rapport at the beginning of the interview and using appropriate probes to deepen the understanding of respondent's exposition proved to be interview success factors. Moreover, respondents often felt more motivated and confident when they were told that their role in the interview was that of an expert and that there was no right or wrong answer. This also had the benefit of reducing the potential response bias deriving from the respondent's perceptions that answers should be *socially desirable* (DeMaio 1984; Greenberg 1972).

Respondent anonymity was other important factor that facilitated the respondents' openness. In addition, the interviewer was able to establish himself as being relatively naive about the topic and to inform the respondent that he was seeking from her/him an *expert view* on the issues.

Finally, the respondents were promised a summary of the key findings once the study is complete and the indication of the place where the thesis will be located for those who wish to examine it in detail. In a sense this worked as the reward respondents were getting for helping with the study. In general rewards have the effect of stimulating respondents' participation (Cooper and Emory 1995; Kinnear *et al*. 1994; Dillamn 2000; Mooney *et al*. 1993). However, rewards do not need to be costly or material to be effective (Brennan *et al*. 1993; Frazer and Lawley 2000).

4.2.4 Content analysis and categorisation

The large amount of data – including the interviewer notes and 46 hours that resulted from the interviews – could have been analysed in many different ways to yield different perspectives and levels of interpretation. Determining which techniques are the most appropriate depends on a number of factors, including the methods that were used to initially gather the data, resource considerations and the study's information requirements. In this study we followed the recommendations of Woodruff and Gardial (1996) who suggest a three-step approach to process qualitative data for subsequent analysis. The data was first transcribed and the transcripts were later revised, corrected and stored on individual computer files. From the transcripts the key statements in each interview were then identified and categorised in such a way as to reflect the conceptual framework of the research. Categorisation is the process of creating meaning to the statements or words. Categories are akin to the *variables or factors* within a 'normal' research setting (Cullinane and Toy 2000). Finally, to ensure a satisfactory degree of validity and reliability of the categories created, ten port experts and managers most of whom were part of the earlier interviews were asked to give their independent assessment of whether the categories presented were truly representative of the most important factors that regional port managers would consider in different stages of the decision-making in the process of competition for profitable opportunities.

After all tapes were transcribed verbatim, the process of categorising the key statements was completed. Table 4.1 summarises the category constructs derived from the process – facilitated in part by the fact the interviews were semi-structured in 3 sections, so that each section could be processed and summarised across all respondents.

Table 4.1 Summary of category constructs and their relationship to underlying factors, variables, words, terms and themes derived iteratively from the interview transcripts and literature

Category name	Variables or terms covered by category
Profitable growth of trade	Profitable growth, Acceptable growth, Required growth
Protect market share	Protect market share, Avoid market erosion, Create barrier to competitors
Improve financial performance of the port	Improve financial outcomes, Improve the bottom-line, Improve the returns
Make use of port assets	Asset utilisation, Infrastructure cost recovery, Make use of under-utilised assets
Promote the image of the port as an economic driver for regional growth	Create jobs for local community, Show community leadership, Parochial
Facilitate regional economic growth	Facilitate trade, Port multiplier, Develop logistic infrastructure for the region

To categorise the key statements a content analysis approach similar to one used by Cullinane and Toy (2000) and Gilmour (1976) and recommended by Jauch *et al*. (1980) was adopted. The technique has been recommended for analysis of open-ended questions and entails decomposing the transcript into discrete statements and using a categorisation scheme to classify the content of each statement. Content analysis is a scientific technique commonly used in social science research to objectively and systematically identify textual characteristics of interest contained in transcripts which can be latter subjected to a quantitative analysis. As Singleton *et al*. (1993: 299) put it 'the basic idea is to reduce the total content of a communication to a set of categories that represent some characteristics of research interest'. In short, the essence of content analysis is that of data reduction. Webrer (1990) and Holsti (1963) provide detailed guidelines on how to design a content analysis and the strengths and weaknesses of this methodology have been analysed by Babbie (1995) and Berg (1995) among others. In this study the discussion is limited to its application to the research at hand.

In this study the investigative questions were contained in the three parts of the interview (Appendix 2). Then, based on the research objectives in each investigative question the categories thought to best capture the information needed were defined alongside the examination of the transcripts and in light of theory and management practice. Such categories represent the most relevant mutually exclusive and collectively exhaustive factors. Variables not collected in the interview but that appear relevant in the literature and management practice can be categorised and added to the list. Theory-based categories can be considered *generic* in that they are easy to generalise across the respondents and industry.

In practice content analysis is implemented through categorisation, definition of the unit of analysis and the establishment of a system of enumeration. Categories need to be devised to provide the basis for classifying textual content. There are three prerequisites for a categorisation of statements in a content analysis. First, the categories must be created to reflect the conceptual framework of the research. Second, every relevant basic recording unit must be classifiable and must fit into only one given category. Third, it should be clear which recording unit is allocated to which category.

The unit of analysis is the smallest body of text in which an example of one of the content categories appears. It represents a discrete thought, idea or behaviour explicit in a single word or term, theme, character, paragraph or statement. In the study a combination of single words, terms and themes were used as the unities of the analysis. This means that each occurrence of the relevant word, term or theme within each transcript was recorded. The enumeration system indicates the criteria used to count the occurrence of the category in the transcripts. In this case, the enumeration of each category was represented by the number of interviews in which the category appeared. Figure 4.2 summarises the outcome of a content analysis for a major theme that was a subject of interview in Part A – regional port strategic motives.

Table 4.2 Summary of category responses about regional port strategic motives using appearance enumeration measure

Category, factor or variable (1)	Number of interviews in which a factor was mentioned (2)	Percentage of respondents who mentioned the factor (3)	Number of port experts who mentioned the category in 5 most important factors (4)	Ranking (Based on Column 3)
Profitable growth of trade	38	100	34	1
Improve financial performance of the port	35	92	31	2
Protect market share	31	82	30	3
Facilitate regional economic growth	25	66	25	4
Make use of port assets	20	53	27	5
Promote the image of the port as an economic driver for regional growth	15	40	23	6

The criteria used to determine which categories to retain for further analysis was subjective as there is no general agreed objective measure. In this study, categories that were mentioned by at least 40 percent of the respondents and were indicated by at least 60 percent of port experts and managers as being in 5 most important factors were retained. Sarantakos (1993) suggests that if at least 80 percent of the variation is agreed upon between researchers, then the category can be fully operationalised. The approach in Table 4.2 was applied to all three parts of the interview and research questions and yielded categories which are discussed in the next section. One of the important characteristics of content analysis is that it also generates data that can be used as input into other types of analysis including importance rating, choice modeling and classification and regression trees which are used in this study in Chapters 5, 6 and 7.

4.3 The Perceptions of Regional Port Growth: The Analysis of Interview Responses

Interview responses suggested that regional port growth is perceived to be closely related to:

- the motives which underline strategy;
- the nature of regional port strategies;
- the choice of investment opportunities; and
- the process by which opportunities are captured.

The following discussion considers briefly each of these dimensions in turn.

4.3.1 The motives underlying strategy

The interviews revealed that port competition was perceived to be related to six underlying motives – the imperative for growth, the need to protect market share, the importance of profitability, maintaining and enhancing asset utilisation, the promotion of a positive image and the ability to facilitate regional economic development.

- **The imperative for growth**

Respondents argued that in recent years major regional ports in Australia have seen trades in their traditional bulk markets declining considerably while significant shifts towards containerization of some traditional bulk cargoes continues to take place. In Newcastle, for example, between 2002 and 2003 general cargo declined from 114,529 to 90,486 tonnes, steel from 195,746 to 132,494 tonnes and major bulk products from 2.1 million to 1.6 million tones (Newcastle Port Corporation 2003). In Port Kembla grain exports declined from 2.3 million revenue tonnes in 2001/02 to 0.8 million revenue tonnes in 2002/03 and coal exports from 9.2 million revenue tonnes in 2001/02 to 9.0 million revenue tonnes in 2002/03 (Port Kembla Port Corporation 2003). Respondents saw these influences as a real threat to regional port existence and indicated that finding survival strategies was a pressing and urgent need. Attaining a certain level of growth was, therefore a critical need.

It is not surprising that most strategic investment decisions that regional port managers make are now controlled by the desire to grow in order to survive. But the complexity of the current circumstances makes it difficult to optimize investment decisions and gives no assurance that the significant investments made will yield the desirable market returns (Slack 1993) or will increase traffic through the regional port. Further, the desire to grow is often limited by the lack of resources and by port's ability to compete for cargo with its adjacent metropolitan port. Nevertheless, the respondents believed that preserving the *status quo* in the face of changing market circumstances and intense competition was not a good strategy for survival. To survive the focus should be on exploiting growth opportunities in both existing and new markets because they provide a durable platform on which differentiated value can be created to shippers and captured by the port.

For growth to occur respondents argued that regional port managers must make strategic decisions concerning how to grow, in which areas to grow and when to grow. Without suitable strategies, growth may not occur and if it does because of the existence of some favourable changes in the market environment, it is unlikely that the port will be able to sustain it. Respondents also pointed that too-rapid growth may trigger painful consequences for the port including a deterioration of its profits and an inadequate return on investment. A sustainable approach to growth was seen to involve matching growth opportunities with resources.

- **The need to protect market share**

In general, the perception of the decision-makers was that preserving market share was an important motive through which a regional port can ensure survival. They argued that market share protection was a way of showing competitive flare and strength needed to dishearten the competition. However, as trades are changing in nature and structure, protecting existing markets and trades though desirable may not be an effective strategy. In fact evidence shows that many low market share companies outperform their larger rivals (Jacobson and Aaker 1985); and that some of the energy that is often devoted to increase or protect market share should be directed toward improving marketing and management effectiveness.

- **The importance of profitability**

The view of the port experts was that for almost all commercial organisations profitability is the driving force and the key objective of the business because shareholders and governments regard financial performance indicators as measures of overall business success and competitiveness. But they recognise that the debate on how well measures such as ROI, RONA, ROC and ROA reflect business performance (Palepu *et al*. 1996) is still alive and far from being resolved. Respondents strongly supported also the view that shareholders and organisations want a healthy *bottom line* because it gives the organisation credence and the financial resources it needs to invest in further growth, as well as, to reward the shareholders' sacrifice and commitment to the organisation in the form of dividends. In addition, good financial performance ensures that the port will be less exposed to financial risk and will be perceived as competitive and attractive to financial investors (Panayides and Cullinane 2002).

The respondents recognised that in today's business environment other objectives such as corporate social responsibility (CSR) are being progressively incorporated into the overall port performance assessment, but they maintain that these additional objectives can be materialised only if financial resources are available in the first place. Any decline in financial performance would therefore be a matter of great concern for regional ports; and improvements in financial performance would significantly improve the prospects of regional port survival in the face of increasing competition.

- **Maintaining and enhancing asset utilisation**

Decision-makers identified the low level of asset utilization as one of the major problems that besets Australian ports. They pointed out that the increasing use of port assets is an important strategic driver and has the benefit of helping to generate more revenue and of improving the returns on assets and infrastructure cost recovery. They further argued that since asset utilisation is directly related to productivity and the ability of the port to generate trade it is an indicator of the competitive standing of the port.

Respondents also noted that improvements in asset utilization may be possible where regional ports develop new logistics or improve the existing ones with a view of providing better service to both shippers and shipping lines.

- **The promotion of a positive port image**

The promotion of a good image is perceived by port managers as an important strategic asset that facilitates the access to key resources (e.g., financial capital) and helps the port to take from its customers advantage of information asymmetries. The basic argument advanced by port managers is that because it is almost impossible to determine the quality of service *ex ante*, reputation is a valid proxy on which customers rely to judge and select the preferred service provider among competing alternatives. Moreover a good image is said to be associated with switching costs for customers that would rather remain associated with their existing service providers (Fills 2003).

It is the view of port managers that the reputation of a port provides a more durable competitive advantage than technology based advantage because the latter is more likely to depreciate quickly over time as new technologies emerge or imitation to existing technologies reduces the effects of technology leadership. Reputation or good image was therefore seen to be an effective way for a regional port to create visibility and legitimacy with potential customers, suppliers, and even competitors. Covin (1991) and Covin and Slevin (1991) examined the conditions under which the promotion of a good image would be a driving force to competition. They conclude that image may confer competitive advantage particularly in stable, predictable environments but produces less impact in tumultuous and highly competitive environments. Nevertheless is it a valid proxy for good performance (Sabate and Puente 2003) and helps improve the port's survival prospects.

- **The ability to facilitate regional economic development**

The facilitation of regional economic growth is an important strategic motive that often drives a regional port's ambition to grow. According to the decision-makers this perception can be justified with two arguments. First, by creating a logistic infrastructure to support regional economic activities, a regional port is in fact helping develop the local industry which becomes the market for goods traded through the port.

Second, as the region develops, it becomes more competitive and attractive to firms and people who are likely to migrate from less attractive regions to take advantage of the opportunities that the developing region offers. This relocation of firms and shifts in demographics have the effect of extending the local industry base and market as well as the local demand for both import and export goods and services which are likely to the carried out through the port.

Decision-makers also revealed that the commitment of a port to regional development lends the port a strong support to its own development efforts from the local community and government who often regard the port as an important business and the 'engine' of the local economy. The port is viewed as a priority industry given that a considerable amount of local employment is generated or associated with port activities. Partnership between regional ports and the local community and government was seen to be essential to maximize the use of local resources to support port development and competitiveness.

4.3.2 The nature of regional port strategies

The respondents recognised that regional ports may need to pursue a number of strategies at any one time to ensure port growth but two broad sets of strategies were seen to be important – those that ensured the capability of the port to deliver effective trade services; and those that exploited the location advantage of the port vis-à-vis the capital city port. Interestingly, the respondents' perceptions noted seven key positioning strategies and three strategies that focus on exploiting the diseconomies of capital city ports.

- **The provision of cost-effective logistics service**

Respondents argued the inadequacy of the view that ports which are close to markets and resources and have modern infrastructure achieve control of the hinterland and its trade. They observed that with increasing levels of supply chain integration and control, closeness became a largely irrelevant basis on which to define competitive advantage. Instead accessibility, which is broader and more useful concept, is dependent on the quality of logistics services and the efficiency of the supporting transport network. A port, effectively integrated into an efficient logistics network and supporting highly differentiated supply chains was seen to be able to compete more effectively in markets that are beyond its traditional hinterland.

- **The provision of efficient cargo handling facilities**

The respondents argued that the provision of efficient cargo handling facilities was critical to port productivity and superior performance. They observed, however, that despite the importance of cargo handling efficiency, the crane rates for Australian ports were below those achieved elsewhere overseas. This performance gap was seen to be an opportunity which regional ports could exploit by providing more efficient cargo handling facilities than their adjacent capital city ports, particularly in those trades in which they possess some competitive advantage.

- **The provision of adequate storage facilities**

Respondents argued that in a period in which capital city ports are unable to handle and provide adequate storage for increased volumes of cargo, particularly container cargo, the lack of backup land in and around the port area provides regional ports with an opportunity to exploit their vacant land. The lack of adequate storage facilities or the existence of ineffective storage provisions were seen to add costs to port customers and to reduce their competitiveness.

- **The provision of vacant land for business development**

The perception of decision-makers is that vacant land in regional ports can be used not only to provide effective storage facilities that the capital city ports lack but also and perhaps more importantly to attract new business to the port. This business then becomes the market for the port and new industrial developments will stimulate growth in local demand and encourage demographic shifts to the region in which the port is located. But it was recognised also that the provision of vacant land needs to be balanced against the market value of the land and the sustainability of regional port business.

- **The provision of efficient land transport**

The provision of efficient land transport is perceived by port managers as a key strategy to promote port growth. They link it to the ability of a port to offer superior access to markets, achieve superior performance and capture trade. They also noted that it is growing in importance as a competitive strategy which seeks to offset the significant proportion of inland cost in the overall logistics cost structure and to provide a superior logistics service that creates competitive advantage to the shippers. Port managers argued also that the main reason why inland costs are so high was the inefficiency and the lack of integrated land transport systems. Problems of rail standardisation and different access regimes (Flor and Defilippi 2002) were also noted.

- **The provision of efficient shipping services**

It was strongly argued that only ports that could secure reliable shipping services could capture trade because for shippers who own the cargo, reliability and seamlessness are major influences of their business success. Respondents noted that the inability of regional ports to secure efficient and regular liner service has been one of the main impediments to regional ports desire to expand in to container business. Closeness to the capital city port and relatively lower volumes were recognised as key factors. Niche operators were seen to be important and a number of lines including COSCO and FESCO were noted as successful operators based on lower volumes and specific cargoes.

- **The provision of customer value through flexible port services**

It was the view of decision-makers that the ability of a port to be proactive and to respond quickly to changing shipper needs and competitive conditions is critical to capturing trade. Regional ports, with smaller management teams and fewer shippers, were seen to be able to provide more flexibility than their larger neighbours.

- **Exploiting diseconomies and the weaknesses of capital city ports**

The respondents noted that increasing trade might trigger some diseconomies that are likely to weaken the competitive position of capital city ports. The diseconomies and weaknesses are likely to surface as the cost of operations increases and the inability of the port to respond efficiently and effectively to new challenges such as the requirement for additional land to accommodate new port activities, the need for efficient transport networks to smooth freight logistics, and as congestion and other negative externalities become evident.

All these challenges were seen to limit the metropolitan port's ability to offer better access to markets which is essential to deliver value to the shippers and capture trade for the port. Additional pressures in metropolitan ports (urban encroachment, environmental pressure) also were seen to constrain the growth of capital city ports and create opportunities for regional ports to attract shippers. Hayuth (1981) recognized this phenomenon as the 'peripheral port challenge'. Miyajima and Kwak (1989) noted similar occurrence in their study of inter-port competition in container cargo for Tokyo Bay ports and argued that the 'peripheral' ports of Nagoya, Shimizu and Nigata grew at the expense of increased congestion and the lack of land for expansion that occurred from 1961 to 1962 in the principal ports of Japan within Tokyo Bay.

- **Cooperating with the adjacent capital city port**

Decision-makers were unanimous in saying that 'coopetition' (Bengtsson and Kock 2000) or cooperation between a regional port and its adjacent capital city port is an effective way for a regional port to compete for growth. 'Coopetition' is a strategy that can be used selectively to enhance efficiency and improve service quality in areas where a port does not have sufficient resources to compete effectively. The decision-makers indicated that there is a possibility of mutual benefits if formal mechanisms of cooperation between the capital city port and their adjacent regional ports were established. It can be argued that some capital city port activities, particularly those that require land for expansion and have been forcing capital city ports to relocate activities to distant locations or to reclaim land at a very high cost, can be handled cost-effectively in the adjacent regional ports.

Some respondents suggested that a State approach to port development, which would require cooperation and alignment of strategies between metropolitan ports and their adjacent regional ports, may be desirable in order to rationalize and optimize infrastructure investment. On the practical side, cooperation between adjacent ports would avoid duplication of efforts and help conservation of scarce resources such as land and capital and improve competitive advantage of the region the ports serve.

Cooperation with the adjacent capital city port, it was also argued, can help offset the power of shipping lines. Many shipping lines are now involved in some sort of strategic alliances to strengthen their market power and diminish the influence of individual ports (Brooks 1995, 2000). They are content to see each port standing alone and to play one port against another because increased competition among ports allows shipping lines to extract lower port tariffs. It should be noted, however, that cooperation is only valid where its benefits outweigh those of competition.

- **Competing as part of an integrated supply chain**

Some decision-makers argued that ports can no longer expect to attract cargo simply because they are natural gateways to rich hinterlands. Major port clients are now likely to choose ports not simply on their efficiency and location but on the quality and reliability of the entire supply chain. For shippers, port choice becomes more a function of overall network performance and ports are chosen on the basis of faster and more cost-effective access to the markets in which the shippers compete.

For the respondents, the greatest value of competing as part of an integrated supply chain is that the supply chain can reduce vulnerability to competition by providing the port with complementary resources and capabilities needed to compete effectively in the marketplace. In essence, supply chain integration may allow some firms to compete effectively in the marketplace without first owning all the critical resources necessary to do so. This is particularly important for regional ports because often they have limited resources.

Strategies defined to assist the regional port to integrate into complex and powerful coalitions of logistics service providers were seen by respondents to be critical to port growth which can be derived from the richness of opportunities that the scope and effectiveness of supply chains provide.

4.3.3 The choice of investment opportunities

The choice of area of investment opportunities is an important strategic decision. This choice must be made at least once and often requires subsequent revision. It is important because some areas yield larger opportunities than others, some grow quickly, while others stagnate or decline. Choosing the markets in which the port will compete is only relevant for growth to the extent port managers have clear ideas about how to compete in that market to achieve both market dominance and growth. For the respondents there were perceived to be three main markets in which a regional port should seek opportunities for profitable growth. These were in the bulk, container and break-bulk trades.

Bulk trades were perceived by the decision-makers as providing better opportunities for growth than break-bulk and container trades. These perceptions are largely associated with the degree of resources that the port can develop, mobilize and deploy. Opportunity for investment in bulk facilities will continue to be attractive to regional ports as oil and bulk facilities are being removed from the traditional urban waterfront because of the need for extensive land space and deep harbours and to eliminate potential environmental and safety hazards. Environmentally active pressure groups are also powerful factors in ensuring decentralisation of bulk facilities.

If one examines closely the established firms with a long history of successful growth, one will find that their strength lies in the fact that they have established and maintained a basic position with respect to the use of certain types of resources and technology and the exploitation of certain types of markets. This may suggest that while the scope of investment opportunities is important, it is the nature of the basic position that the firm is able to establish for itself which is of special consideration. This is not to say, however, that a firm that has been 'long-established' and successful in particular markets will have its future secured. On the contrary, the future may require that the firm employ actions and strategies that radically depart from those of the past.

Having attained a satisfactory and reasonably secure position in its areas of specialization, a regional port with resources available for growth over and above those required to maintain its position in those areas may well find that opportunities for growth in new business such as container trades look more promising than further growth in its existing business. In entering a new field, however, a regional port must consider not only the rate of return it might expect on its new investment but also whether or not its resources are likely to be sufficient for the maintenance of the rate of investment that will be required to keep up with the adjacent capital city port's innovations and expansion in its existing fields as well as in the new one. Even when a regional port enters new markets equipped with cutting-edge innovation and is able to ward off competition, it must expect that in time it will be overtaken if it fails to continue to develop its advantage. The respondents noted that the most effective approach for a regional port to attract some container trades was to position itself as a niche operator exploiting the diseconomies and weaknesses of its adjacent capital city port.

Decision-makers believe that beak-bulk trades are growth markets for regional ports, in particular those that can be classified as neo-bulk because they share some common characteristics with bulk cargoes in which regional ports seem to have significant competitive advantage relative to capital city ports. Over the years, regional ports have developed infrastructure which handles bulk trades with notable efficiency and also they have developed key differentiating skills and capabilities. But as noted by the respondents, break-bulk trades may also attract strong competition from capital city ports because most break-bulk cargoes can be easily containerized.

4.3.4 The process by which opportunities are captured

The respondents noted three key factors in explaining why some regional ports and not others were successful in discovering and capturing growth opportunities. These were:

- the approaches used to identify opportunities;
- the criteria used to evaluate and select opportunities; and
- the way opportunities are implemented.

- **The approaches used to identify opportunities**

The respondents pointed out that successful regional port managers approach opportunities by first defining the scope in which they should search for opportunities and then by applying a number of methods to identify those opportunities that are valuable and worth pursuing. But, it was noted that the intensity of search for market opportunities ultimately depends on port managers' propensity to search for opportunities. Port managers with high propensity to search scan the environment for market opportunities more intensively than do others. Also, the propensity to search for opportunities is higher in market driven ports which focus on finding new and better ways to create and deliver superior value to the shippers and capture value for themselves.

The scope in which successful regional port managers search for opportunities extends beyond the geographical boundaries of the port area to include the adjacent metropolitan area, intra-state markets, inter-state markets and overseas markets. There is a perception that 'hinterlands' and overseas markets are increasingly becoming unified markets in which regional port managers have the opportunity to search for valuable opportunities.

It was revealed by the experts that the most common methods used by port managers to identify valuable opportunities are environmental scanning, the identification of shipper needs, value chain analysis, intuition, strategic planning, marketing research and approaches from port users or social networks.

Port managers use environmental scanning to monitor events outside the regional port's boundaries. They collect, analyse, and interpret data about the firm's external environment and the competition and introduce results into the organisational decision process to anticipate impacts. Port managers use scanning to acquire relevant data on industry trends and changes, thereby permitting the accumulation of knowledge on new opportunities in the industry that may be of interest to the port. In other words, scanning is a way port managers look outside the organisation for opportunities and impending risks soon enough to deal with them effectively. The most significant trends regional port managers monitor relate to the origin and destination of cargoes, cargo composition, trade growth projections, market structure, technology improvements, prices, quantities purchased, market share of each trade, actions of competition and customers, custom duties, environmental standards and regulations and more recently security regulations as well. It was noted, however, that identifying trends is a data intensive activity which requires the collection and analysis of data with the use of both qualitative and quantitative methods to uncover patterns and structure in the data which may indicate the presence of valuable opportunities.

It was said that a major source of opportunities is unmet shipper demands and future needs. The discussions with the decision-makers revealed that approaching shippers and asking them about their needs, expectations and perceptions is the most effective method of discovering important dimensions of customer value which represent valuable opportunities to be exploited. Many ways to approach customers are used by port managers. These include visits to customers, customer satisfaction surveys and market research among others. Respondents were confident that regional port managers also used value chain analysis to detect opportunities. They argued that port managers often examined inbound and outbound logistics to determine opportunities to introduce new activities, innovation, or methods of operations to improve the quality and the effectiveness of services been provided. Interestingly, it was also found that most port managers use intuition to identify opportunities. Intuition was used because port managers believed that their long experience and learning enabled them to make a good judgment of the existence or absence of an opportunity.

Opportunities were also identified in the process of strategic planning. Generally, in the process of strategic planning port managers identified the key success factors – the basis of competitive advantage – which represent opportunities that are available for the port to exploit to improve its competitive position and earn positions of market dominance. Respondents noted, however, that strategic planning was not effective if the strategy was not clearly defined and articulated. A more traditional approach to opportunity identification is based on market research. Port managers were said to use market research to gather information and conduct analysis about customers, competitors and markets. The focus of such research was on information about shipper needs, competitors' value chain activities and strategies, as well as, economic events which may lead to the detection of unmet needs which are opportunities to be exploited.

Last but not least the decision-makers revealed that often port customers approach port managers with specific needs which they perceive could be serviced better than they have been currently served either by the port or by the competitors. At other times shippers contacted the port with the objective of assessing it as an alternative supplier of logistics services for their export or import activities and needs. In both cases, the respondents said that port managers could identify valuable opportunities to exploit and that real opportunities were linked to those needs that the port could service better than the competitors. It was recognised that establishing ties with customers gives access to valuable information about a pool of market opportunities and that these opportunities may continue to grow as the port learns more not only about its markets but also about the productive potentialities of it own resources. In addition, it was said that network relationships increase the possibility that the port 'discovers' an opportunity by chance.

- **The criteria used to evaluate and select opportunities**

Experts revealed that regional port managers evaluate and select opportunities to pursue based on two dimensions and five generic criteria. The dimensions they consider are the attractiveness or the perceived desirability of an opportunity and the ease of implementation or the feasibility of an opportunity and include economic and non-economic factors. It was argued that not all opportunities are equally attractive nor are they equally easy to implement. An 'ideal' opportunity would be very attractive and easy to implement, but such opportunities are rare or simply do not exist; or if they do exist, they are more likely to attract intense competition. A very attractive opportunity becomes difficult to implement because of the competition it attracts or the size of the resources it requires in order for it to be successfully implemented. Other opportunities may be easy to implement but not very attractive to pursue in the sense that they have only a marginal contribution to shipper value and competitive advantage and may require the use of resources that otherwise could be put to the best use in other alternative activities.

Under this framework, any opportunity that has been identified is systematically assessed against its perceived benefits and perceived feasibility or practicality (Krueger 2000). Only after the examination of the underlining dimensions has been made, is the decision to pursue, delay or not pursue a given opportunity finally made.

The generic criteria represent the disaggregation of the two dimensions in meaningful and practical components each of which includes the relevant factors used to evaluate and select valuable market opportunities. These generic criteria are market access, perceived benefits (economic and non-economic), resources availability, business risk and political risk.

The experts argued that superior access to markets is the mechanisms through which shippers are attracted to the port, because it gives them benefits and advantages over their own competitors. It allows shippers to reach the end markets faster and cost-effectively. Good market access, which is determined by the efficiency of the existing transport networks and the effectiveness of supply chains to link both ends of the markets, is required to sustain trade through the port and should be used as a criterion to judge the ability of the port to capture growth opportunities. Furthermore, the experts argued that an opportunity is worth pursuing only if it is real and has clear benefits not only for shippers but also for the port. But they stressed that benefits need to be not only economic and other benefits are also important. For example, the potential contribution to the environment and community wellbeing is now a benefit that governments and communities increasingly regard as critical if port activities are to earn broad support and succeed. The view of the decision-makers was that the benefits that can be derived or expected from a given opportunity are diverse, but successful regional port managers focus the assessment of benefits on:

- potential business growth;
- potential financial returns;
- potential contribution to the regional development;
- potential social returns; and
- potential environmental returns.

The respondents recognised, however, that even the most creative entrepreneur may not succeed if he or she fails to secure resources that are required to exploit an opportunity. Penrose (1959) contends that the origin for the plans of any firm to grow is circumscribed by the firm's resources and by the services they can render. It should be stressed, however, that entrepreneurial resources are not limited to the resources the organisation currently possesses or controls (Stevenson and Jarillo 1990; Brown *et al*. 2001). Required resources are extended to include those that can be developed or acquired with time. But even in these circumstances, no resources, not even entrepreneurial resources, are of much use by themselves; any effective use for them is always viewed in terms of possible combinations with other resources. In this context, regional port managers evaluate and select opportunities to pursue based on the assumption that they can mobilize financial and technical resources to make the implementation possible.

The respondents pointed out that a resource that is often overlooked is the time required to implement an opportunity. In their view, *time compression* is important because it determines whether other resources can be mobilized in the short-term, medium-term or long-term, and it is associated with the risk of 'missing the boat' (Dickson and Giglierano 1986). Accordingly, opportunities for which resources can only be mobilized in the long-term are less attractive and difficult to implement that those for which resources are readily available because, as the time horizons expand market factors change and new elements tend to emerge. These are likely to require additional effort and resources in order to be addressed. Further, with time, the opportunity becomes obvious to many players and the competition intensifies. Being able to mobilize and deploy resources before the competition is in itself a major competitive advantage.

Business risk was another important factor which decision-makers suggested was critical in the assessment and selection of valuable opportunities. Business risk, they argued is caused by shifts in shippers taste, the level of competition that opportunity attracts, the product or service life cycle, the emergence of substitutes, changes in technology, the fit with organisational profit and growth objectives, and the level of commitment of top management. These factors were perceived as being associated with the risk of 'sinking the boat', that is the risk that the opportunity will fail to materialize even after sizeable and expensive resources have been invested (Dickson and Giglierano 1986). Interestingly, the respondents suggested that abandoning an initiative should be viewed as a valuable *real option* (Amram and Kulatilaka 1999a) or 'exit strategy' that managers can and should be encouraged to exercise in the process if the opportunity fails to produce the desirable outcomes.

Political risk was recognised as a key dimension in the process of evaluation and selection of opportunities but often was the least understood or the most underestimated risk. Respondents pointed out that the likelihood that an opportunity will be implemented successfully depends on the support it can earn from the government and the community and also on the port managers' ability to adapt and overcome the barriers imposed by the regulatory requirements which may be stringent, flexible or minimal.

- **The way opportunities are implemented**

The results of the interviews suggested that a painstaking evaluation and selection of opportunities to pursue was a very important condition for effective exploitation of valuable opportunities but did not guarantee that the opportunity will be implemented successfully. The experts argued that only regional port managers that had the ability to mobilize relevant resources, select carefully the markets in which to compete for opportunities, identify opportunities ahead of competition, deliver competitive advantage to shippers, anticipate the viability of the new trade, mobilize resources to undertake capital investments, and secure top management support and commitment were successful in implementing opportunities.

The ability to mobilize relevant resources has been already recognised as critical to the whole process of market opportunity exploitation. Penrose (1959) suggested that the returns earned by firms were largely attributed to the resources firms are able to bring together. More recently Amit and Schoemaker (1993), Rumelt (1991), and Barney (1991) argued that resources both tangible and intangible, capabilities and competences facilitate the development of sustainable competitive advantage. Hitt *et al.* (2001) maintained for example, that Southwest Airline was successful with its cost leadership strategy in poor economic times when all of its competitors were making losses because it possessed unique and valuable resources that allowed it to compete in a way not available to the competition. It was noted, however, that entrepreneurs in ports were not driven by the resources that were required to exploit market opportunities but rather by the opportunities that exist in the market environment. In essence their strategies were driven by the opportunity. They regarded any trade as a potential business for the port even though they recognised that there were challenges associated with the levels of investment, performance expectations, problems of the tyranny-of-distance (costs), critical mass (material handling capability) and resource flexibility that needed to be addressed.

The decision to enter new markets such as container trades was seen as important, but experts suggested that a regional port should not attempt to pursue opportunities in trades or markets in which it cannot compete or attain competitive advantage relative to the adjacent capital ports. Porter (1999) argues that competitive advantage is not about the industry in which a firm competes; but rather about how the firm competes in a given industry. Opportunities to create value to customers and achieve growth can be found in every industry.

It was pointed out that success in implementing opportunities is also linked to the ability of regional port managers to see opportunities not yet obvious to the competing adjacent capital city port. This ability gives the regional port the 'first-mover' advantage. The ability to anticipate the competition has been treated in the literature (Kotler 1994) as a way most firms use for effective long-run protection both against direct competition as well as indirect competition. Lee *et al*. (2000) for example, report that early and fast movers achieve highest returns. First movers are the first to introduce new products or services (Grimm and Smith 1997) and in so doing, they earn monopoly profits, until a competitor imitates their new product or services or finds a substitute.

The viability of new trade through the port is largely dependent on the value shippers and other port customers get from the port. Ports that offers little value will find it difficult to sustain trade when superior alternatives exist. Even if the port is able to mobilize resources to undertake capital improvements, trade will decline if the overall value the port offers is perceived as inferior relative to the competing capital city port. Trade follows the path of superior market access and cost-effective logistics services and not the existence of infrastructure *per se*. The latter should be regarded only as a threshold requirement to enter the port industry.

As can be seen, success in implementing opportunities comes at a cost and unless the regional port has a senior management team that is committed to devote its managerial talent and resources to address all these requirements, the likelihood that the regional port will seize the opportunity and that the opportunity implemented will produce the desirable outcomes is slim.

4.4 Summary

The earlier chapters have analysed the contributions from the literature on why ports grow leading to a suggestion that ports grow because of their ability to capture opportunities over time. But how does a regional port capture opportunities for growth?

Chapter 3 addressed this question by proposing a framework for defining regional port growth strategies and opportunity capture and outlined the approach to be taken to empirically investigate these issues.

In this chapter, and following the methodology outlined in Chapter 3, a sample of port experts was selected and interviewed in an attempt to understand their perceptions about how a regional port grows and how regional port managers capture opportunities for growth. The interview data were collected, processed and analyzed with the use of 'content analysis'. Content analysis allowed us to condense the data into meaningful categories and constructs which were able to capture the complexity and richness of the qualitative interview data. The categories pertain to key decision factors port managers consider relevant in the process of competition for growth opportunities and opportunity share. Relevant factors and constructs which explain how a regional port captures valuable opportunities for growth will serve as input to the next chapter.

CHAPTER 5

Testing the Perceptions of Regional Port Managers about Regional Port Growth

5.1 Introduction

In the previous chapter an interview-based survey with a small sample of port experts was used to develop a better understanding of the key processes, mechanisms, criteria and factors that regional port managers might use to develop market-driven strategies. The interviews offered, in the absence of revealed data, an exploratory context within which a number of decision factors relevant to port growth were determined. Given that, the data were qualitative in nature, however, no descriptive statistics were formally reported. Rather, the relevant dimensions and factors were categorized and listed in such a way as to define the *domain of the problem* without trying to determine the relative importance of its various aspects.

This chapter builds upon the previous chapter. It takes the results of the earlier interviews and literature review as input and develops a more structured and formal Internet-based survey to collect data from a much broader sample of regional port managers. The data collected through the Internet-based survey was used to test the perceptions of regional port managers about regional port growth and to model opportunity choice in Chapter 6. The data, and the descriptive statistics used in this chapter, shed light on how port managers actually perceive, evaluate and trade-off combinations of relevant factors in competing for the share of growth opportunities.

5.2 The Design and Implementation of an Internet-Based Survey

To collect quantitative data on the study research questions and allow for empirical testing of decision-makers' responses about regional port growth perceptions, a survey was designed and implemented through the Internet (Appendix 4). The original format can be found in the following website address:

http://www.trolleytracker.com.au/survey/intro1.html

In terms of design, Internet questionnaires are most similar to mail questionnaires and similar principles to designing the mail questionnaires can be applied to the Internet questionnaires. Figure 5.1 outlines the structure of the Internet-based survey. With the exception of Section D which is addressed in Chapter 6, all other sections are addressed in this chapter.

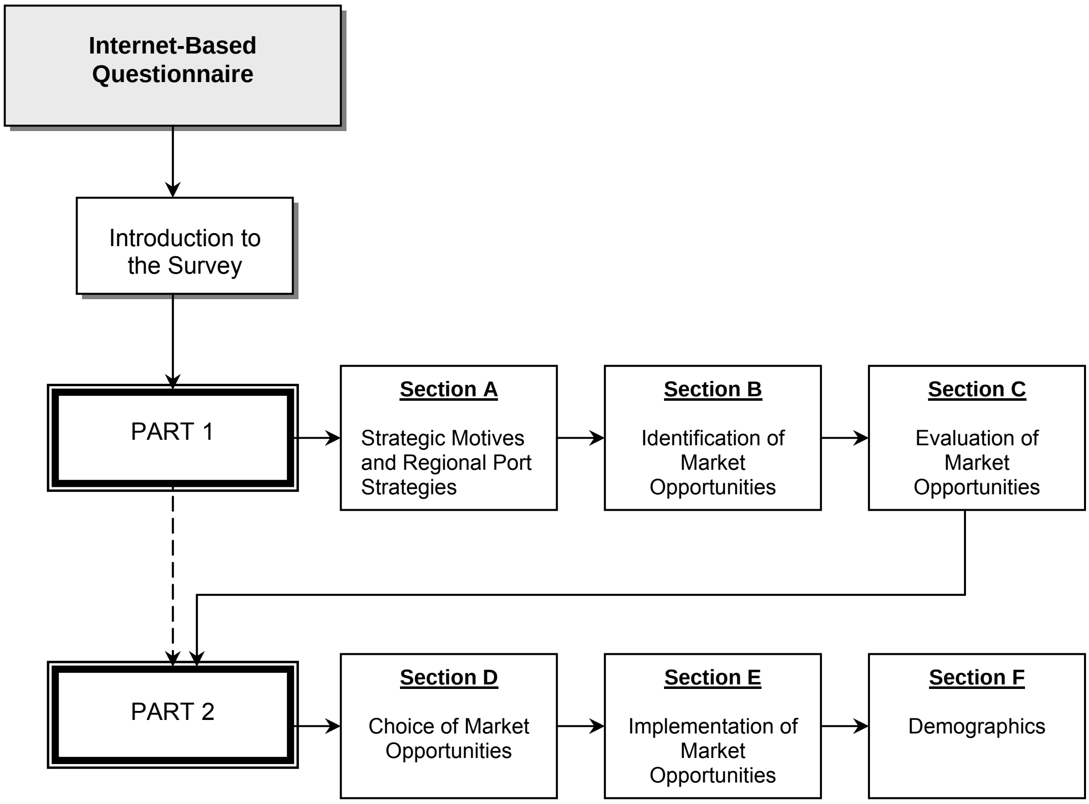


Figure 5.1 The structure of the Internet-based survey.

5.2.1 Questionnaire design

The questionnaire was designed following the recommendations of Dillman (2000); Bower (1999); Frazer and Lawley (2000); Kinnear *et al*. (1994); Copper and Emory (1995) and included the following substantive processes:

- the determination of required information and from whom it should be sought;
- the determination of the interview method and the length of the questionnaire;
- preparation of the draft questionnaire;
- pre-testing and revision of the questionnaire; and
- the assessment of validity and reliability.

- **Determination of required information and sources**

The required information was defined by the research questions and was sought from managers of both port authorities and port service providers as the key decision-makers involved in the process of exploiting market opportunities.

- **Determination of the interview method and length of the questionnaire**

In the present study, a self-administrated Internet questionnaire was chosen as the method through which effective communication with respondents could be achieved. Internet surveys are very new; but with the widespread availability and the growing use of the Internet they are becoming popular (Kotler 1998; Forrest 1999; Frazer and Lawley 2000; Dillman 2000; Nicholas and Sedivi 1998). Internet surveys made it possible to reach virtually all port managers dispersed across Australia in the most cost-effective manner. Consideration was also given to the fact that port managers had access to the Internet and preferred a survey that was simple and easy to complete.

There are no general agreed rules about the length of Internet questionnaires. The survey was within the 4-12 pages suggested by some authors as long enough to cover the investigative questions without causing respondent fatigue (Frazer and Lawley 2000).

- **Preparation of the draft questionnaire**

The draft questionnaire was prepared taking into account question content, question wording, response format and a structure and layout to ensure that the questionnaire was valid, reliable and practical (Cooper and Emory 1995; Forrest 1999; Dillman *et al*. 1998).

Question content: The content of the questionnaire was consistent with the objectives of the study and was specific to each research question. Overall, the questions asked regional port managers to evaluate the significance and relative importance of the factors that were gathered in the interviews reported in Chapter 4 and the literature review and which were considered by port experts as critical to the process of regional port growth strategy definition and implementation. For completeness one section asked demographics with the aim of determining the profile of a regional port manager involved in opportunity capture.

Question wording: The questions represented the link between the data and the information needs of the study. Asking the wrong question has the potential of increasing the measurement error and reducing the response rate. While it is impossible to say which wording of a question is best, there is a substantial literature on principles and guidelines that should be followed to ensure that the question being asked is correct, effective and suitable for the context. In designing the Internet questionnaire we followed these recommendations (Gendall 1998; Schuman and Presser 1981).

Response format: In the questionnaire design we also considered the degree and form of structure imposed on responses. The literature suggests at least three types of response format – free-response or free-answers; close-ended or structured responses in the sense that responses are categorized as single (where one response is required), dichotomous (were two response items are provided), or multichotomous (where several alternatives are listed); and scaled-responses which are generally used to measure the attributes or factor of a construct (Bruner II and Hensel 1994; Rockwood *et al*. 1997; Kinnear *et al*. 1994). In the Internet survey we used only a two-response format – close-ended and scaled-responses – depending on the issue being investigated.

Structure and layout: A self-administrated Internet survey needs to be attractive and clear and should motivate the respondent to complete the questionnaire. To achieve this, effort was made to ensure that questions proceeded from the general to the more specific with questions on demographics appearing last. This approach is often referred to in the literature as the *funnel approach* and is highly recommended (Cooper and Emory 1995).

The questions were written in readable size fonts and we used limited colours to lend the questionnaire a professional appearance without distracting the respondents. Each question had instructions printed in colour to attract the attention of the respondents. There was also a provision of radio buttons to allow the recording of respondent's responses with a simple click of the radio button number that indicated the respondent's best answer to the question being asked. The questionnaire was designed in such a way that no respondent could submit the survey without having completed all questions. If the respondent had missed an answer to some questions at the time of the submission a prompt message appeared indicating which questions were left unanswered and needed to be answered before the submission could be successful. This strategy is effective and ensures that no *missing data* type of problems exists.

Before submitting the questionnaire the respondents were required to provide their identification. This was intended to ensure that the questionnaire had been completed by the right respondent. Once the responses were submitted they were automatically recorded and sent via email to the researcher in a pre-coded format that facilitated their recording into an Excel spreadsheet for later analysis. It is possible to design an Internet questionnaire which allows automatic recording of all responses directly into a spreadsheet; but in any case the success of the Internet survey is dependent on the fact that all respondents can open the questionnaire and have access to the Internet. To ensure this, the questionnaire was designed in Hyper Text Markup Language (HTML) and adjusted to fit the smallest computer standard size screen and one continuous page format was used. Respondents did not have to go to the next page; instead they were offered a continuous access to all questions through the page-scrolling button. When a questionnaire uses separate pages it raises the possibility that the respondent has to use the *forward and back and reload* buttons to get to the right question. This increases the complexity of the survey and the time required to fill-in the questionnaire.

- **Pre-testing and revision of the questionnaire**

Once the questionnaire was complete it was then pretested on 15 individuals with the objective of ensuring that potential problems were detected and eliminated and the questionnaire would be able to accomplish the survey objectives. Of these 15 individuals, 10 were port managers, 5 of which where chosen from those who had participated in the early interviews. The other 5 were chosen from potential respondents to the Internet survey. The remaining 5 individuals were port consultants (3) and academics (2). All individuals asked to pretest the questionnaire responded positively to the invitation and returned the questionnaires within a week with comments that were later incorporated in the final questionnaire. Most comments were related to question wording, although a few observations were made on question content.

After modifications were made to the questionnaire it was loaded to the Internet and sent again to the same individuals. This time, however, the respondents were asked not only to re-assess the questionnaire content but also to make some comments on the ease of completion of the survey. Additionally, it allowed us to verify that the information was collected in the way in which it was conceptualised. Deficiencies detected in this process were eliminated before the questionnaire was ready to be administrated to a broad sample of regional port managers.

- **Assessment of validity and reliability**

The content and construct validity were assessed with the assistance of port experts and by recourse to the literature. All constructs used in the questionnaire were derived either from the interviews or from the literature or from general management practice. All constructs had been previously presented to a selected sample of port specialists to check for their consistency and conformity with the theory. Equally, the items under each construct were extracted from the results of the analysis presented in the previous chapter. The feedback from pretesting was also important in providing for content and construct validity. Port managers in the pretest stage felt that the questionnaire was robust. No specific measures of reliability such as correlations were developed but experts suggested that the way in which the questions, constructs and items were constructed was consistent with the theoretical underpinnings of questionnaire reliability and the results a test of reliability would produce (Frazer and Lawley 2000). The scales used were objective and appropriate, thus making the questionnaire reliable.

5.2.2 The sampling frame

The respondents to the Internet survey were chosen from port service providers and port authorities in major regional ports. Seventy-five potential respondents were assembled. The potential respondents were drawn from databases of 11 regional ports in Australia and covered New South Wales, Victoria, Western Australia, Queensland, South Australia and Tasmania. In selecting the respondents a key consideration was that they would hold senior management positions within their organisations. Seniority was regarded as a critical selection criterion because generally it is related to strategic decisions and choices which are the subject of interest of the study (Khatri and Ng 2000).

Given that there are not many regional ports in Australia that qualify for the study, a strategy to maximize the sample was to target at least 5 senior managers in each port authority and port service provider. This approach is accepted in the literature not only as a means of maximizing the number of respondents but also of checking the consistency of responses within an organisation (Khatri and Ng 2000). One would expect to find less variability in responses if the strategy is shared equally by the management team within the organisation.

The number of managers surveyed was 57. The ports surveyed were Bunbury, Burnie, Devonport, Flinders Ports, Geelong, Gladstone, Launceston, Geraldton, Newcastle, Port Kembla and Portland and most managers in these ports held one of the following senior positions: CEO, managing director, general manager, business development manager, marketing manager, operations manager, logistics manager or financial manager. Each individual in the sample was approached, firstly via telephone and later through a personalised letter attached to an email and directed to each individual (Appendix 5). In both cases the objective was to secure the respondents' commitment to complete the Internet questionnaire.

5.2.3 Data collection and processing

The Internet questionnaire was made available to 57 regional port managers from port authorities (30) and port service providers (27) at the beginning of February 2003. All respondents were first sent an invitation letter (Appendix 5) before the survey was loaded and three weeks later were informed (Appendix 6) that the survey was ready and could be accessed at the specified website address for completion. It took one month - a relatively short period - for the data to be collected and the response rate was 74 percent (42 respondents out of 57 invited to the survey), which was highly satisfactory if assessed against other similar surveys (Cerit 2000, 2002; Panayides and Cullinane 2002). A major reason for the high response rate was that respondents found the topic relevant and timely. A second plausible explanation is that the questionnaire was simple and well designed. The questions were straightforward and required the respondents to indicate their responses by simply clicking a *radio button* close to the answer that best represented their views from a set of pre-set alternative answers. Also, all respondents had access to the Internet and were individually contacted to ensure their commitment to the survey. No less important were the personalized invitation letters sent to all respondents and later the follow-up letters that were sent to those who after two weeks had not responded (Appendix 6).

From the survey, 42 useable responses were received – all in numerical format. The challenge then, was to make sure that all data were correct and properly recorded into an Excel spreadsheet which was suitable for use in subsequent statistical analysis. The other issue was to ensure that the data were entered correctly and that typing mistakes if any were eliminated. Basically there were two Excel spreadsheets – one which contained the data on questions in Section A, B, C, E and F of the questionnaire and the other which contained only data on the choice experiment for use in Chapters 6 and 7 to model opportunity choice with discrete choice modelling and the classification and regression trees techniques. For classification and regression trees the data had to be modified and turned into *character data* type because the program used – CART 5.0 – to develop the decision tree has the ability to model *character variable* data and this was very desirable to lend the model an improved explanatory value as a management decision support tool.

The results of the survey for sections A, B, C, E and F are discussed in section 5.4 of this chapter with the use of descriptive statistics.

5.3 Perceptions of Port Growth: A Statistical Analysis

This section presents and discusses the key results of the Internet survey (Appendix 4). The discussion focuses on generic perceptions of regional port growth. The analysis of managers' responses as they pertain to specific markets – bulk, container or break-bulk – is presented in Appendix 7. Table 5.1 links the research objectives with the questions asked in the survey and the appropriate data analysis technique used through different stages of the research.

5.3.1 A profile of regional port managers

Table 5.2 provides some background to the role, status and experience of regional port managers surveyed. It suggests that almost 7 out of 10 managers saw themselves as being directly involved in exploiting opportunities for growth; most (75 percent) had been involved in exploiting bulk opportunities for more than four years but fewer had been involved in either container or break-bulk opportunities for the same period of time (about 60 percent); and, interestingly, there are some ambivalence about the degree to which managers should be involved in pursuing market opportunities – less than 20 percent 'strongly agreed'!

5.3.2 Relative importance of motives underlying regional port strategy

The analysis of interviews in the previous chapter provided a number of strategic motives which drive the pursuit of market opportunities. In the Internet survey port managers were asked to provide their rating of the relative importance of such strategic motives on an interval rating scale of 1 to 5. The results in Table 5.3 indicate that port growth (4.57) is the most important strategic motive and about 60 percent of the respondents indicated that they regarded growth as a 'vital' strategic motive.

The growth motive also showed the smallest standard deviation which means that the respondents were more consistent in their assessment of growth as a key strategic motive. This finding is very consistent with the literature and with the results of the analysis of the earlier interviews conducted with port managers and port experts. Taylor and Cosenza (1997) have argued that growth was fundamental to success and survival and was the aftermath of the ability of the port to find new and better ways to deliver and capture value through opportunities.

Table 5.1 Links between stages of the research process

Research objectives	Relevant question from questionnaire	Type of measurement scale	Proposed analysis technique
1. Identify the profile of a regional port manager involved in the process opportunity capture	F1 F2 F3 F4 F5 F6 F7	Nominal Ordinal Interval Likert Nominal	Frequency and percentages
2. Determine the strategic motives and strategies regional port managers use to compete with the capital city ports	A1 A2 A3	Interval Interval Interval	Means, percentages and standard deviations
3. Determine the factors that facilitate the identification of profitable market opportunities	B1 B2 B3	Interval Interval Likert	Means, percentages and standard deviations
4. Determine the key criteria that regional port managers uses to evaluate market opportunities and their relative importance	C1 C2 C3 C4	Interval Likert Interval Interval	Means, percentages and standard deviations
5. Identify the determinants of market opportunity selection and their relative importance	D1 Choice Set 1 to 36	Likert Ordinal for independent variables (factors & levels) and Nominal choice scale type for dependent variable (Chosen and Not Chosen)	Means, percentages and standard deviations Discrete choice modeling, multinomial logit models, Utilities, chi-squares, non-parametric classification and regression trees, misclassification costs
6. Identify the factors that determine successful implementation of valuable market opportunities	E1	Interval	Means, percentages and standard deviations

Table 5.2 Profile of 42 regional port managers surveyed

	Number (Frequency)	Percentage
Business category		
Port authority	21	50.00
Port service provider	21	50.00
Manager's functional position		
CEO	5	12.00
Managing Director	3	7.00
General Managers	11	27.00
Business Development Managers	6	14.00
Logistics Manager	1	2.00
Operations Manager	9	21.00
Financial Manager	3	7.00
Marketing Manager	4	10.00
Senior Management involvement in opportunity exploitation		
Directly	31	73.81
Indirectly	11	26.19
Years of involvement in bulk opportunities		
Never	2	4.75
1 - 3 years	8	19.05
4 - 6 years	7	16.67
7 -10 years	8	19.05
More than 10 years	17	40.48
Years of involvement in container opportunities		
Never	13	30.95
1 - 3 years	5	11.95
4 - 6 years	8	19.05
7 -10 years	7	16.67
More than 10 years	9	21.43
Years of involvement in break-bulk opportunities		
Never	3	7.14
1 - 3 years	12	28.58
4 - 6 years	6	14.28
7 -10 years	7	16.67
More than 10 years	14	33.33
Degree of agreement with the idea of ports having manager charged with the pursuit of market opportunities		
Strongly disagree	2	4.76
Disagree	5	11.90
Neither agree nor disagree	14	33.33
Agree	14	33.33
Strongly agree	7	16.67
Gender		
Female	0	0.00
Male	42	100.00

Note: All surveyed ports but one were corportised. Therefore, port ownership was not considered in the study.

Table 5.3 Regional port strategic motives

Strategic Motive	Rank	Percentage of respondents with particular response* 1	2	3	4	5	Mean Response	S.D.
Port growth†	1	—	—	2.38	38.10	59.52	4.57	0.55
Market share	3	4.76	2.38	21.43	38.10	33.33	3.93	1.04
Financial performance	2	—	4.75	14.29	40.48	40.48	4.17	0.85
Asset utilization	4	—	2.38	26.19	50.00	21.43	3.91	0.76
Image††	6	2.38	19.05	26.19	35.71	16.67	3.45	1.06
Facilitate regional economic growth	5	2.38	11.90	16.67	47.62	21.43	3.74	1.01

*1: Irrelevant; 2: Not important; 3: Moderately important; 4: Very important; 5: Vital.

†Pairwise comparisons show the mean of 'Port growth' to be statistically different (more significant) from the other five variables at the 5% level of significance.

††Pairwise comparisons show the mean of 'Image' to be statistically different (less significant) from the other five variables at the 5% level of significance.

Financial performance ranked second with more than 80 percent of managers recognising it as at least 'very important'. Market share ranked third but responses were very dispersed with almost 30 percent of respondents rating the relative importance of market share motive between 'moderately important' and 'irrelevant'. This result lends support to the argument that market share is an effect and not the cause of growth and superior performance (Jacobson and Aaker 1985). More importantly, pursuing market share may not be an effective strategy for regional ports that have limited resources to compete in scale in new trades.

All other strategic motives rated above a 'moderately important' score (3.00) but image was the most incoherent judged by its high standard deviation (1.06) and it was the least significant. It has been argued that image is an important intangible resource (Deephouse 2000), which can facilitate access to other key resources such as finance and government and community support, but in this study other motives such as asset utilization and the facilitation of regional economic growth were seen to be more important.

5.3.3 Profile of regional port strategies

Table 5.4 shows the distribution of responses with respect to strategies used by regional ports to compete for growth in the shadow of capital city ports. Essentially, the strategies adopted by regional port managers focus on opportunities they perceive as valuable to exploit in order to deliver value to port customers and capture value for the port.

Table 5.4 Strategies adopted by regional ports to compete for growth in the shadow of metropolitan ports

		Percentage of respondents with particular response*						
Regional Port Strategies	Rank	1	2	3	4	5	Mean Response	S.D.
Provision of cost-effective† logistics service	2	—	—	21.43	30.95	47.62	4.26	0.79
Provision of efficient cargo handling facilities	3	—	—	19.05	40.48	40.47	4.21	0.75
Provision of adequate storage facilities	4	—	—	9.52	64.29	26.19	4.17	0.58
Provision of vacant land for business development	3	—	—	14.29	50.00	35.71	4.21	0.68
Provision of efficient land† transport	1	—	—	7.14	42.86	50.00	4.43	0.63
Provision of efficient† shipping service	2	—	—	11.90	50.00	38.10	4.26	0.66
Improvement of Financial performance	6	—	2.38	23.81	45.24	28.57	4.00	0.79
Improvement of environmental returns	8	—	4.76	40.48	40.48	14.28	3.64	0.79
Improvement of social returns††	10	—	9.52	54.76	28.57	7.14	3.33	0.75
Provision of competitive port charges	5	—	—	19.05	52.38	28.57	4.10	0.69
Provision of a lesser congested market access alternative	6	—	2.38	21.43	50.00	26.19	4.00	0.76
Provision of customer value† through flexible port services	2	—	—	11.90	50.00	38.10	4.26	0.66
Compete head to head with†† the adjacent capital city port	11	4.76	28.57	40.48	14.29	11.90	3.00	1.06
Exploiting diseconomies and weaknesses of capital city ports	7	4.76	4.76	28.57	38.10	23.81	3.71	1.04
Cooperating with adjacent capital†† city port	10	7.14	7.14	38.10	40.48	7.14	3.33	0.97
Competing as a stand-alone business entity	9	4.76	14.29	23.81	40.48	16.67	3.50	1.09
Competing as part of an integrated supply chain	3	—	—	16.67	45.23	38.10	4.21	0.72

*1: Irrelevant; 2: Not important; 3: Moderately important; 4: Very important; 5: Vital.

†Pairwise comparisons show the means of 'Provision of efficient land transport', 'Provision of cost-effective logistics service', 'Provision of customer value through flexible port services' and 'Provision of efficient shipping service' to be statistically different (more significant) from the other thirteen variables at the 5% level of significance.

††Pairwise comparisons show the means of 'Compete head to head with the adjacent capital city port', 'Improving social returns' and cooperating with the adjacent capital city port' to be statistically different (less significant) from the other fifteen variables at the 5% level of significance.

The provision of efficient land transport was voted as the most important strategy, with 50 percent of respondents considering it as 'vital' (5) and about 83 percent saying that it was at least 'very important' (4). It has been argued that a key factor in providing superior access to markets is the provision of an efficient land transport that is physically and functionally integrated with the whole freight supply chain (Robinson 2002, 2003). In practice inland transport costs are the major component of the total supply chain costs and cost factors contribute most for competitive disadvantage. Cases have been demonstrated where savings made on the sea leg were reduced or totally absorbed on the landside because the roads were often congested, efficient rail unviable and the transport network segmented and poorly managed. To reduce cost and improve the value delivered to port customers an efficient, reliable and integrated land transport is critical.

While the mean response for provision of efficient land transport was the highest (4.43), the provision of a cost-effective logistics service, the provision of customer value through flexible port services and the provision of efficient cargo handling facilities were ranked equally second with the mean relative importance 4.26. Most respondents (at least 79 percent) indicated that such strategies were 'very important' if a regional port is to compete successfully with capital city ports.

One of the most recent trends in every industry is the competition that is taking place between supply chains. Firms and ports realize that they can no longer continue to stand-alone and compete and succeed in this new environment without being integrated in value driven supply chains. The logic is simple: to compete successfully considerable resources are required. Such resources, however, lie beyond the possibilities of a single port and customers too are becoming very demanding and their needs are complex. One way to deliver and capture value under such circumstances is to compete as part of value driven chains which offer the opportunity to eliminate the inefficiencies in the supply chain by aligning and integrating all activities of their supply chain members. In this context respondents ranked the strategy of competing as part of an integrated supply chain as third (4.21). The strategy of competing as a stand-alone entity was viewed as moderately important (3.50). From the highest standard deviation (1.09) it can be inferred that respondents were not clear about the importance of this strategy. It can be argued that 'bitter' experiences and 'divorces' of many strategic alliances may restrain organisations which still are struggling to understand how to compete within a supply chain much less within a value-driven supply chain or fail to see the benefits that such mechanism of competition and new form of industrial organisation can bring to individual organisations.

All respondents were unanimous in saying that competing head to head with the adjacent capital city port was a risky strategy – a zero-sum game strategy in which price wars are likely to dominate. Although it rated as moderately important (3.00), the responses were very dispersed and the tendency was clearly in opposition to the strategy. Compared to other strategies it was found to be the least statistically significant.

Most new market entrants manage to erode incumbent market share and profits by focusing on niche markets and providing innovative solutions. In the port industry, exploiting the diseconomies and weaknesses of capital city ports is a valid competitive strategy. Respondents rated this strategy between 'moderately important' and 'very important' (3.71).

Socially responsible strategies such as those oriented to deliver environmental and social returns were perceived as 'very important' and 'moderately important' respectively (3.64 and 3.33). This assessment suggests that regional port managers are gradually incorporating in their performance goals the 'triple-bottom' line and while there is still no clear understanding of what social returns are, port managers seem to have better understanding of the environmental returns perhaps because in most cases environmental issues are being addressed through comprehensive regulations.

One strategy that should be viewed as very important if not vital is the 'provision of vacant land' often available in regional ports for business development. Respondents rated this strategy as third with a mean score of 4.21. One of the major weaknesses of capital city ports is the lack of both land for adequate and effective storage and the back-up land for further development as trade grows. To counteract this trend, there has been a proliferation of inland ports and terminals at high cost. But even where these terminals are being operated their operations have not been without some apparent opposition from local communities because of the negative externalities with which they are associated. Regional ports, often with considerable back-up land, are well positioned to exploit their vacant land and attract local industry that will serve as a market for the port. Regional ports may also offer a viable alternative for inland ports and new terminal developments.

5.3.4 Relative importance of investment opportunities for regional ports

Table 5.5 shows what type of investments regional ports are likely to pursue.

Table 5.5 Likely investment opportunities for regional ports in the quest for growth

		Percentage of respondents with particular response*						
Investment Opportunity	Rank	1	2	3	4	5	Mean Response	S.D.
Break-Bulk	2	—	2.38	7.14	30.95	59.53	4.48	0.74
Container††	3	11.90	7.14	14.29	23.81	42.86	3.79	1.39
Bulk†	1	—	—	7.14	14.28	78.58	4.71	0.58

*1: Very unlikely; 2: Unlikely; 3: Don't know; 4: Likely; 5: Very likely.

†Pairwise comparisons show the mean of 'Bulk'' to be statistically different (more significant) from the other two variables at the 5% level of significance.

††Pairwise comparisons show the mean of 'Container' to be statistically different (less significant) from the other two variables at the 5% level of significance.

The results indicate that bulk investment opportunities are the most preferred. About 79 percent of the respondents would 'very likely' pursue bulk opportunities, while 93 percent said that were likely or more than likely. Statistically, bulk opportunities are very significant compared to break-bulk and container. The result accords with the expectations and the findings from interviews, literature and managerial practices and are not surprising in the sense that regional ports see bulk trades as the sector in which they possess distinctive competences and competitive advantage over the capital city ports.

Break-bulk opportunities ranked second with a mean 4.48. Approximately 60 percent of respondents 'would very likely' pursue break-bulk opportunities and 31 percent would 'likely' pursue. It can be argued that most respondents believe that regional ports have the infrastructure and required skills to take advantage of break-bulk opportunities. The most attractive break-bulk opportunities are in neo-bulk trades – timber logs, motorvehicles and bagged rice, for example. However, it is important to stress that some break-bulk cargoes can be equally well handled and with notable efficiency in capital city ports. It is likely that competition between regional and capital city ports will be intense.

Respondents were not sure whether pursuing container opportunities was beneficial for regional port growth. Compared with bulk and break-bulk investment opportunities, the mean response for container opportunities was statistically less significant. The variation in opinions was the greatest with standard deviation of 1.39. Such a variation makes it difficult to make sustainable inferences. Despite this, about 43 percent of respondents indicated that they were 'very likely' to pursue container opportunities. There may be two explanations. One, as the container trade continues to grow (Amoako 2002), there is a possibility that some container trades have to be handled in regional ports whether by political decision or by imposition of market forces and requirements of competition. The other possibility is that with increased volumes of container traffic at capital city ports and with it the constraints to efficiency and flexibility, there will be some niche markets that can be serviced well by regional ports. While still the decision to build container terminals in regional ports remains the controversial the opportunities are real. Nevertheless, the final test is that trade drives infrastructure and not the other way around.

5.3.5 Relative importance of methods used to identify market opportunities

An important issue of the research was to determine why some regional ports seem to discover more opportunities than other. The results in Table 5.6 suggest that the methods they use are a very important component of the process of identifying market opportunities.

Social networks ranked first (4.21) and are used 'often' by 43 percent of respondents and 'to a great extent' by 41 percent. The results validate the earlier discussion which pointed out that social networks provide an extended platform on which information on opportunities, problems, market trends, customers needs and expectations and technological possibilities is circulated and exchanged and that social networks increase the possibility that a port becomes a recipient of an accidental opportunity.

Table 5.6 Methods used to identify market opportunities

Methods	Rank	Percentage of respondents with particular response*					Mean Response	S.D.
		1	2	3	4	5		
Chance††	10	7.14	52.38	30.95	9.53	—	2.43	0.77
Formal processes	7	7.14	9.52	38.10	42.86	2.38	3.24	0.93
Identification of trends	4	—	9.53	28.57	54.76	7.14	3.60	0.77
Identification of shipper needs†	2	—	2.38	16.67	42.86	38.09	4.17	0.79
Environmental scanning	9	7.14	30.95	30.95	19.06	11.90	2.98	1.14
Value chain analysis	6	4.76	23.81	19.04	35.71	16.67	3.36	1.17
Intuition	8	2.38	19.05	50.00	21.43	7.14	3.12	0.89
Strategic planning	3	—	7.14	19.05	57.14	16.67	3.83	0.79
Marketing research	5	2.38	11.90	33.34	35.71	16.67	3.52	0.99
Social networks†	1	—	2.38	14.28	42.86	40.48	4.21	0.78

*1: Not at all; 2: Seldom; 3: To some extent; 4: Often; 5: To a great extent.

†Pairwise comparisons show the means of 'Social networks" and 'Identification of shipper needs' to be statistically different (more significant) from the other eight variables at the 5% level of significance.

††Pairwise comparisons show the mean of 'Chance' to be statistically different (less significant) from the other nine variables at the 5% level of significance.

The identification of shipper needs ranked second and was, with social networks, the most significant method in statistical terms. Once again the results accord with the proposition that a port can grow if and only if it can deliver value to the shippers and its key customers and by doing so capture value for itself. To deliver value it is critical that port managers understand shipper needs.

Chance is 'seldom' (2.43) used as a method to identify opportunities. Statistically it was found to be the least significant. This is in agreement with the literature which while recognizing that chance is a factor, stresses the need for more systematic and predictable approaches. Surprisingly, however, environmental scanning scored 2.98, with 69 percent of respondents stating that they used it as a method 'to some extent', 'seldom' or 'not at all'. The literature has suggested that there is a strong positive relationship between environmental scanning and opportunity recognition (Smeltzer *et al*. 1988; Pearce *et al*. 1982; Lenz and Engledow 1986). But like small organisations, regional ports may lack resources to conduct a systematic search of opportunities or may still hold an unrealistic view of entrepreneurship as an 'opportunistic' way of doing business. To lend support to this view, formal processes and value chain analysis are only used 'to some extent' (3.24 and 3.36 respectively).

Often, some regional ports discover more opportunities than others not only because they use sophisticated methods but also because they search the environment more broadly and intensely. Table 5.7 shows the scope and intensity of search for market opportunities.

Table 5.7 Scope and intensity of search for market opportunities

		Percentage of respondents with particular response*						
Markets for opportunities	Rank	1	2	3	4	5	Mean Response	S.D.
Hinterland[†]	1	—	16.67	19.05	19.05	45.23	3.93	1.16
Intra-State	2	4.76	21.43	26.19	33.33	14.29	3.31	1.12
Inter-States	5	7.15	21.43	40.48	28.57	2.38	2.98	0.95
Overseas Markets	3	4.76	26.19	16.67	40.48	11.90	3.29	1.32
Adjacent Metropolitan Area	4	9.53	23.81	23.82	33.33	9.52	3.10	1.17

*1: Not at all; 2: Seldom; 3: To some extent; 4: Often; 5: To a great extent.

[†]Pairwise comparisons show the mean of Hinterland" to be statistically different (more significant) from the other four variables at the 5% level of significance.

Most respondents (45 percent) search the hinterland rather than other markets. Although the 'hinterland' is still perceived as a 'safe haven of captive opportunities', new evidence suggests that the hinterland is no longer a relevant notion to define the region in which a port has competitive advantage. Certainly, improvements in transport networks mean that diverse and widespread markets can be accessed easily by competitors.

An interesting point is that the respondents ranked overseas markets as third and ahead of inter-state markets. This suggests that they are aware of the fact that competition is taking place at a global scale and that to be part of supply chains which span the globe they need to demonstrate the ability to compete not only in domestic but also in international markets. In general, the focus of competition for opportunities is on the 'hinterland', overseas markets and within the state in which the regional port is located. To some extent the search is extended to the adjacent metropolitan area, but as the results suggest the intensity of search is not significant because the competition with capital city ports is likely to be intense. Fewer searches are conducted in other states where other regional ports and capital city ports may have established adequate infrastructure and relationships.

Table 5.8 shows that the propensity to search for market opportunities is primarily driven by a growth motive (4.24) and the existence of a proactive management (4.05) both of which are positively associated with the market orientation of a port (3.86). More than 57 percent of respondents agree that attempts to position themselves in the marketplace force them to search the immediate environment for market opportunities. No less important is the attempt to make themselves 'visible'. Visibility is associated with reputation and the perception of a good image.

Table 5.8 Propensity to search for market opportunities

Key factors in the search for market opportunities	Rank	Percentage of respondents with particular response* 1	2	3	4	5	Mean Response	S.D.
Factor endowments	9	4.76	21.43	38.10	30.95	4.76	3.10	0.96
Competitive pressure††	10	2.38	28.57	38.10	30.95	—	2.98	0.84
Proactive management	2	—	2.38	21.43	28.57	2.38	4.05	0.79
Growth motive†	1	—	—	7.14	61.91	30.95	4.24	0.58
Visibility	5		14.29	28.57	38.09	19.05	3.62	0.96
Risk tolerance	6	—	16.67	30.95	45.24	7.14	3.43	0.86
Market orientation	3	—	4.76	26.19	47.62	21.43	3.86	0.81
Established search procedures	8	2.38	21.43	38.10	28.57	9.52	3.21	0.98
Developed social networks	7		11.91	45.24	30.95	11.90	3.43	0.86
Competitive positioning	4	—	9.52	33.33	42.86	14.29	3.62	0.85

*1: Strongly disagree; 2: Disagree; 3: Neither agree nor disagree; 4: Agree; 5: Strongly agree.

†Pairwise comparisons show the mean of 'Growth motive" to be statistically different (more significant) from the other nine variables at the 5% level of significance.

††Pairwise comparisons show the mean of 'Competitive pressure' to be statistically different (less significant) from the other nine variables at the 5% level of significance.

Most respondents (69 percent) said that the search for market opportunities was not driven by competitive pressure or factor endowments they have or may control, but rather by growth motive and proactive management. The results also suggest that regional port managers are not sure if they take more risk than their capital city ports counterparts. Research has suggested that small business are more tolerant to risk and ambiguity (Schere 1982).

5.3.6 Relative importance of generic criteria used to evaluate market opportunities

Table 5.9 shows the relative importance regional port managers attach to each of the key decision criteria they use to evaluate market opportunities that they are likely to pursue.

Table 5.9 Relative importance of generic criteria used to evaluate market opportunities

Generic criteria used to evaluate market opportunities	Rank	Percentage of respondents with particular response* 1	2	3	4	5	Mean Response	S.D.
Market access	1	—	—	9.52	28.57	61.91	4.52	0.67
Perceived benefits	2	—	2.38	14.29	30.95	52.38	4.33	0.82
Attractiveness dimension†	3	—	—	16.67	38.09	45.24	**4.29**	0.74
Resources Availability	5	—	4.76	19.05	52.38	23.81	3.95	0.79
Business risk	4	—	2.38	19.05	42.86	35.71	4.12	0.80
Political risk††	7	2.38	16.67	42.86	23.80	14.29	3.31	1.00
Implementation dimension	6	—	2.38	21.43	61.91	14.29	**3.88**	0.67

*1: Irrelevant; 2: Not important; 3: Moderately important; 4: Very important; 5: Vital

†Pairwise comparisons show the mean of 'Attractiveness dimension' to be statistically different (more significant) from the 'Implementation dimension' at the 5% level of significance.

††Pairwise comparisons show the mean of Political risk' to be statistically different (less significant) from the other criteria at the 5% level of significance.

The first two generic criteria represent the degree of attractiveness of an opportunity and the last three the ease with which an opportunity can be implemented. Respondents were requested to evaluate each criteria and each of the two dimensions.

The results indicate that when regional port managers evaluate market opportunities they perceive access to markets as the most important factor. The provision of superior access to markets is seen at least by 62 percent of the respondents as 'vital' (4.52) and by no less than 90 percent as a 'very important' strategy. The perception that the existing market opportunity has the potential to provide benefits to the organisation is an important factor in the overall evaluation of a market opportunity. This criterion ranked second with 52 percent of respondents saying that it was 'vital' to *see* benefits in potential opportunities. More importantly, benefits may be economic and non-economic.

Relative to the factors associated with the opportunity implementation dimension, business risk was the most significant criteria (4.12). This means that port managers consider that if the business risk is considerable, implementation is less likely to succeed. Political risk ranked last in importance (3.31) but nonetheless it was considered to be at least 'moderately important' by 81 percent of the respondents. This result is very encouraging because in the past, political risk has been underrated as a major influence in decision outcomes and overall organisational performance.

The two key dimensions – attractiveness and implementation – were all significant and rated 'very important'. Attractiveness performed better (4.29) against implementation (3.88) but statistically there was no difference, probably because the implementation dimension displayed less variability. The results support the research that has called on managers to focus more on the implementation of decisions.

Table 5.10 allows easy comparison of the results across all three types of markets – bulk, break-bulk and container – in which regional port managers seek profitable opportunities. It shows the analysis of each criterion and factor in a specific market opportunity evaluation context. In the first column of the table the factors are presented and grouped under each generic evaluative criterion. In the second, third and fourth columns the relative importance of the means and the standard deviations of each generic criterion and factor are shown for each market opportunity. The last column reproduces the results set out in Table 5.9 and indicates the overall importance of each key criterion irrespective of the market evaluation context.

The results in Table 5.10 show that in general regional port managers perceive access to market as being the most important criterion when evaluating market opportunities whether the opportunity is in bulk, break-bulk or container trade. Business risk ranked second in importance. Economic benefits were ranked third for bulk opportunities but fourth for break-bulk and container opportunities. Availability of resources ranked fourth for bulk, but was perceived as third in importance for break-bulk and container trades. In all contexts the political risk criterion was rated as the least important. In essence, all factors are 'moderately important', 'very important' or 'vital' and should be considered critical in the process of strategy definition and opportunity capture for a regional port.

Table 5.10 Relative importance of criteria and factors used to evaluate market opportunities

OPPORTUNITY PROFILE	Bulk		Break-Bulk		Container		Overall Criterion	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Market Access	4.26	0.59	4.31	0.60	4.52	0.55	4.52	0.67
Logistics service	4.36	0.72	4.43	0.63	4.60	0.59		
Labour force/steveroding	3.90	0.98	4.14	0.81	4.29	0.77		
Cargo handling facilities	4.50	0.59	4.38	0.62	4.48	0.55		
Land transport	4.21	0.56	4.31	0.68	4.48	0.55		
Shipping service	3.93	0.92	4.10	0.76	4.40	0.63		
Storage facilities	4.48	0.55	4.31	0.78	4.29	0.11		
Perceived Benefits	4.02	0.56	3.95	0.66	4.02	0.64	4.33	0.82
Business growth potential	4.29	0.64	4.29	0.67	4.33	0.57		
Potential financial returns	4.45	0.59	4.31	0.68	4.36	0.62		
Potential social returns	3.02	1.00	3.21	0.90	3.29	0.86		
Potential economic benefits to the region	3.62	0.85	3.57	0.83	4.0	0.77		
Potential environmental returns	3.26	1.01	3.14	1.05	3.26	0.94		
Resources Availability	3.88	0.74	4.10	0.73	4.29	0.64	3.95	0.80
Financial resources	4.19	0.80	4.19	0.77	4.45	0.67		
Technical resources	3.86	0.90	3.88	0.89	4.12	0.80		
Relevant skills competences	3.90	0.79	4.02	0.87	4.14	0.78		
Time to implementation	3.71	0.86	3.79	0.84	4.00	0.77		
Business Risk	4.05	0.70	4.12	0.71	4.31	0.64	4.12	0.80
Commercial success potential	4.45	0.59	4.43	0.63	4.43	0.50		
Fit with profit and growth organizational objectives	4.29	0.71	4.19	0.77	4.31	0.68		
Potential level of competition that the opportunity will attract	3.76	0.96	3.79	1.00	3.90	0.88		
Management support and commitment	4.26	0.77	4.24	0.82	4.48	0.59		
Political Risk	3.67	0.85	3.48	1.04	3.95	0.88	3.31	1.00
Government support	3.67	1.14	3.40	1.15	4.00	1.04		
Community support	3.52	1.04	3.29	1.18	3.74	0.99		
Regulatory requirements	3.88	0.89	3.57	1.06	3.62	1.01		

*1: Irrelevant; 2: Not important; 3: Moderately important; 4: Very important; 5: Vital

5.3.7 Relative importance of market opportunity implementation success factors

Implementing market opportunities that have been identified as valuable is an important aspect of the framework which regional port managers use to address market opportunities in the quest for value delivery and capture to attain competitive advantage and growth. Table 5.11 reports the results of the analysis of factors which determine success in implementing market opportunities.

Table 5.11 Relative importance of factors that determine the ability of an organisation to successfully implement market opportunities

		Percentage of respondents with particular response*						
Success Decision Factors	Rank	1	2	3	4	5	Mean Response	S.D.
Ability to mobilize relevant resources	5	—	—	19.05	47.62	33.33	4.14	0.72
Type of markets in which to compete for opportunities	3	—	4.76	7.14	45.24	42.86	4.26	0.79
Ability to exploit opportunity not[††] yet identified by the competitors	7	7.14	9.52	26.19	33.33	23.82	3.57	1.17
Ability of the port to deliver and capture value	1	—	—	9.52	35.72	54.76	4.45	0.67
Anticipated viability of a new trade	4	—	2.38	7.14	57.15	33.33	4.21	0.68
Extent of capital investment needed to attract the trade	2	—	—	16.67	38.09	45.24	4.29	0.74
Management commitment and support	6	—	7.14	14.29	45.24	33.33	4.05	0.88

*1: Irrelevant; 2: Not important; 3: Moderately important; 4: Very important; 5: Vital
[††]Pairwise comparisons show the mean of 'Ability to exploit the opportunity not yet identified by the competitors' to be statistically different (less significant) from the other six variables at the 5% level of significance.

The results suggest that it is the ability of the port to deliver and capture value that is the key for successful implementation of market opportunities. Port managers rated this factor as 'very important' (4.54) with 55 percent saying that it is 'vital'.

The second most important factor is the extent of capital investment needed to attract the trade. Most respondents rated this factor as 'very important' (4.29) with more than 80 percent of them stating that is either 'very important' or 'vital'. This result accords with earlier discussion and findings from the fieldwork.

Respondents rated the type of markets in which a regional port competes for opportunities as 'very important' factor (4.26) to consider if the opportunity is to be implemented successfully. Furthermore, the results suggest that even if a port has chosen the right market in which to compete, there will still be the need to determine whether the new trade will be viable. Some trades are only viable in the short run and in the long run diminish in importance as the competition intensifies and market conditions change. Anticipating the viability of the trade is a 'very important' (4.21) consideration that regional port managers need to take into account.

Contrary to expectations, the ability to exploit opportunities not yet obvious to competitors is only moderately important (3.57) and the least significant in the eyes of regional port managers. The literature has argued that first-mover advantage is in itself a competitive advantage because it gives the lead-time advantage for organisations in their development efforts (Lee *et al*. 2000; Grimm and Smith 1997). In the context of regional ports which compete for growth opportunities, this factor is important but not critical. Generally, it takes lengthy periods before a major development in a port can be implemented – during which time more resource-rich capital city ports may be able to enter the market and compete for the same opportunity.

5.4 Summary

This chapter has presented the results of the Internet survey which was conducted with the objective of collecting data to test for statistical significance of decision-makers perceptions of regional port growth.

The findings from this survey give credence to the relevance of the conceptual framework *of how a regional port captures opportunities* and grows. On the evidence presented in this chapter, it can be argued that a successful regional port is primarily driven by growth and profit motives when competing for opportunities. Regional port managers use a combination of different methods to consistently search the environment for profit opportunities. Further, they focus key resources and efforts on opportunities for which they possess or can develop and sustain relative competitive advantage over the adjacent capital city ports.

The statistical evidence strongly supports the view that providing superior access to markets is a key strategy through which opportunities are captured. Shippers demand more services from ports which are capable of providing them with faster and cost-effective access to markets. In addition, the findings suggest that when evaluating market opportunities, regional port managers focus on both the attractiveness and implementability aspects of the opportunity. Access to markets, the perceived benefits, the availability of resources, the business and political risk are critical and determine whether an opportunity should be pursued. Efforts to seize an opportunity based only on how attractive it is may be fruitless if implementation issues are not addressed in the early stage of the whole process of opportunity capture.

CHAPTER 6

Modelling Opportunity Choice 1: The Determinants of Opportunity Choice

6.1 Introduction

In the introductory chapters, it was argued that 'strategy decay' and less-than-adequate conceptual frameworks for defining port growth strategies as set out in the literature were incapable of providing adequate explanation of how a port, and particularly regional ports achieve growth. Within that context, we offered a new framework for defining regional port growth strategies. Essentially, we suggested that the growth of a port is determined by its ability to capture valuable market opportunities over time; and that a critical issue was to understand and explain how successful regional port managers capture growth opportunities.

Figure 6.1 highlights the mechanism for regional port growth and notes the identification, evaluation, choice and implementation of market opportunities as the key process and mechanisms by which opportunities are captured. The significance of the methods and criteria used by port managers to identify and evaluate market opportunities, as well as, the significance of the factors that determine that an opportunity will be successfully implemented have been extensively discussed in Chapters 3, 4 and 5. But on what basis is a 'valuable' opportunity chosen from among a range of opportunities? What are the determinants of opportunity choice? How do managers actually choose a 'valuable' opportunity?

Most approaches to study the determinants of managerial strategic choices have been based on the importance rating of the factors (a similar approach has been used in Chapter 5 to determine the significance of criteria and factors used by the port managers to evaluate market opportunities). These approaches, however, have not been satisfactory because importance rating *generally measures attitudes and not the actual behaviour*, which in the present study is the subject of interest. Perceptions are key influences of the decisions being made but they do not always portray correctly the actual performance of the subject being evaluated.

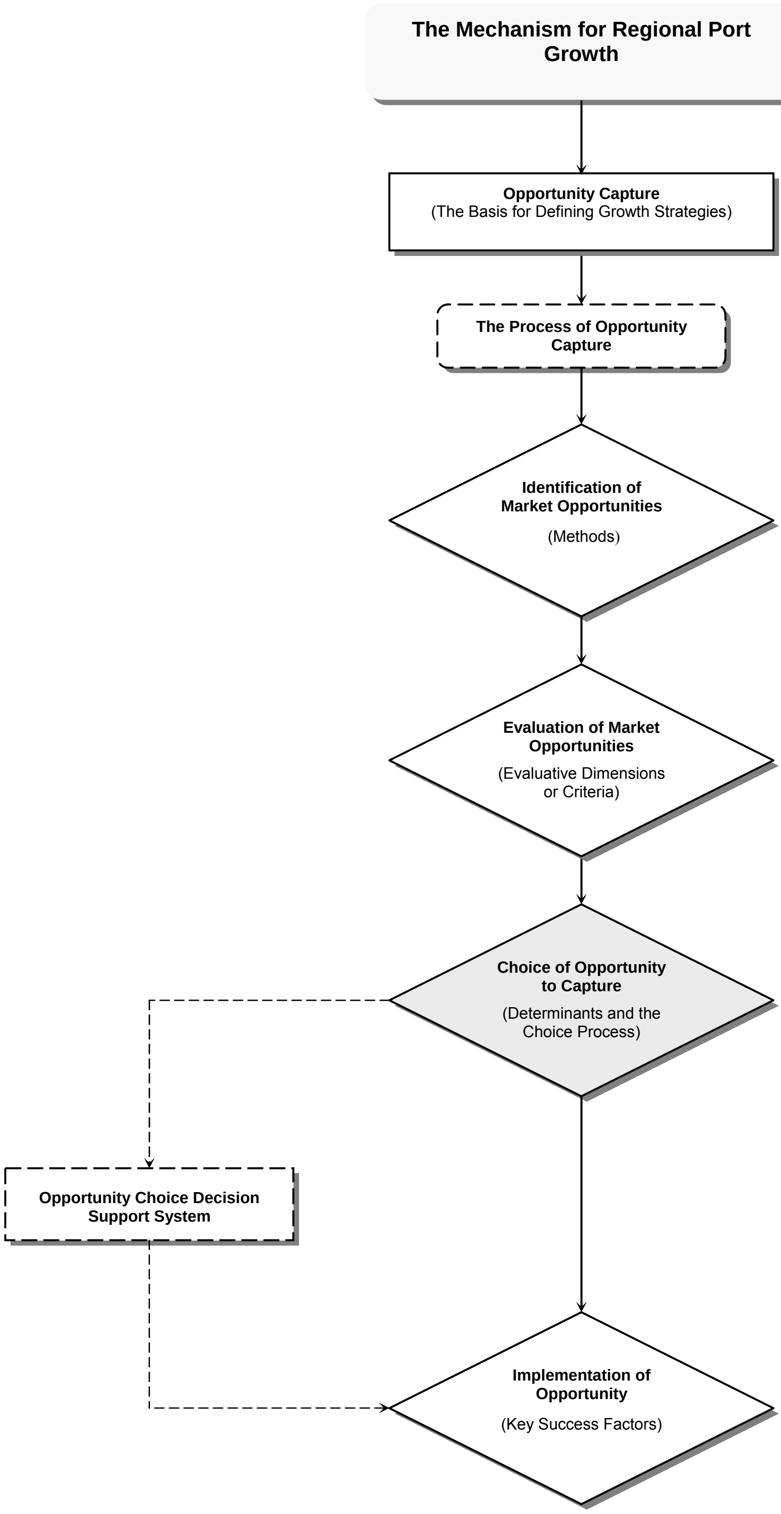


Figure 6.1 Opportunity capture and port growth: the mechanism

In this chapter the opportunity choice modelling technique is used in a novel way to model executive judgment at the strategic level (Priem and Harrigan 1994). It examines the determinants of opportunity choice and their relative importance using discrete choice modelling which is premised on behavioural and economic theory of how decision-makers actually choose a course of action to pursue among alternatives in a specific decision context. To model the determinants of opportunity choice with discrete choice modelling we used the stated-choice experimental data collected through the Internet-based survey.

This chapter is the first of two chapters which outlines this approach to modelling opportunity choice. The chapter comprises two major sections. The first explains how the discrete choice technique is used to model executive judgment and strategic choices; and in the second section the discrete choice modelling approach is applied to the stated-choice experimental data to analyse the determinants of market opportunity choice and to establish their relative importance.

6.2 Implementing a Stated Choice Experiment for Opportunity Choice/Selection

A major interest of this study is to understand *how port managers actually choose market opportunities they pursue*. Understanding this process has important implications for port growth; it defines the scope and scale of competition for opportunity share and port growth.

Two different modelling approaches dominate the study of choices individuals make in a particular context (Louviere and Woodworth 1993; Louviere *et al*. 1999; Hensher and Johnson 1981; Hensher and Bradley 1993; Ben-Akiva *et al*. 1994). The first approach uses discrete choice models based upon revealed choice data. Revealed choice data provides information on past choice decisions individuals made on the subject of interest. The second approach, using discrete choice models derived from data on stated choices, is very useful for situations where the subject of interest is the behaviour in the presence of new situations (eg., new market opportunities). A key assumption of the approach is that decision-makers behave rationally (although admittedly bounded) and will always choose those alternatives that yield maximum utility or satisfaction.

Stated choice models are based on information integration theory in psychology (Anderson 1981), random utility theory in economics, and econometric specifications of discrete choice models (Hensher and Johnson 1981) and are growing in popularity in marketing, economics and transport studies (Louviere *et al*. 2000; Kuhfeld 2003). They enable researchers to model choice in an explicit competitive context thus realistically emulating market decisions. They are based upon the assumption that individuals arrive at a choice by cognitively integrating the utilities attached to the magnitudes of attributes that constitutes the choice object (eg., a market opportunity), according to a simple algebraic rule and by implementing a utility-maximizing rule to convert their preferences into a choice. In order to estimate the assumed utility function and to test the underlying choice model individuals in a sample are typically presented with choice sets that may vary in size and composition and are asked to select from each choice set the alternative they like best.

The choice possibilities or alternatives may be examples from the real word (eg., existing market opportunities), but more typically they represent profiles of hypothetical market opportunities. Choices are aggregated across individuals for each choice set and analysed by means of a formal choice model, usually a multinomial logit model (Kuhfeld 2003; Louviere *et al*. 2000; Hensher and Johnson 1981). Once a specific model is assumed, the aggregated choice frequencies may be decomposed to determine the contribution of each factor/attribute. Stated choice models assume that utility functions and the contribution of each factor/attribute can be estimated on the basis of data gathered by means of an experimental design.

In the absence of useable revealed preference data on how regional port managers choose market opportunities, there is strong justification for stated preference techniques. Even if the former data were available, Hensher and Bradley (1993) and Bradley and Daly (1991) have shown that revealed preference data could be enriched by combining it with stated preference data. In any case, the strategic intentions of its managers rather than the revealed choices of current market opportunities are of special interest in this context.

Stated preference analysis is premised on a controlled experiment, out of which comes a series of survey questions eliciting a response to alternative combinations of levels of attributes. A good experiment has a rich set of attributes and choice contexts together with enough variation in the attribute levels necessary to produce meaningful behavioural responses in the context of strategies under study (Hensher 1994: 113); and a design will be efficient when the parameters of the choice model are estimated with maximum precision.

Hensher (1994) suggests a sequence of tasks is required to design a choice experiment and although the tasks can be ordered and performed sequentially, there is some simultaneity in decisions about the key parameters (Hague Consulting Group 1991). The important consideration is to decide, at the outset, on whether the respondents should rank, rate or choose. In this study the decision was made to have the response as a first preference choice task. Choosing one option is an easier task for most respondents than ranking and/or rating them.

The experimental design is based on a number of decisions, as follows, and these are discussed briefly.

- the relevant factors/attributes, their number and levels, the response metric and presentation;
- contextual factors or covariates that are included in the experiment that could influence the choice task;
- the design of the alternative and later, choice sets via a statistical experimental design; and
- the design of a survey instrument that translates the statistical design into a comprehendible form which elicits the required information on the choices.

6.2.1 Opportunity choice 'context'

The environments under which strategic choices are made have been the subject of much research (Priem 1992). One of the challenges of designing stated preference (SP) experiments lies in setting out an unambiguous choice context for the respondents. The choices that respondents make are conditioned by the choice alternatives available to them, the set of observed attributes or factors of each alternative, the decision-maker’s own characteristics and the unobserved influences represented by a random component.

In this study, the port managers were not offered the no-choice option. By having the SP task not incorporating the no-choice alternative, we are measuring the utilities of alternatives given that regional port managers will choose an opportunity. Such models have been called share or conditional demand models. They identify the probability of making a choice, given that a choice will be made. On the other hand, models that explicitly incorporate and model 'no choice' are only demand models (Louviere 1993). Including the no-choice option is useful when modelling the overall demand for a product or, in this particular context, for modelling opportunity profiles. It is not the objective of this study to model demand for market opportunities, but rather to gauge what the important market opportunity attributes in the opportunity choice process are. It is possible that the omission could introduce bias into the results in cases where port managers strongly felt that they had no preference for any of the alternatives on offer. However, Louviere *et al*. (2000) have demonstrated that *forced choices* are an effective methodology to study trade-offs and strategic choices managers make or are required to make.

Strategic decisions have a longer time horizon compared to tactical decisions. They involve substantial investment of money, managerial talent and effort and time. The conventional business strategy literature looks at strategic decisions as spanning periods of two to five years or more. In this study, the focus was on strategic rather than tactical and short-term decisions.

In the earlier survey, port managers were asked to indicate the investment opportunities they were likely to pursue. Answers to this question could be indicators of a port's market coverage strategy, or which trades – bulk, break-bulk or container – regional port managers perceive as providing more opportunities for growth. The scope of markets in which port managers search for opportunities is an indicator of regional port positioning intent, that is, whether it sees itself as a niche, regional, national or international player. This positioning intent could be expected to translate into different choices for its overall preferred market opportunity choice strategy.

The attributes of the choice experiments are one source of direct influence on opportunity choice. In addition there are a number of covariates which may interact with the design variables in the choice model specification as, for example, the type of port ownership i.e., private or public; the strategic motives for pursuing market opportunities; the geographical location of the port; and the respondent manager's position in the port. However, in this study these covariates are not included because they are not design variables and as such do not contribute to the definition of choice alternatives (Kuhfeld 2003) which are the subject of interest. Also, a conditional demand is often modelled with a conditional logit model, which treats the choice among alternatives as a function of the characteristics of the alternatives.

It is often difficult to know the implications of various specifications of representative utility and to determine whether and how, for example, one specification is intrinsically different from another. In this, case utility theory has always been used as a useful aid for interpreting and motivating specifications. The neo-classical theory of the trade-off between goods and leisure is often used at the individual consumer level particularly in the individual travel mode choice context. The situation is somewhat more complex at the firm's strategic choice level; SP models are yet to incorporate agency theory in managerial strategic choice (an interesting avenue for future research in its own right). The researcher has to decide not just what attributes affect the choice probabilities, but how to enter the indirect utility expressions defining each alternative, that is, what types of interaction terms to specify and by what algebraic operations, if any, to transform the variables (e.g., log-linear forms or exponential forms (Train 1985)).

6.2.2 Factors or attributes and their levels

On the basis of the interviews and literature search noted in earlier chapters twenty-two factors were grouped into five criteria – access to markets, perceived benefits, resources availability, business and political risks (Table 6.1).

The use of qualitative factors presented some difficulties as far as selection of the measurement unit for each attribute was concerned. It would have been preferable to have well defined attribute measures such as the actual rate of growth in the *potential business growth* factor on the *perceived benefits* criterion, or the specific amount of investment required to implement an opportunity on *the resources availability* criterion for instance. However, ordinal scales such as *low, medium, high, or requires huge* *investment, requires modest investment, requires small investment* for instance were used.

Table 6.1 Criteria, factors and levels used in the experiment of market opportunity selection

Criteria and Factors	Levels		
Market Access			
Logistics Service	Cost-ineffective and partial logistics service	Cost-effective and total logistics service	
Labour Force/Stevedoring	Limited skills, inflexible & inefficient	Sufficient skills, flexible & efficient	
Cargo Handling Facilities	Underdeveloped and inefficient	Developed and efficient	
Land Transport	Segmented, inefficient and unreliable	Integrated, efficient and reliable	
Shipping Service	Unreliable and inefficient	Reliable and efficient	
Storage Facilities	Underdeveloped and ineffective	Developed and effective	
Perceived Benefits			
Potential Business Growth	Low	Medium	High
Potential Financial Returns	Low	Average	High
Potential Social Returns	Low	Satisfactory	High
Potential Regional Economic Development Benefits	Low	Considerable	Very High
Potential Environmental Returns	Low	Satisfactory	High
Resources Availability			
Financial Resources	Requires huge investment	Requires modest investment	Requires small investment
Technical Resources	Can be acquired in the long-term	Can be acquired in the medium-term	Can be acquired in the short-term
Relevant Skills & Competences	Can be developed in the long-term	Can be developed in the medium-term	Can be developed in the short-term
Time to Implementation	Can be implemented in the long-term	Can be implemented in the medium-term	Can be implemented in the short-term
Business Risk			
Potential Commercial Success	Low	Moderate	High
Fit with Organisational Profit & Growth Objectives	May have negative impact on organisational objectives	Has no impact on organisational objectives	It is likely to enhance organisational objectives
Potential Level of Competition that the Opportunity will attract	High	Moderate	Low
Top Management Support and Commitment	Low	Medium	High
Political Risk			
Government Support and Commitment	Low	Sufficient	High
Community Acceptance & Support	Low	Sufficient	High
Regulatory Requirements	Stringent	Flexible	Minimal

The difficulty with such ordinal scales is that they may be interpreted differently (subjectively) by responding port managers. Nonetheless, it was apparent that the subjectivity problem could be effectively controlled by using the factors that were rigorously derived from the earlier interviews and from an understanding of management practice in the port industry.

The number of levels each attribute took was defined by the nature of the metric of each attribute, that is, whether the attribute elicited a binary response (e.g., segmented and integrated) or three levels where there was a possibility of non-linearity (e.g., low, medium, high) or the nature of the attribute as it is known in the industry (The *logistics service* attribute under the Market Access criterion, for example, was best described in terms of the scope of market service provision such as *partial and cost-ineffective* or *total and cost-effective service*. Port managers confirmed that the measurements used were broadly familiar to them). The overall number of levels for each attribute is also determined by the complexity of the design – and involved consideration of the attribute levels generated, the manner in which they are presented to the respondent, the need to investigate non-linearity and the main effects of factors in the experiment.

6.2.3 The design of alternatives and choice sets

In the design of choice sets, levels of attributes are combined into a stated choice experiment. In the experiment there were 6 factors with 2 levels each for the *Market Access* criterion, 5 factors with 3 levels each for the *Perceived Benefits* criterion, 4 factors with 3 levels each for the *Resources Availability c*riterion, 4 factors with three levels each for the *Business Risk* criterion and 3 factors with 3 levels each for the *Political Risk* criterion (Table 6.1) to make a design of $2^6 3^5 3^4 3^4 3^3$ = 2,754,990,144 different possible combinations or choice sets. As the number of attributes and their levels increases, the number of resulting choice sets grows exponentially. As a result, the reliability of the measurements may be questionable.

In a full-factorial design, all main effects, two-way interactions, and higher-order interactions are estimable and uncorrelated. The problem with a full-factorial design is that, for most practical situations, it is cost-prohibitive and tedious if not impossible to have respondents evaluate all possible combinations or choice sets. Greene and

Srinivasan (1978) and Greenberg (1986) suggest that respondents evaluate no more than 30 profiles. Brazell and Louviere (1997) and Johnson and Orme (1996) suggest that at least twenty and perhaps more than forty choice sets may be possible in some experiments but most researchers attempt to limit the number of choice sets to 16 or less to prevent degradation of response quality. Five possible strategies for reducing the number of options or choice sets to be presented to the respondent have been suggested by the Hague Consulting Group (1991: 33):

i) using fractional factorial designs;
ii) removing those options that are dominated or will dominate other options in the choice set;
iii) separating the options into blocks so that the full set is completed by groups of respondents, each responding to a different sub-set of options;
iv) carrying out a series of experiments with each respondent, offering different level combinations of attributes to determine consistency in judgment;
v) defining attributes in terms of differences between alternatives. A sixth option might be recognised and we add;
vi) the hierarchical information integration designs developed by Louviere (1984) which were in fact an extension of Anderson's information integration theory (Anderson 1974, 1981, 1982).

In this study all these options were considered but the focus was on four approaches – the fractional factorial, the blocking of the design, the repetition of experiments with each respondent and the hierarchical information integration design.

The Fractional factorial design: This design is the most common solution because it allows the examination of an appreciably larger numbers of attributes and levels, while using fewer runs or choice sets than those generated by a full-factorial design. Many choice experiments use relatively small sizes and fewer attributes reflecting an implicit recognition that 'better' information comes from making the choice less complex and parsimonious. The approach rests on the assumption that some or all interactions between attributes are not statistically significant and will not influence responses adversely. However, if the interactions are statistically significant, their effects in a fractional factorial design will be carried onto the individual main effects – and confounding, in fact, main effects with interaction effects (Hague Consulting Group 1991: 33; Montgomery 2001). If some or all interaction effects are considered to be insignificant, the opportunity exists to modify the experimental design, such that the number of options is reduced, but the interactions between the attributes do not vary independently from the attributes themselves.

A special type of fractional-factorial design is the orthogonal array in which *all estimable effects* are uncorrelated. An orthogonal array refers to design that is both orthogonal and balanced, and hence optimal (Kuhfeld 2003). The measure of the goodness of the design used in this present experiment was the D-efficiency measure after Kuhfeld (2003). Designs with D-efficiency equals 100 are the most efficient, but efficiencies that are not near 100 may be perfectly satisfactory (for an extensive discussion of the issue see Kuhfeld 2003). Orthogonal arrays are categorized by their resolution. The resolution identifies which effects, possibly including interactions, are estimable. For example, for resolution III designs, all main effects are estimable free of each other, but some of them are confounded with two-factor interactions. Higher resolution designs have many estimable factors uncorrelated but require larger designs. Resolution III orthogonal arrays are frequently used in choice studies.

In using fractional factorial designs, specific decisions had to be made regarding the treatment of interactions. The fractional design used was the main effects plan (Resolution III), which assumes that individuals process information in a strictly additive way, such that there are no significant interactions between attributes (Louviere 1988). Hensher (1994) notes that the main effects plan does not in a statistical sense provide a sufficient number of alternatives to be able to detect unobserved but possibly important interaction effects, preventing determination of whether the estimated main effects are statistically biased. Despite potential presence of confounding interactions, Louviere *et al*. (2000: 94) and HCG (1991) suggest that main effects explain about 70 to 90 percent of the variance in response data, with two-way interactions accounting for between 5 and 15 percent and higher-order interactions accounting for the remaining explained variance (The factors under the five criteria in Table 5.1 were combined into alternatives using fractional factorial designs. In the circumstances, it was felt that the main effects design plan used was sufficiently robust to engender a statistically efficient design).

The blocking of the design: When there are too many options for one individual to evaluate, blocking the design can be effective. With blocking, individuals are assigned to different groups and each group, which is considered to be relatively homogeneous, evaluates only a subset of all choice sets generated through the experimental design. In the present case, 6 blocks were created from a total of 36 choice sets in each decision situation (e.g., the selection of opportunities based on access to markets criterion). Each block had 6 choice sets and each individual was assigned to one block.

Repetition of the experiments: Blocking was critical to reduce the number of choice sets that the respondents were required to evaluate while maintaining the statistical properties of the design. However, because the size of the population under examination was small and the sample of respondents in each surveyed port varied between 5 to 15 it was important that for a given decision situation, each individual in a block evaluated 6 choice sets. As there were in total 6 different experiments each with 6 blocks and each block with 6 choice sets, this meant that for the whole study each respondent evaluated a total of 36 choice sets which were within the range recommended in the literature (Louviere *et al*. 2000). This type of arrangement of choice sets allowed the number of responses obtained with a limited sample (42) to provide enough data for subsequent statistical analysis.

Hierarchical information integration: This approach is based on the assumption that in complex decision-making problems, subjects divide the set of attributes that influences their choice behaviour into subsets. They evaluate these subsets separately and then aggregate their evaluations of each of them in order to arrive at an overall judgment or choice. In this study we considered twenty-two influential attributes in the process of market opportunity selection. It was then assumed that regional port managers group these attributes into higher order constructs or five criteria – market access, perceived benefits, resources availability, business risk and political risk – and evaluate the factors/attributes (Table 6.1) associated with each criterion to arrive at a preference for the choice alternatives, but only taking into consideration that single criterion. In a subsequent step, port managers were assumed to trade-off their evaluations of the higher order constructs or criteria to arrive at an overall preference and choice.

Using SAS 9.0 and following the procedure developed by Kuhfeld (2003), computer codes for creating efficient choice experiments and performing discrete choice modelling for each decision situation under examination were written and implemented (Appendix 3). The most efficient designs were generated following steps 1 to 4 of the computer codes in Appendix 3 and the following choice sets resulted.

- **Choice sets based on market access criterion**

Under the criterion *market access* there were 3 alternative opportunities (bulk, break-bulk and container investment opportunities) and 6 attributes (logistics service, labour force/stevedoring, cargo handling facilities, land transport, shipping service and storage facilities) at 2 levels each (Table 6.2) – a $2^{6*3} = 2^{18}$ design yielding a full factorial design of 262,144 market opportunity profiles or choice sets.

Table 6.2 Selection of opportunities based on market access criterion

Trade opportunity	Attributes	Levels	
Container	Logistics Service	Cost-ineffective and partial logistics service service	Cost-effective and Total logistics
	Labour Force/Stevedoring	Limited skills, inflexible and inefficient	Sufficient skills, flexible and efficient
	Cargo Handling Facilities	Underdeveloped and inefficient	Developed and efficient
	Land Transport	Segmented, inefficient and unreliable	Integrated, efficient and reliable
	Shipping Service	Unreliable and inefficient	Reliable and efficient
	Storage Facilities	Underdeveloped and ineffective	Developed and effective
Bulk	Logistics Service	Cost-ineffective and Partial logistics service service	Cost-effective and Total logistics
	Labour Force/Stevedoring	Limited skills, inflexible and inefficient	Sufficient skills, flexible and efficient
	Cargo Handling Facilities	Underdeveloped and inefficient	Developed and efficient
	Land Transport	Segmented, inefficient and unreliable	Integrated, efficient and reliable
	Shipping Service	Unreliable and inefficient	Reliable and efficient
	Storage Facilities	Underdeveloped and ineffective	Developed and effective
Break-Bulk	Logistics Service	Cost-ineffective and Partial logistics service service	Cost-effective and Total logistics
	Labour Force/Stevedoring	Limited skills, inflexible and inefficient	Sufficient skills, flexible and efficient
	Cargo Handling Facilities	Underdeveloped and inefficient	Developed and efficient
	Land Transport	Segmented, inefficient and unreliable	Integrated, efficient and reliable
	Shipping Service	Unreliable and inefficient	Reliable and efficient
	Storage Facilities	Underdeveloped and ineffective	Developed and effective

For this design the computer search found six 100 percent efficient designs. The smallest optimal design had 20 runs or choice sets and the largest 40. An optimal fractional factorial design of 36 choice sets with D-efficiency = 100 was chosen, randomized and divided into 6 blocks of 6 choice sets each.

- **Choice sets based on perceived benefits criterion**

Under the criterion *perceived benefits* there were alternative opportunities (bulk, break-bulk and container investment opportunities) and 5 attribute (potential business growth, potential financial returns, potential social returns, potential regional economic benefits, and potential environmental returns) at 3 levels each (Table 6.3) – a $3^{5*3} = 3^{15}$ design yielding a full factorial design of 14,348,907 market opportunity profiles or choice sets. For this design the computer search found 2 optimal designs with 100 percent efficiency and 3 near optimal designs. The smallest design had 36 runs or choice sets and the largest 72. A fractional factorial design of 36 choice sets with D-efficiency = 99 was chosen, randomized and divided into 6 blocks of 6 choice sets each.

Table 6.3 Selection of opportunities based on perceived benefits criterion

Trade opportunity	Attributes	Levels		
Container	Potential Business Growth	Low	Medium	High
	Potential Financial Returns	Low	Average	High
	Potential Social Returns	Low	Satisfactory	High
	Potential Regional Economic Development Benefits	Low	Considerable	Very High
	Potential Environmental Returns	Low	Satisfactory	High
Bulk	Potential Business Growth	Low	Medium	High
	Potential Financial Returns	Low	Average	High
	Potential Social Returns	Low	Satisfactory	High
	Potential Regional Economic Development Benefits	Low	Considerable	Very High
	Potential Environmental Returns	Low	Satisfactory	High
Break-Bulk	Potential Business Growth	Low	Medium	High
	Potential Financial Returns	Low	Average	High
	Potential Social Returns	Low	Satisfactory	High
	Potential Regional Economic Development Benefits	Low	Considerable	Very High
	Potential Environmental Returns	Low	Satisfactory	High

- **Choice sets based on resources availability criterion**

Under the criterion *resources availability* there were alternative opportunities (bulk, break-bulk and container investment opportunities) and 4 attribute (financial resources, technical resources, relevant skills and competences and time to implementation) at 3 levels each (Table 6.4) – a $3^{4*3} = 3^{12}$ design yielding a full factorial design of 531,441 market opportunity profiles or choice sets. For this design the computer search found 3 optimal designs with 100 percent efficiency and 1 near optimal design. The smallest optimal design had 27 runs or choice sets and the largest 54. A fractional factorial design of 36 choice sets with D-efficiency = 100 was chosen, randomized and divided into 6 blocks of 6 choice sets each.

Table 6.4 Selection of opportunities based on resources availability criterion

Trade opportunity	Attributes	Levels		
Container	Financial Resources	Requires huge investment	Requires modest investment	Requires small investment
	Technical Resources	Can be acquired in the long-term	Can be acquired in the medium-term	Can be acquired in the short-term
	Relevant Skills & Competences	Can be developed in the long-term	Can be developed in the medium-term	Can be developed in the short-term
	Time to implementation	Can be implemented in the long-term	Can be implemented in the medium-term	Can be implemented in the short-term
Bulk	Financial Resources	Requires huge investment	Requires modest investment	Requires small investment
	Technical Resources	Can be acquired in the long-term	Can be acquired in the medium-term	Can be acquired in the short-term
	Relevant Skills & Competences	Can be developed in the long-term	Can be developed in the medium-term	Can be developed in the short-term
	Time to implementation	Can be implemented in the long-term	Can be implemented in the medium-term	Can be implemented in the short-term
Break-Bulk	Financial Resources	Requires huge investment	Requires modest investment	Requires small investment
	Technical Resources	Can be acquired in the long-term	Can be acquired in the medium-term	Can be acquired in the short-term
	Relevant Skills & Competences	Can be developed in the long-term	Can be developed in the medium-term	Can be developed in the short-term
	Time to implementation	Can be implemented in the long-term	Can be implemented in the medium-term	Can be implemented in the short-term

- **Choice sets based on business risk criterion**

Under the criterion *business risk* there were alternative opportunities (bulk, break-bulk and container investment opportunities) and 4 attribute (potential commercial success, fit with organisational profit and growth objectives, potential level of competition that the opportunity will attract and top management support and commitment) at 3 levels each (Table 6.5) – a $3^{4*3} = 3^{12}$ design yielding a full factorial design of 531,441 market opportunity profiles or choice sets. For this design the computer search found 3 optimal designs with 100 percent efficiency and 1 near optimal design. The smallest optimal design had 27 runs or choice sets and the largest 54. A fractional factorial design of 36 choice sets with D-efficiency = 100 was chosen, randomized and divided into 6 blocks of 6 choice sets each.

Table 6.5 Selection of opportunities based on business risk criterion

Trade opportunity	Attributes	Levels
Container	**Potential Commercial Success**	Low Moderate High
	Fit with Organisational Profit and Growth Objectives	May have negative impact on organisational objectives; Has no impact on organisational objectives; It is likely to enhance organisational objectives
	Potential Level of Competition that the Opportunity will Attract	Low Moderate High
	Top Management Support & Commitment	Low Medium High
Bulk	**Potential Commercial Success**	Low Moderate High
	Fit with Organisational Profit and Growth Objectives	May have negative impact on organisational objectives; Has no impact on organisational objectives; It is likely to enhance organisational objectives
	Potential Level of Competition that the Opportunity will Attract	Low Moderate High
	Top Management Support & Commitment	Low Medium High
Break-Bulk	**Potential Commercial Success**	Low Moderate High
	Fit with Organisational Profit and Growth Objectives	May have negative impact on organisational objectives; Has no impact on organisational objectives; It is likely to enhance organisational objectives
	Potential Level of Competition that the Opportunity will Attract	Low Moderate High
	Top Management Support & Commitment	Low Medium High

- **Choice sets based on political risk criterion**

Under the criterion *political risk* there were alternative opportunities (bulk, break-bulk and container investment opportunities) and 3 attribute (government support and commitment, community acceptance and support, and regulatory requirement) at 3 levels each (Table 6.6) – a $3^{3*3} = 3^9$ design yielding a full factorial design of 19,683 market opportunity profiles or choice sets. For this design the computer search found 3 optimal designs with percent efficiency and 1 near optimal design. The smallest optimal design had 27 runs or choice sets and the largest 54. A fractional factorial design of 36 choice sets with D-efficiency = 100 was chosen, randomized and divided into 6 blocks of 6 choice sets each.

Table 6.6 Selection of opportunities based on political risk criterion

Trade opportunity	Attributes	Levels		
Container	Government Support and Commitment	Low	Sufficient	High
	Community Acceptance and Support	Low	Sufficient	High
	Regulatory Requirements	Stringent	Flexible	Minimal
Bulk	Government Support and Commitment	Low	Sufficient	High
	Community Acceptance and Support	Low	Sufficient	High
	Regulatory Requirements	Stringent	Flexible	Minimal
Break-Bulk	Government Support and Commitment	Low	Sufficient	High
	Community Acceptance and Support	Low	Sufficient	High
	Regulatory Requirements	Stringent	Flexible	Minimal

- **Choice sets based on generic decision criteria**

Under the criterion *generic decision criteria* there were alternative opportunities (bulk, break-bulk and container investment opportunities) and 5 attribute (access to markets, perceived benefits, availability of resources, business risk and political risk) at 3 levels each (Table 6.7) – a $3^{5*3} = 3^{15}$ design yielding a full factorial design of 14,348,907 market opportunity profiles or choice sets. For this design the computer search found 2 optimal designs with 100 percent efficiency and 3 near optimal designs. The smallest design had 36 runs or choice sets and the largest 72. A fractional factorial design of 36 choice sets and D-efficiency = 99 was chosen, randomized and divided into 6 blocks of 6 choice sets each.

The choice sets based on the overall decision criteria represent the highest level of hierarchical information integration. They link and incorporate all five decision criteria and present hypothetical market contexts within which port managers are requested to make an overall evaluation and actual selection or choice of market opportunities they are likely to pursue. However, before the experiment was included in the Internet survey artificial data was generated for each decision context using step 5 in Appendix 4 and the choice modelling simulated through steps 6 to 10 in Appendix 4. The objective was to have an idea of how the experiment would work once the actual data were collected. This also can be seen as a way of pre-testing for functionality of the experiment (Kufeld 2003).

Table 6.7 Selection of opportunities based on the overall criteria

Trade opportunity	Attributes	Levels		
Container	**Market Access**	Regional port provides inferior access than the adjacent metropolitan port	Regional port provides inferior access than the adjacent metropolitan port	Regional port provides inferior access than the adjacent metropolitan port
	Perceived Benefits	Low Medium	High	
	Resources Availability	Can be mobilized in the long-term	Can be mobilized in the medium--term	Can be mobilized in the short-run
	Business Risk	High Medium	Low	
	Political Risk	High Medium	Low	
Bulk	**Market Access**	Regional port provides inferior access than the adjacent metropolitan port	Regional port provides inferior access than the adjacent metropolitan port	Regional port provides inferior access than the adjacent metropolitan port
	Perceived Benefits	Low Medium	High	
	Resources Availability	Can be mobilized in the long-term	Can be mobilized in the medium--term	Can be mobilized in the short-run
	Business Risk	High Medium	Low	
	Political Risk	High Medium	Low	
Break-Bulk	**Market Access**	Regional port provides inferior access than the adjacent metropolitan port	Regional port provides inferior access than the adjacent metropolitan port	Regional port provides inferior access than the adjacent metropolitan port
	Perceived Benefits	Low Medium	High	
	Resources Availability	Can be mobilized in the long-term	Can be mobilized in the medium--term	Can be mobilized in the short-run
	Business Risk	High Medium	Low	
	Political Risk	High Medium	Low	

6.3 Selecting Growth Opportunities: A Discrete Choice Modelling Framework

The decision to choose an investment opportunity to pursue is a multi-step, complex process which is guided by a variety of economic and non-economic issues, and by quasi-rational assessment of economic costs and benefits that are also filtered through behavioural processes of perception and interpretation. Managers are subject to bounded rationality and are affected by their own past experiences and learned responses. The presence of coalition politics in organisations also influences the choice of market opportunities to pursue in regional ports. The choice of a particular investment opportunity is an important decision influencing regional port performance, since it influences the mix of skills and resources which will be required and the ability of the port to capture growth opportunities.

In this study we use discrete choice techniques to model the choice of market opportunity in the regional port context. Discrete choice modelling is premised on the economic dictum of 'utility maximisation' that economists use to explain how individuals make choices.

If we accept the premise that an individual manager's choice of opportunities represents an expression of his or her preference among the available options at the time, then it is possible to model the choices that regional port managers would make if presented with alternative opportunities with various attributes and level combinations. Port managers are assumed to evaluate alternative opportunities within a framework of random utility theory (RUT) or utility maximisation subject to budgetary, business and political constraints. The set of factors considered by management are not all observed and measured by the analyst; hence a number of unobserved influences exist. To ensure that the principle of utility maximisation is adhered to, we have to account for the contribution of these influences on opportunity selection.

Opportunity choice involves port managers evaluating options (defined as a vector of factors or attributes) from a set of mutually exclusive alternatives and choosing the one which results in securing the maximum utility. The RUT proposes that utilities are latent and can be decomposed into two components – a systematic or explainable and a random or unexplainable component. The systematic component includes as many relevant attributes of the choice alternatives as can be identified and measured and impact choices. It also includes many factors that can be identified and measured to explain the differences in individuals' choices. The inclusion of factors peculiar to the individual decision-maker is relevant particularly when mixed logit models are used. A mixed logit model which is often referred to as the multinomial logit model includes both the characteristics of the alternatives and the individual making the choices and possibly other covariates or environmental factors that influence the choice being made. However, with conditional logit models which are used in this study it is possible to develop useful opportunity choice models that do not include all the variables that may influence opportunity choice. This possibility arises because conditional logit models or the multinomial logit models which are later discussed are probabilistic. This means that the variables which influence the choice of an opportunity are not all known to analysts and not all of the known variables can be measured in practice. It does not follow, however, that a model based on any subset of the influential variables will be useful. On the contrary, there are certain types of variables such as policy variables and variables specific to the opportunity which must be included to obtain a useful model.

The random component includes all unidentified factors that impact choices. Psychologists postulate that individuals are themselves imperfect measurement devices, and therefore the random component captures omitted factors that reflect differences in individual's response variability that have to do with the individual and not with the choice options *per se* (Louviere 2000). Given that a subset of influencing attributes are unobserved, the analyst can only identify the utility maximising alternative up to a probability. The presence of unobserved influences results in a random utility maximisation interpretation of opportunity selection.

6.3.1 Deriving the choice model

Formally, the RUT model can be expressed as:

$$U_{ij} = \beta' x_{ij} + \varepsilon_{ij}$$

where:

x_{ij} = an index of the observed influences on utility (usually linear additive in the attributes)

β = is a vector of unobserved marginal utilities (parameters); β' = transpose of β

ε_{ij} = an index of the unobserved influences or random errors

The presence of the random component implies that utilities or preferences are inherently stochastic when viewed from the vantage point of the research. It also suggest that the researcher can predict only the probability that an individual *j* will choose option *i,* not the exact option that will be chosen. That is, we can specify the probability that individual *j* chooses option *i* from a set of competing options as follows:

$$P(i \mid C_q) = P[(\beta' x_{ij} + \varepsilon_{ij}) > Max(\beta' x_{kj} + \varepsilon_{kj})]$$

for all *n* options in choice set C_q, where all terms are as previously defined, except for *Max*, the maximum operator. In other words, the equation above states that the probability that individual *j* chooses option *i* from the choice set C_q is equal to the probability that the systematic and random components of option *i* for individual *j* are larger than the systematic and random components of all other options that compete with option *i*.

Families of probabilistic discrete choice models can be derived from the previous equation by specifying particular probability distributions for ε_j (Louviere *et al*. 2000). For example, Thurstone (1927) postulated that the random components were non-independent and non-identically distributed Normal random variates; and McFadden (1974) postulated that the random components were independent and identically distributed (IID) Gambel. In Thurstone's case, the Normal distributional assumption limited further development of RUT and multiple choice models because the Normal does not have a closed form for more than two choice options, and until yew years ago good approximations to solve multiple integrals were unavailable (Yellott 1977).

The Gambel distribution closely resembles the Normal, but it is slightly asymmetric and has the salient property of having a closed form expression for the probabilities for multiple options (dimensions) if the random components are IID. In the latter case, the IID Gumbel assumption leads to the well-known Multinomial Logit (MNL) model, which has become the workhorse of practical applications. Unfortunately, however, if the random components are not IID, the Gambel also lacks a closed-form expression for the probabilities. In addition the MNL may suffer from the consequences of independence from irrelevant alternatives (IIA). The IIA property states that for any individual, the ratio of the probabilities of choosing two alternatives is independent of the availability or attributes of any other alternatives. For example, in a MNL model the choice between bulk (B), container (C) and break-bulk (BB) investment opportunities, the probabilities of choosing bulk and container investment opportunities are:

$$P_r(B) = \frac{\exp(V_B)}{\exp(V_B) + \exp(V_C) + \exp(V_{BB})}$$

and

$$P_r(C) = \frac{\exp(V_C)}{\exp(V_B) + \exp(V_C) + \exp(V_{BB})}$$

The ratio of these probabilities is

$$\frac{P_r(B)}{P_r(C)} = \frac{\exp(V_B)}{\exp(V_C)} = \exp(V_B - V_C)$$

This ratio is independent of the attributes and availability of break-bulk opportunities. The ratio is the same regardless of whether break-bulk opportunities are an available alternative. One advantage of this assumption is that it greatly simplifies the process of predicting the effects of adding a new investment opportunity alternative to the choice set. However, unrealistic consequences of IIA can render the model irrelevant; nevertheless they can be avoided by including a manageable number of relevant variables in the observed set of influences of the utility function. Another way to alleviate these consequences is to base predictions on a model other than the MNL, that does not have IIA property; for example the nested logit model; the heteroskedastic MNL and the multinomial probit (see Louviere *et al*. 2000; Hensher and Johnson 1991; Ben-Akiva and Lerman 1985). In this study, we have attempted to minimise IIA violation through a robust model specification that includes relevant design attributes and their levels.

6.3.2 Specifying the choice estimation model: the multinomial logit model

In mathematical terms the multinomial logit model (MNL) is formulated as follows:

$$P_{ij} = \frac{e^{\mu V_{ij}}}{\sum_{k=1,L} e^{\mu V_{kj}}}$$

where P_{ij} = the probability of selecting alternative *i* from the *j*th choice set containing *K* possible choices.

V_{ij} = systematic utility of alternative *i* in choice set *j*.

μ = is a scale parameter

Representing a choice alternative as a bundle of its attributes, and by assuming an additive utility function, V_{ij} can be calculated in the following manner:

$$V_{ij} = \sum_{l=1,L} \beta_l x_{ijl}$$

where x_{ijl} = the level of attribute *l* of alternative *i* in choice set *j*

β_l = the relative utility weight (part-worth utility) associated with attribute *l*

L = the total number of attributes

In the MNL the challenge is to estimate the β_l parameters or the relative utility weights. There are a number of approaches to finding β_l parameters although in practice the maximum likelihood estimation procedure is used. This consists of choosing the values of the coefficients so as to maximize the likelihood (or probability) according to the model being developed of observing the choices made by the individuals in the estimation sample. A maximum likelihood estimator is the value of the β parameters for which the observed sample is most likely to have occurred (Ben-Akiva and Lerman 1991). It can be shown that the maximum likelihood method yields estimates of the coefficients and predictions of choice probabilities that have the greatest accuracy. The likelihood function for *M* subjects can be represented as:

$$L = \prod_{m=1,M} \prod_{l=1,L} \prod_{j=1,J} P_{ij}^{Y_{ijm}}$$

where $Y_{ijm} = 1$ if subject *m* chooses alternative *i* in choice set *j*

$Y_{ijm} = 0$ otherwise

The theoretical derivation of the multinomial logit model is only one part of the empirical exercise. An empirical model that is to be used to estimate the model parameters has to be specified and the functional form defined. Statistical models used with stated choice experiments will differ according to the specific functional form for the probability that a particular alternative is chosen, the specific functional form that links the exogenous variables to the former and the nature of the random component assumed for the difference of the utilities of the choices. The analyst has to consider the following issues:

- What is the complete set of alternatives available to the sampled population?
- What subset of alternatives is in each individual's choice set?
- Should a fixed choice set across the sample or a varying choice set be used?
- How are the exogenous variables to be included in the model?
- Are the parameter (or taste) weights to be different across the alternatives for the same attribute? (Hensher 1994).

A distinction must be made between generic attribute weights and alternative-specific attribute weights. A generic attribute involves constraining the parameter estimates associated with an attribute in each utility expression to be equal where the equality can be a theoretical condition and/or an empirical result. Where there exists the possibility of port managers evaluating the attributes differently for different alternative opportunities, the model should include the alternative-specific effects. In this study a model with alternative specific effects (Kuhfeld 2003) was only specified for the choice context which was based on market access factors. The argument was that only in this situation was the difference between the results of the model with the generic attributes and alternative-specific effects significant. Kuhfeld (2003) suggests that there is no need to use a more complex model containing the alternative-specific effects if a much simpler generic model can be derived and provide similar information. This is consistent with the parsimonious principle, which states that the aim of modelling is to produce and make use of the simplest model – a model that includes the fewest number of explanatory variables and permits an adequate interpretation of the dependent variable of interest.

6.3.3 Estimating opportunity choice with a multinomial logit model

To estimate the choice models, i.e., to estimate β parameters for the market opportunity choice based on six criteria previously discussed – access to markets, perceived benefits, resources availability, business risk, political risk and the overall decision criteria – we used the computer software SAS 9.0 and the computer program we developed (Appendix 3). SAS 9.0 calculates the β parameters for an aggregated sample data using SAS/STAT procedure PHREG (proportional hazards regression), with the *ties = breslow* option. The likelihood function of the multinomial logit models has the same form as a survival analysis model fit by procedure PROC PHREG in SAS.9.0. In a discrete choice study, subjects are presented with sets of alternatives and asked to choose the most preferred alternative. The data for one choice consist of one alternative that was chosen and *m – 1* alternatives that were not chosen. First choice was observed. Second and subsequent choices were not observed; it is only known that the other alternatives would have been chosen after the first choice. In survival analysis, subjects (rats, people, light bulbs, machines, and so on) are followed until a specific event occurs (such as failure or death) or until the experiment ends. The data are event times. The data for subjects who have not experienced the event (such as those who survive past the end of a medical experiment) are censored. The exact time is not known, but it is known to have occurred after the censured time. In discrete choice study, first choice occurs at time one, and all subsequent choices (second choice, third choice, and so on) are unobserved or censored. It has been demonstrated that the survival and choice model are the same (Kufeld 2003).

The specific model developed for each decision context and the analysis of the results are presented in the next section. However, before the port managers were submitted to the stated choice experiments which were used to collect choice data for discrete choice modelling, they were asked about the mechanics of the opportunity selection process. Table 6.8 shows that regional port managers consider a number of factors in their decision-making but the final decision is based on the overall assessment of key decision criteria. This result is consistent with the hierarchical information integration theory discussed in the earlier chapters and with findings from D'Este and Meyrick (1992). More than 64 percent of the respondents said that they 'agree' that the final decision is based on the overall assessment of key factors. While on average (3.43) port managers were uncertain whether the knowledge and experience were factors that guided them to the final decision, at least 52 percent agreed or strongly agreed.

Table 6.8 Factors that guide the decision-making process when selecting valuable market opportunities

		Percentage of respondents with particular response*						
Decision factors	Rank	1	2	3	4	5	Mean Response	S.D.
Knowledge and experience	2	2.38	16.67	28.57	40.48	11.90	3.43	0.99
Focus on small number of relevant factors	3	4.76	23.81	21.43	38.10	11.90	3.29	1.11
Final decision based on the overall† assessment of key decision criteria	1	—	—	11.90	64.29	23.81	4.12	0.59

*1: Strongly disagree; 2: Disagree; 3: Uncertain; 4: Agree; 5: Strongly agree.

†Pairwise comparisons show the mean of 'Final decision based on the overall assessment of key decision factors' to be statistically different (more significant) from the other two variables at the 5% level of significance.

It has been argued that a number of factors influence the decision being made, however, the number and complexity of these factors mean that port managers were only able to focus on the most critical factors. When port managers were asked whether they based their decision on a small number of factors they were uncertain (3.29). However, more than 50 percent said that they 'agree' or 'strongly agree' while others were uncertain (21.4 percent), disagree (23.81 percent) or strongly disagree (4.76 percent).

6.4 Determinants of Opportunity Choice

This section discusses six models of the determinants of opportunity choice and their relative importance. Each model is based on factors that are grouped under a specific choice decision criterion in order to model the choice of an opportunity within the framework of sequential decisions and information integration theory discussed in Chapter 4. The market opportunities under examination are bulk, break-bulk and container. The input data were collected through the choice experiment that was part of the Internet-based survey that was described in Chapter 5. The models assume that the part-worth utilities are additive and linear in parameters. They were estimated with the maximum likelihood estimation procedure (Louviere *et al*. 2000). Where there was the possibility of port managers evaluating the factors or attributes of choice of bulk, break-bulk and container opportunities differently, an alternative-specific model to account for the effects of these differences was estimated. A generic model was estimated for a choice context in which port managers perceived the effects of the factors constant across bulk, break-bulk and container opportunities.

In this study, an alternative-specific model was estimated only for the context in which the opportunity choice was based on market access factors; port managers perceived market access factors as having different impact for bulk, break-bulk and container opportunities.

6.4.1 Determinants of opportunity choice based on market access criterion

The choice sets for selection of market opportunities based on market access factors asked regional port managers to select the opportunities which they perceived as valuable to capture because they would allow them to provide port customers with superior access to markets relative to their adjacent metropolitan port. The factors or attributes and the levels used in the choice model and their naming are presented in Table 6.9. Table 6.10 reports the determinants of opportunity selection and their relative importance based on market access factors.

For the model, the global null hypothesis that the factors/attributes on the model do not influence the choice of an opportunity is strongly rejected. The -2 Log L statistic for a model *With Covariates* is 412.656 and the *Chi-Square* (χ^2) statistic for the log likelihood ratio with 20 degrees of freedom (df) is 141.0442 and the $p < .0001$. This means that the model is statistically significant. At 5% level of confidence and 20 df, the estimated model χ^2 = 141.0442 far exceeds the χ^2 critical value equals 31.410 (from Berenson and Levine 1996 table of critical values of χ^2). Therefore, it can be concluded with confidence that the empirical data fit the MNL model extremely well.

Table 6.9 Naming of factors and levels used to model opportunity choice based on market access criterion

Factor/Attribute Level Name	Factor Description	Original Factor/Attribute
COST INEFFECTV & PARTIAL	The level of logistic service that a regional port can provide is cost-ineffective and partial	LOGISTIC_SERVICE (Logistics Service) (1)
COST EFFECTV & TOTAL	The level of logistic service that a regional port can provide is cost-effective and total	
LIMITED SKILLS	Regional port labour force has limited skills, is inflexible and inefficient	LABOUR_FORCE (Labour Force) (2)
SUFFICIENT SKILLS	Regional port labour force has sufficient skills, is flexible and efficient	
UNDERDEVELOPED	Regional port can only provide underdeveloped and inefficient cargo handling facilities	HANDFAC (Cargo Handling Facilities) (3)
DEVELOPED	Regional port can provide developed and efficient cargo handling facilities	
SEGMMNT, UNRLB, INEFF	Regional port can only provide a segmented, unreliable and inefficient land transport	LANDTRANS (Land Transport) (4)
INTGRT, RLB, EFFIC	Regional port can provide an integrated, reliable and efficient land transport	
UNRLB & INEFF	Regional port can only secure an unreliable and inefficient shipping service	SHIPSERV (Shipping Service) (5)
RLB & EFFIC	Regional port can secure a reliable and efficient shipping service	
UNDERDEV_INEFFECTIVE	Regional port can only provide underdeveloped and ineffective storage facilities	STOREFAC (Storage Facilities) (6)
DEV_EFFECTIVE	Regional port can provide developed and effective storage facilities	

The results suggest that the utility of a cost-effective logistics service is greater (1.09920) than the utility of a logistics service that is cost-ineffective and partial. The relative importance of a cost-effective logistics service is more significant when the investment opportunity chosen on the basis of market access factors is container. The factor is, however, statistically not significant for break-bulk market opportunities. This result was not expected and deserves further examination; nevertheless it suggests that even though regional port managers understand and perceive logistics service as a very important factor, in practice when choosing break-bulk market opportunities, they choose opportunities based primarily on factors others than logistics service. Perceptions and actual choices may differ as in this case and as was argued in earlier chapters. However, since earlier findings have suggested that *logistics service* is a strategy variable that has impact on the effectiveness of bulk, container and break-bulk supply chains it is useful in deriving a useful opportunity choice model.

Table 6.10 Multinomial logit model of opportunity choice based on market access criterion with alternative specific effects

Model Fit Statistics

Criterion	Without Covariates	With Covariates
-2 LOG L	553.701	412.656
AIC	553.701	452.656
SBC	553.701	523.245

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	141.0442	20	<.0001
Score	120.1429	20	<.0001
Wald	85.4726	20	<.0001

Multinomial Logit Parameter Estimates

	Factor Level	DF	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq
(*)	Container	1	-0.49079	0.66269	0.5485	0.4589
	Bulk	1	0.45134	0.58912	0.5869	0.4436
	Break-Bulk	0	0	.	.	.
(1)	Break-Bulk, cost effectv & total	1	0.03729	0.31125	0.0081	0.9282
	Break-Bulk, cost ineffctv & partial	0	0	.	.	.
	Bulk, cost effctv & total	1	0.46190	0.30842	3.3732	0.0400
	Bulk, cost ineffctv & partial	0	0	.	.	.
	Container, cost effctv & total	1	1.09920	0.35279	9.7079	0.0018
	Container, cost ineffctv & partial	0	0	.	.	.
(2)	Break-Bulk, limited skills	1	-0.02803	0.31097	0.0144	0.9046
	Break-Bulk, sufficient skills	0	0	.	.	.
	Bulk, limited skills	1	-1.02818	0.31189	10.8678	0.0010
	Bulk, sufficient skills	0	0	.	.	.
	Container, limited skills	1	-1.40149	0.36393	14.8299	0.0001
	Container, sufficient skills	0	0	.	.	.
(3)	Break-Bulk, developed	1	0.62903	0.31614	3.9589	0.0383
	Break-Bulk, underdeveloped	0	0	.	.	.
	Bulk, developed	1	0.96151	0.31757	9.1669	0.0025
	Bulk, underdeveloped	0	0	.	.	.
	Container, developed	1	0.61121	0.34360	3.1643	0.0753
	Container, underdeveloped	0	0	.	.	.
(4)	Break-Bulk, intgrt, rlb, effic	1	0.77668	0.32893	5.5753	0.0182
	Break-Bulk, sgmmnt, unrlb, ineff	0	0	.	.	.
	Bulk, intgrt, rlb, effic	1	0.36143	0.31168	2.1962	0.0466
	Bulk, sgmmnt, unrlb, ineff	0	0	.	.	.
	Container, intgrt, rlb, effic	1	1.43180	0.37357	14.6903	0.0001
	Container, sgmmnt, unrlb, ineff	0	0	.	.	.
(5)	Break-Bulk, rlb & effic	1	1.24420	0.32890	14.3103	0.0002
	Break-Bulk, unrlb & ineff	0	0	.	.	.
	Bulk, rlb & effic	1	1.47116	0.33341	19.4703	<.0001
	Bulk, unrlb & ineff	0	0	.	.	.
	Container, rlb & effic	1	2.09399	0.38499	29.5832	<.0001
	Container, unrlb & ineff	0	0	.	.	.
(6)	Break-Bulk, dev_effective	1	0.80579	0.33714	5.7123	0.0168
	Break-Bulk, underdev_ineffective	0	0	.	.	.
	Bulk, dev_effective	1	0.59010	0.33723	3.0618	0.0502
	Bulk, underdev_ineffective	0	0	.	.	.
	Container, dev_effective	1	0.13403	0.34799	0.1483	0.7001
	Container, underdev_ineffective	0	0	.	.	.

(*) Trade Type; (1) Logistics Service; (2) Labour Force/Stevedoring; (3) Cargo Handling Facilities; (4) Land Transport; (5) Shipping Service; (6) Storage Facilities.

The zero coefficients or structural zeroes in the model are for the reference levels which are compared with other levels of attributes in terms of utility (Kufeld 2004). For example, for logistics service, the part-worth utility of cost effective and total service for break-bulk is 0.03729 and it is larger than the part-worth utility for cost ineffective and partial service for bulk opportunities which is at the reference level of zero. However, it is statistically not significant. This result suggests that the cost may not be a critical factor in markets were the demand is inelastic – in order words, in markets where it is relatively easy to transfer the cost of doing business to the customers.

The results also show that regional port managers have negative perceptions of a labour force that is inflexible, inefficient and low skilled. The utility for flexible and efficient labour force is higher than the utility for inflexible and inefficient labour force whether in container, bulk or break-bulk business situation. The disutility of inefficient and inflexible labour force is greater for container opportunities (-1.40149), than for bulk opportunities (-1.02818) and break-bulk opportunities (-0.02803). All levels except for break-bulk context are statistically significant. The results are consistent with theoretical and practical observations. In the high value container business, industrial disruptions are very costly, whereas in the break-bulk business the perception is that they have only a mild effect.

The likelihood that an opportunity will be chosen increases when the port can secure or has handling facilities that are modern and very efficient. The utility for developed and efficient cargo handling facilities is greater than the utility for underdeveloped and inefficient cargo handling facilities and it is perceived to be even higher (0.96151) and statistically significant for bulk trades than for container trades (0.61121) and break-bulk trades (0.62903). Operating bulk business requires very specialized equipment and the adequacy of this equipment has been linked to relative competitive advantage in the bulk market (Meyrick and Associates 1998).

The utility for reliable, efficient and integrated land transport is positive. The part-worth utilities of container (1.43180), bulk (0.36143) and break-bulk (0.77668) are positive and statistically significant. Where the possibility of having a good land transport system and network exists, the likelihood of pursuing market opportunities increases.

The ability of the port management to secure required shipping service at the regional port has the most significant influence (2.09399) on the choice of market opportunities that the regional port can capture. For bulk and break-bulk the part-worth utilities are 1.47116 and 1.24420 respectively. This result is very important; it suggests that regional ports cannot compete with capital city ports particularly for container trade opportunities unless they can secure a reliable and efficient shipping service. Some industry observers have argued that regional ports cannot and should not involve themselves in container business because they have limited ability to secure liner shipping services. Generally, regional ports do not have enough volumes to attract container liner shipping.

The utility for modern and effective storage facilities is greater than the utility for obsolete and ineffective storage facilities. This factor is even more relevant for break-bulk than for bulk or container. The part-worth utility for modern and effective storage facilities for break-bulk is 0.80579 and for bulk is (0.59010). Both are statistically significant. The part-worth utility for container is positive (0.13403) but it is the least significant statistically. This suggests that respondents believe that regional ports can have competitive advantage in the provision of effective storage facilities. One of the major problems facing capital city ports is the lack of back-up land to accommodate further growth in container trade and to undertake further developments. While this situation has prompted strategies that focus on the development of inland terminals, container parks and inland ports (Maunsell 2000; Everett 2002) there has been a strong case in favour of regional ports which appear to offer a good alternative for handling the increasing volume of containers often concentrated in congested metropolitan ports.

The model estimated also includes the alternative-specific constants for container, bulk and break-bulk trades. The signs and magnitudes of these constants suggest that in the choice of market opportunities based on access market access criterion, on average factor others than those specified in the model tend to favour bulk (0.45134) over break-bulk (0.0) and break-bulk over container opportunities (-0.49079). However, such factors are statistically not significant and therefore, less likely to have a significant impact on opportunity choice.

For a useful summary of the discussion, Table 6.11 presents the determinants of opportunity choice based on market access criterion ranked according to their relative importance or impact on opportunity choice and allows for the determinants to be compared within and across bulk, break-bulk and container trades.

Table 6.11 Determinants of opportunity choice based on market access factors and ranking according to their relative importance for each market context

		Bulk		Break-Bulk		Container	
Factor/Attribute	Factor/Attribute Level	Parameter Estimate	Rank (Absolute Value)	Parameter Estimate	Rank (Absolute Value)	Parameter Estimate	Rank (Absolute Value)
Logistics Service	Cost-effective and total	0.46190	5	0.03729	5*	1.09920	4
Labour Force	Limited skills, inflexible and inefficient	-1.02818	2	-0.02803	6*	-1.40149	3
Cargo Handling Facilities	Developed and efficient	0.96151	3	0.62903	4	0.61121	5
Land Transport	Integrated, reliable and efficient	0.36143	6	0.77668	3	1.43180	2
Shipping Service	Reliable and efficient shipping service	1.47116	1	1.24420	1	2.09399	1
Storage Facilities	Developed and Effective	0.59010	4	0.80579	2	0.13403	6*

* Statistically not significant at 5% level of confidence.

6.4.2 Determinants of opportunity choice based on perceived benefits criterion

The choice sets for selection of market opportunities based on perceived benefits asked regional port managers to select the opportunities which they perceived as providing economic and non-economic benefits that were in line with the regional port strategy and growth objectives. The factors and the levels for use in the choice model and their naming are presented in Table 6.12.

Table 6.13 reports the results of a generic model of the determinants of market opportunity choice based on perceived benefits criterion. The model is statistically significant. At 5 % level of confidence and 12 df the estimated model χ^2 = 329.4335 far exceeds the χ^2 critical value (21.026). It can be concluded that the empirical data fit the MNL model extremely well.

Table 6.12 Naming of factors and levels used to model opportunity choice based on perceived benefits criterion

Factor/Attribute Level Name	Factor Description	Original Factor/Attribute
LOW	Business growth that can be derived from the opportunity is low	BUSINESS_GROWTH (Potential Business Growth) (1)
MEDIUM	Business growth that can be derived from the opportunity is reasonable	
HIGH	Business growth that can be derived from the opportunity is high	
LOW	Potential financial returns for investing in the opportunity are low	FINANCE_ROI (Potential Financial Returns) (2)
AVERAGE	Potential financial returns for investing in the opportunity are acceptable	
HIGH	Potential financial returns for investing in the opportunity are high	
LOW	Returns to community that can be derived from the opportunity are low	SOCIAL_RETIURN (Potential Social Returns) (3)
SATISFACTORY	Returns to community that can be derived from the opportunity are satisfactory	
HIGH	Returns to community that can be derived from the opportunity are high	
LOW	Regional economic development benefits that can be derived from the opportunity are low	R_ECON_DEV (Potential Regional Economic Benefits) (4)
CONSIDERABLE	Regional economic development benefits that can be derived from the opportunity are considerable	
VERY HIGH	Regional economic development benefits that can be derived from the opportunity are very high	
LOW	Returns to the environment that can be derived from the opportunity are low	ENVIRO_RETURN (Potential Environmental Returns) (5)
SATISFACTORY	Returns to the environment that can be derived from the opportunity are satisfactory	
HIGH	Returns to the environment that can be derived from the opportunity are high	

The results suggest that the most significant influence on the decision to select a market opportunity based on the assessment of key benefits is the expected high financial return which is positive and statistically significant and has a part-worth utility value of 3.01738. While high financial returns drive the pursuit of market opportunities, the possibility of earning average financial returns still makes the pursuit of market opportunities attractive as indicated by the part-worth utility of 1.5246 for this factor. In a competitive environment above-normal long-term returns are rare and most businesses are content with or can only earn acceptable returns (Brealey and Myers 1996).

Regional port managers place low business growth potential that the opportunity promises to deliver as the third most important factor. Its perceived part-worth utility is -1.40222 and is negative but statistically significant. Conversely, high business growth potential that is associated with the opportunity has a positive utility (1.32434). This result suggests that in their decision-making regional port managers show more concern about opportunities that, though they may appear attractive judged by other criteria, they promise lower potential for growth than on opportunities that promise high growth potential. It can be argued that managers feel that they may be heavily penalised in their performance evaluation for investing expensive resources in opportunities that add little to the regional port's profit and growth objectives. On the other hand, investing in opportunities that promise high growth may not be seen by the 'Board' as anything exceptional; though good, it may just be perceived as a normal job of a competent manager.

Table 6.13 Multinomial logit model of opportunity choice based on perceived benefits criterion with generic attributes

Model Fit Statistics

Criterion	Without Covariates	With Covariates
-2 LOG L	553.701	314.267
AIC	553.701	338.267
SBC	553.701	380.620

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	239.4335	12	<.0001
Score	193.7043	12	<.0001
Wald	114.7013	12	<.0001

Multinomial Logit Parameter Estimates

	Factor Level	DF	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq
(*)	Container	1	0.18521	0.23074	0.6443	0.4222
	Bulk	1	0.88114	0.22325	15.5775	<.0001
	Break-Bulk	0	0	.	.	.
(1)	high	1	1.32434	0.26493	24.9874	<.0001
	low	1	-1.40222	0.33102	17.9439	<.0001
	medium	0	0	.	.	.
(2)	average	1	1.52546	0.33525	20.7041	<.0001
	high	1	3.01738	0.33500	81.1283	<.0001
	low	0	0	.	.	.
(3)	high	1	0.17764	0.27504	0.4172	0.5184
	low	1	-0.22663	0.28243	0.6439	0.4223
	satisfactory	0	0	.	.	.
(4)	considerable	1	0.08745	0.25751	0.1153	0.7342
	low	1	-0.64701	0.31605	4.1909	0.0406
	very high	0	0	.	.	.
(5)	high	1	0.42855	0.29295	2.1400	0.1435
	low	1	-0.27537	0.30588	0.8105	0.3680
	satisfactory	0	0	.	.	.

(*) Trade type; (1) Potential Business Growth; (2) Potential Financial Returns; (3) Potential Social Returns; (4) Potential Regional Economic Benefits; (5) Potential Environmental Returns.

An interesting empirical finding is the assessment of the importance of potential regional economic benefits that the opportunity promises to deliver. Port managers seem to settle for considerable benefits instead of very high benefits. Like returns to the environment, returns to the community are part of strategy that socially responsible ports and corporations in general pursue and are important but clearly in this context not the key for corporate survival and growth. Hence, providing considerable economic benefits to the region is perceived as adequate enough to justify the contribution of the port to the region in which it operates. Low regional economic benefits are perceived as having negative impact judged by the part-worth utility (-0.64701) that managers attach to them and this impact seems to be significant in both practical and statistical terms.

While the impact of potential environmental returns is not statistically significant, the utility for high environmental returns is greater than the utility for satisfactory returns which is greater than the utility for low environmental returns.

The results also suggest that factors other than those specified in the model seem to increase the probability of the opportunity being chosen if it is bulk rather than if it is container and much less if it is break-bulk. This result accords with our expectation with respect to the attractiveness of the investment opportunities. In Chapter 5, empirical evidence suggested that regional port managers exhibit high propensity to invest primarily in bulk trades, and then container. Break-bulk trades were the least preferred.

As in the previous choice modelling context, the model signs are as expected and as theory would suggest. The levels with zero coefficients were used as reference levels to create a platform on which attributes levels can be compared. Although overall the model is statistically significant, some levels are not – which means that in such cases it will not be possible to conclude with confidence about their role – their retention in the model can be justified on the ground of theoretical considerations. Horowitz *et al.* (1986) suggest that the fact the coefficient has high *p-value* does not automatically mean that the corresponding variable should be dropped from the model. They argue that when there is a theoretical justification the analyst may well retain the variable in the model despite the fact that it is not significant statistically.

For a useful summary of the discussion, Table 6.14 presents the determinants of opportunity choice based on perceived benefits factors ranked according to their relative importance or impact on opportunity choice.

Table 6.14 Determinants of opportunity choice based on perceived benefits factors and ranking according to their relative importance

Rank (Absolute Value)	Factor/Attribute	Factor/Attribute Level	Parameter Estimate
1	Potential Financial Returns	High	3.01738
2	Potential Financial Returns	Average	1.52546
3	Potential Business Growth	Low	-1.40222
4	Potential Business Growth	High	1.32434
5	Potential Regional Economics Benefits	Low	-0.64701
6*	Potential Environmental Returns	High	0.42855
7*	Potential Environmental Returns	Low	-0.27537
8*	Potential Social Returns	Low	-0.22663
9*	Potential Social Returns	High	0.17764
10*	Potential Regional Economics Benefits	Considerable	0.08745

* Statistically not significant at 5% level of confidence.

6.4.3 Determinants of opportunity choice based on the resources availability criterion

The choice sets for selection of market opportunities based on availability of resources asked regional port managers to consider what type of opportunities they favour in the face of the constraints placed on them by the availability of required resources to make the implementation successful. The factors and the levels for use in the choice model and their naming are presented in Table 6.15. Table 6.16 presents the results of a generic model of the determinants of opportunity choice based on the criterion of availability of resources.

Table 6.15 Naming of factors and levels used to model opportunity choice based on resources availability criterion

Factor/Attribute Level Name	Factor Description	Original Factor/Attribute
HUGE	The opportunity will require huge investment to be successfully implemented	FINANCIAL_RES (Financial Resources) (1)
MODEST	The opportunity can be implemented successfully with a modest investment	
SMALL	The opportunity can be implemented successfully with a small investment	
LONG-TERM	Required technical resources can only be acquired in the long-term	TECHNICAL_RES (Technical Resources) (2)
MEDIUM-TERM	Required technical resources can be acquired in the medium-term	
SHORT-TERM	Required technical resources can be acquired in the short-term	
LONG-TERM	Required skills and core competences to successfully implement the opportunity can only be developed in the long-term	SKILLS_COMPETENCES (Relevant Skills and Core Competences) (3)
MEDIUM-TERM	Required skills and core competences to successfully implement the opportunity can be developed in the medium-term	
SHORT-TERM	Required skills and core competences to successfully implement the opportunity can be developed in the short-term	
LONG-TERM	The opportunity can only be implemented in the long-term	TIME_TO_IMPLEMENT (Time to Implementation) (4)
MEDIUM-TERM	The opportunity can be implemented in the medium-term	
SHORT-TERM	The opportunity can be implemented in the short-term	

The results suggest that the model is statistically significant. At 5 % level of confidence and 10 df the estimated model χ^2 = 126.9861 far exceeds the χ^2 critical value (18.307). On the basis of statistical evidence, it can be concluded with confidence that the empirical data fit the MNL model extremely well.

The results suggest that the most important consideration for regional port managers is the availability of financial resources which are needed to implement the opportunity. The part-worth disutility for huge investment is the greatest (-1.92794) and is statistically significant. Port managers perceive the requirement for huge financial investment as imposing a penalty in their decision to select an opportunity to pursue. On the other hand the requirement for small financial investment tend to have a positive effect on their decision to pursue a given investment opportunity.

The finding admits that the second most important factor is the availability of skills and competences that enable the port to handle the opportunity. If these can be acquired only in the long-term, the attractiveness of the opportunity is reduced (-0.94085). The ability to acquire or mobilize relevant skills and core competences in the short-term is positive relative to the decision to pursue an opportunity and is statistically significant. This result is in line with the core idea of the resources and competence-based theories of competition, which argue that relevant skills and core competences are key resources that promote differentiation and competitive advantage (Penrose 1959; Hunt 2000).

Table 6.16 Multinomial logit model of opportunity choice based on resources availability criterion with generic attributes

Model Fit Statistics

Criterion	Without Covariates	With Covariates
-2 LOG L	553.701	426.715
AIC	553.701	446.715
SBC	553.701	482.009

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	126.9861	10	<.0001
Score	112.2381	10	<.0001
Wald	84.3291	10	<.0001

Multinomial Logit Parameter Estimates

	Factor Level	DF	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq
(*)	Container	1	0.24171	0.18659	1.6780	0.1952
	Bulk	1	0.56512	0.18054	9.7979	0.0017
	Break-Bulk	0	0	.	.	.
(1)	huge	1	-1.92794	0.28044	47.2615	<.0001
	modest	1	-0.26678	0.20177	1.7482	0.1861
	small	0	0	.	.	.
(2)	long term	1	-0.68758	0.21067	10.6522	0.0011
	medium term	1	-0.26393	0.20486	1.6598	0.1976
	short term	0	0	.	.	.
(3)	long term	1	-0.94085	0.21264	19.5774	<.0001
	medium term	1	-0.53527	0.23141	5.3502	0.0207
	short term	0	0	.	.	.
(4)	long term	1	-0.89126	0.23436	14.4629	0.0001
	medium term	1	-0.22056	0.23226	0.9018	0.3423
	short term	0	0	.	.	.

(*) Trade type; (1) Financial Resources; (2) Technical Resources; (3) Relevant Skills and Core Competences; (4) Time to Implementation.

Port managers perceive the time required to implement an opportunity as the third most important factor and as a constraint-resource. The prospect of an opportunity being implemented in the long-term reduces the attractiveness of the opportunity by a factor of -0.89126. The utility for short-term is higher than the utility for medium-term which is higher than the utility for the long-term. This result is not surprising, for in the long-term many variables come into play and often the first-mover advantage is greatly reduced as the information becomes available to others including the competitors.

Technical resources are important, but unlike core competences they are less difficult to acquire or imitate (Hamel and Prahalad 1994). This may well explain why they were perceived by port managers as the least important in a set of factors that impact choice of opportunity on the criterion of availability of resources even though the disutility for long-term acquisition of resources which is -0.68758 is statistically significant. The same results suggest that the utility increases if technical resources can be acquired in the short-term.

The alternative-specific constants suggest that other factors which may have been omitted in the model tend to increase the attractiveness of bulk opportunities (0.56512) when assessed against the availability of resources but tend to reduce their positive impact when the opportunity considered is container or break-bulk. For bulk opportunities these influences are statistically significant. In general the model is consistent with the theoretical discussions advanced early through the literature review; the signs of the parameter estimates are in the predicted direction; and the zero coefficients are only used for the reference levels.

For a useful summary of the discussion, Table 6.17 presents the determinants of opportunity choice based on resources availability factors ranked according to their relative importance or impact on opportunity choice.

Table 6.17 Determinants of opportunity choice based on resource availability factors and ranking according to their relative importance

Rank (Absolute Value)	Factor/Attribute	Factor/Attribute Level	Parameter Estimate
1	Financial Resources	Huge	-1.92794
2	Relevant Skills and Core competences	Long-Term	-0.94085
3	Time to Implementation	Long-Term	-0.89126
4	Technical Resources	Long-Term	-0.68758
5	Relevant Skills and Core competences	Medium-Term	-0.53527
6*	Financial Resources	Modest	-0.26678
7*	Technical Resources	Medium-Term	-0.26393
8*	Time to Implementation	Medium-Term	-0.22056

* Statistically not significant at 5% level of confidence.

6.4.4 Determinants of opportunity choice based on business risk criterion

The choice sets for selection of market opportunities based on the assessment of the business risk requested the respondents to look to the opportunity profiles with different combinations of risk factors and then select those opportunities for which the business risk was a constraint that could be overcome to make the implementation possible and eventually a success story. The factors and the levels for use in the choice model and their naming are presented in Table 6.18.

Table 6.18 Naming of factors and levels used to model opportunity choice based on business risk criterion

Factor/Attribute Level Name	Factor Description	Original Factor/Attribute
LOW	The opportunity has low chance of achieving any commercial success	COMM_SUCCESS (Potential Commercial Success) (1)
MODERATE	The opportunity has a moderate chance of achieving commercial success	
HIGH	The opportunity has a high chance of achieving commercial success	
NEGATIVE IMPACT	Pursuing the opportunity may have negative impact on organisational objectives	ORGANISATIONAL_FIT (Fit with Organisational Profit and Growth Objectives) (2)
NO IMPACT	Pursuing the opportunity has no impact on organisational objectives	
ENHANCES	Pursuing the opportunity is likely to enhance organisational objectives	
HIGH	The available opportunity is likely to attract high level of competition	COMPETITION (Potential Level of Competition that the Opportunity will Attract) (3)
MODERATE	The available opportunity is likely to attract moderate level of competition	
LOW	The available opportunity is likely to attract low level of competition	
LOW	Top management support and commitment to the opportunity is low	MGT_SUPPORT (Top Management Support and Commitment) (4)
MEDIUM	Top management support and commitment to the opportunity is medium	
HIGH	Top management support and commitment to the opportunity is high	

The results in Table 6.19 indicate that the generic model of the determinants of opportunity choice based on business risk criterion is statistically significant ($p < .0001$). At 5 % level of confidence and 10 df the estimated model χ^2 = 140.2189 far exceeds the χ^2 critical value (18.307). Based on this assumption, it can be concluded that the empirical data fit the MNL model extremely well.

Table 6.19 Multinomial logit model of opportunity choice based on business risk criterion with generic attributes

Model Fit Statistics

Criterion	Without Covariates	With Covariates
-2 LOG L	555.898	415.678
AIC	555.898	435.678
SBC	555.898	471.012

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	140.2198	10	<.0001
Score	122.2059	10	<.0001
Wald	88.9656	10	<.0001

Multinomial Logit Parameter Estimates

	Factor Level	DF	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq
(*)	Container	1	-0.07200	0.18473	0.1519	0.6967
	Bulk	1	0.26399	0.18173	2.1102	0.1463
	Break-Bulk	0	0	.	.	.
(1)	high	1	0.84273	0.21513	15.3446	<.0001
	low	1	-1.11336	0.25089	19.6927	<.0001
	moderate	0	0	.	.	.
(2)	enhances	1	0.81297	0.21915	13.7609	0.0002
	negative impact	1	-0.78306	0.23919	10.7181	0.0011
	no impact	0	0	.	.	.
(3)	high	1	-0.52030	0.23050	5.0951	0.0240
	low	1	-0.00722	0.21906	0.0011	0.9737
	moderate	0	0	.	.	.
(4)	high	1	0.20587	0.21697	0.9002	0.3427
	low	1	-0.81289	0.22372	13.2027	0.0003
	medium	0	0	.	.	.

(*) Trade type; (1) Potential Commercial Success; (2) Fit with Organisational Profit and Growth Objectives; (3) Potential Level of Competition that the Opportunity will Attract; (4) Top Management Support and Commitment.

The results suggest that opportunities that have low probability of achieving commercial success are the least desirable. The part-worth utility of this factor level is -1.11336 and it is the smallest of all factor levels included in the model; nevertheless it is statistically significant ($p < .0001$). The utility for high potential of the opportunity achieving commercial success (0.84273) is greater than the utility for moderate and low potential for commercial success. This result is self-explanatory and can be interpreted from the view that regional port managers strive to avoid the risk of 'sinking-the-boat' (Dickson and Giglierano 1986); or in other words, regional port managers are preoccupied with minimising the risk of investing resources in a venture they know upfront is less likely to succeed.

Another important finding is that port managers focus on opportunities that are likely to enhance organisational objectives. These opportunities have positive utility (0.81297) which is statistically significant. Those opportunities that are not aligned with organisational objectives and are likely to have a negative impact on organisational performance are not desirable; they have negative utility (-0.78306). This result suggests that port managers need to exercise care when selecting opportunities. It is not enough that the opportunity is attractive; to be relevant it needs to serve the strategic objectives of the organisation; more specifically, it needs to be profitable and contribute to growth.

The level of competition that the opportunity attracts influences port managers' selection decision. But what is even more appealing is that port managers feel that there is at least some level of competition that the opportunity should attract to be worth pursuing. While opportunities that attract high level of competition may not be desirable – their utility is -0.52030 – opportunities that attract low levels of competition are also not desirable they are regarded as unattractive (-0.00722). Despite the fact that statistically the utility for low level of competition that the opportunity will attract is not significant, theoretically the finding is sound. Competition intensifies if the opportunity promises good returns; conversely competition lessens if there is not much to gain from investing time and effort in an opportunity which promises inadequate returns. But intense competition also means that the likelihood of *zero-sum-game* is higher.

It has been argued that the involvement and commitment of top management to the opportunity is critical if the opportunity is to be successfully implemented. The findings validate this proposition. High involvement and support of top managers (0.20587) is preferred over medium involvement and support (0.0), which is preferred over low involvement and support (-0.81289). Low involvement creates disutility and negatively impacts the decision to pursue market opportunities. Statistically, it is very significant ($p < 0.0003$) relative to other two levels.

The sign and magnitude of the alternative specific-constants suggests that business risk is magnified when the opportunity is related to container business (-0.07200) but statistically the factors that contribute to such a negative assessment are not significant.

Influences that were not accounted for in the model tend to reduce the risk perceptions when the opportunity is bulk (0.21102) or break-bulk. But even in this case such influences are statistically not significant.

In general the model performed to expectation. All but two factor levels are statistically significant. After a qualification was made with respect to the negative sign for the low level of competition that the opportunity may attract, all factors and levels have the correct sign.

For a useful summary of the discussion, Table 6.20 presents the determinants of opportunity choice based on business risk factors ranked according to their relative importance or impact on opportunity choice.

Table 6.20 Determinants of opportunity choice based on business risk factors and ranking according to their relative importance

Rank (Absolute Value)	Factor/Attribute	Factor/Attribute Level	Parameter Estimate
1	Potential Commercial Success	Low	-1.11336
2	Potential Commercial Success	High	0.84273
3	Fit with Organisational Profit and Growth Objectives	Enhances	0.81297
4	Top Management Support and Commitment	Low	-0.81289
5	Fit with Organisational Profit and Growth Objectives	Negative Impact	-0.78306
6	Potential Level of Competition that the Opportunity will Attract	High	-0.52030
7*	Top Management Support and Commitment	Low	0.20587
8*	Potential Level of Competition that the Opportunity will Attract	Low	-0.00722

* Statistically not significant at 5% level of confidence.

6.4.5 Determinants of opportunity choice based on political risk criterion

The choice sets for selection of market opportunities based on political risk factors asked port managers to evaluate opportunity profiles with different combinations of political risk attribute levels and then select those opportunities they would consider attractive enough to pursue. The factors and the levels for use in the choice model and their naming are presented in Table 6.21.

Table 6.21 Naming of factors and levels used to model opportunity choice based on political risk criterion

Factor/Attribute Level Name	Factor Description	Original Factor/Attribute
LOW	Expected government support and commitment to the opportunity is low	GOV_SUPPORT (Government Support and Commitment) (1)
SUFFICIENT	Expected government support and commitment to the opportunity is sufficient	
HIGH	Expected government support and commitment to the opportunity is high	
LOW	Community acceptance and support to the opportunity is low	COMM_SUPPORT (Community Acceptance and Support) (2)
SUFFICIENT	Community acceptance and support to the opportunity is sufficient	
HIGH	Community acceptance and support to the opportunity is high	
STRINGENT	The opportunity will face stringent regulations during its implementation	REG_REQUIRE (Regulatory Requirements) (3)
FLEXIBLE	The opportunity will face flexible regulations during its implementation	
MINIMAL	The opportunity will face minimal regulations during its implementation	

The results on Table 6.22 indicate that the generic model of determinants of opportunity choice based only on political risk factors is statistically significant ($p < .0001$). At 5% level of confidence and 8 df the estimated model χ^2 = 209.5922 far exceeds the χ^2 critical value (15.507). Therefore, it can be concluded that the empirical data fit the MNL model extremely well.

Further, the results indicate that regulatory requirements can be a major impediment to the implementation of an opportunity particularly when they are stringent. Flexible regulations (2.17934) are welcome by port managers and minimal regulations (2.20557) facilitate the implementation of market initiatives. All the part-worth utilities for regulatory requirements are statistically significant with the utility increasing when the regulations are minimal. We would expect the effect of stringent regulations to be negative but the model in fact uses this factor level as a reference level. The results also suggest that regional port managers need to develop strategies which minimize the effect of regulations or invest in opportunities that will not be lost because the resources and effort needed to overcome hurdles imposed by the regulations are very expensive.

Table 6.22 Multinomial logit model of opportunity choice based on political risk criterion with generic attributes

Model Fit Statistics

Criterion	Without Covariates	With Covariates
-2 LOG L	553.701	344.108
AIC	553.701	360.108
SBC	553.701	388.344

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	209.5922	8	<.0001
Score	169.9643	8	<.0001
Wald	112.0293	8	<.0001

Multinomial Logit Parameter Estimates

	Factor Level	DF	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq
(*)	Container	1	0.47001	0.21802	4.6476	0.0311
	Bulk	1	1.16811	0.21662	29.0786	<.0001
	Break-Bulk	0	0	.	.	.
(1)	high	1	0.63340	0.23767	7.1024	0.0077
	low	1	-1.22722	0.29470	17.3417	<.0001
	sufficient	0	0	.	.	.
(2)	high	1	0.00336	0.24059	0.0002	0.9888
	low	1	-1.61617	0.28180	32.8912	<.0001
	sufficient	0	0	.	.	.
(3)	flexible	1	2.17934	0.29312	55.2781	<.0001
	minimal	1	2.20557	0.31617	48.6624	<.0001
	strigent	0	0	.	.	.

(*) Trade type; (1) Government Support and Commitment; (2) Community Acceptance and Support; (3) Regulatory Requirements.

Regional port managers place significant importance to the level of support that their activities receive from the community, more specifically from local communities. Low community support is perceived as having negative impact (-1.61617) on the outlook of the opportunity. The part-worth for the low community support is statistically significant. However, while the perception that low support is a serious problem is strong and consistent, the statistical evidence is not strong enough to justify which level of community support – whether sufficient or high – regional port managers perceive as being the most desirable. This clearly suggests that port mangers are still not clear about the level of importance and the precise impact the communities have on the success of their projects or about how to incorporate community concerns into their strategies.

Contrary to the importance of community support, regional port managers were clear about the relative importance of government support and commitment. Low government support has negative impact (-1.22722) on the opportunity implementation. By the same token high government support has a positive impact (0.63340). Regional port managers prefer high support to sufficient support and sufficient support to low support. The part-worth utilities for government support levels are statistically significant and help explain why regional port managers may elect to pursue some opportunities and not others.

The alternative-specific constants suggest that factor others than those specified in the model have influence on the decisions being made on the basis of assessment of political risk. Such factors tend increase the utility of bulk opportunities than the utility of container opportunities and also seem to favour less break-bulk opportunities. All factor levels but one are statistically significant and have the signs consistent with prior expectations.

For a useful summary of the discussion, Table 6.23 presents the determinants of opportunity choice based on political risk factors ranked according to their relative importance or impact on opportunity choice.

Table 6.23 Determinants of opportunity choice based on political risk factors and ranking according to their relative importance

Rank (Absolute Value)	Factor/Attribute	Factor/Attribute Level	Parameter Estimate
1	Regulatory Requirements	Minimal	2.20557
2	Regulatory Requirements	Flexible	2.17934
3	Community Acceptance and Support	Low	-1.61617
4	Government Support and Commitment	Low	-1.22722
5	Government Support and Commitment	High	0.63340
6*	Community Acceptance and Support	High	0.00336

* Statistically not significant at 5% level of confidence.

6.4.6 Determinants of market opportunity choice based on the overall criteria

The choice sets for selection of market opportunities based on the assessment of key decision criteria represented the highest level of hierarchical information integration which regional port managers use to aggregate complex and extensive influences into a manageable number of critical dimensions on which they base their final choice decisions. Regional port managers were asked to evaluate and then select the opportunity profiles that were more desirable and were most likely to be pursued based on their assessment of the overall opportunity choice decision criteria. The factors and the levels for use in the choice model and their naming are presented in Table 6.24. All factors were specified in the model as generic because the model that was developed and tested with alternative-specific effects did not produce results which would suggest that port managers perceive the effect of these factors differently for each market opportunity context.

The results in Table 6.25 indicate that the model developed to study the determinants of opportunity selection based on key decision criteria is statistically significant ($p < .0001$). The global null hypothesis that the attributes do not influence the choice is strongly rejected. The -2 Log L statistic under *With Covariates* is 365.332 and the *Chi-Square* (χ^2) statistic for the log likelihood ratio with 12 degrees of freedom (df) is 188.3681 and the $p < .0001$. At 5% level of confidence and 12 df, the estimated model χ^2 = 188.3681 far exceeds the χ^2 critical value (21.026). It can be concluded that the empirical data fit the MNL model extremely well.

The results in Table 6.25 clearly suggest that at the highest level of information integration and decision-making in the process of selection of market opportunity to pursue, the market access factors are the key. The willingness to pursue an opportunity increases if a regional port can provide the shippers and other port customers with superior access to markets relative to the adjacent capital city port. Inferior access to markets relative to the metropolitan port has negative impact (-1.51977) on the attractiveness of the opportunity as does similar market access level (-0.09134) but the latter is statistically not significant. This important finding validates the theory developed in this study which argues that the key for competitive advantage is the value a regional port can deliver to its customers and that such value can be delivered through the provision of superior access to markets or highly integrated and efficient supply chains to the regional port customers.

Table 6.24 Naming of factors and levels used to model opportunity choice based on the overall criteria

Factor/Attribute Level Name	Factor Description	Original Factor/Attribute
INFERIOR	Regional port provides inferior access to markets than the adjacent capital city port	MARKET_ACCESS (Access to Markets) (1)
SIMILAR	Regional port provides similar access to markets as the adjacent capital city port	
SUPERIOR	Regional port provides superior access to markets than the adjacent capital city port	
LOW	Potential benefits for pursuing the opportunity are low	PERCEIVED_BENEFITS (Economic AND NON-ECONOMIC Benefits) (2)
MEDIUM	Potential benefits for pursuing the opportunity are reasonable	
HIGH	Potential benefits for pursuing the opportunity are high	
LONG-TERM	Required resources to successfully implement the opportunity can only be mobilized in the long-term	RESOURCE_AVAILABILITY (Availability of Resources) (3)
MEDIUM-TERM	Required resources to successfully implement the opportunity can be mobilized in the medium-term	
SHORT-TERM	Required resources to successfully implement the opportunity can be mobilized in the short-term	
HIGH	The business risk associated with the opportunity is high	BUSINESS_RISK (Business Risk) (4)
MEDIUM	The business risk associated with the opportunity is medium	
LOW	The business risk associated with the opportunity is low	
HIGH	The political risk associated with the opportunity is high	POLITICAL_RISK (Political Risk) (5)
MEDIUM	The political risk associated with the opportunity is medium	
HIGH	The political risk associated with the opportunity is low	

The impact of perceptions of the benefits the port will get by pursuing a given market opportunity is considerable. High benefits increase the utility (0.82095) while low benefits decrease it significantly (-1.25693) or even worse, they make the port managers unwilling to pursue the opportunity.

If resources can be mobilized only in the medium or long-term, then regional port managers may not find the opportunity worth pursuing. But if the resources needed to implement the opportunity can be made available in the short-term, the likelihood that port managers will pursue the opportunity increases. In any case, the exposure to market forces is a major consideration. High business risk has a negative utility (-1.22423) and low business risk has a positive impact (0.39716). This suggests that port managers are to some degree risk averse and they tend to favour opportunities that are associated with a manageable risk.

Table 6.25 Multinomial logit model of opportunity choice based on the overall criteria with generic attributes

Model Fit Statistics

Criterion	Without Covariates	With Covariates
-2 LOG L	553.701	365.332
AIC	553.701	389.332
SBC	553.701	431.686

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	188.3681	12	<.0001
Score	162.2170	12	<.0001
Wald	98.3766	12	<.0001

Multinomial Logit Parameter Estimates

	Factor Level	DF	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq
(*)	Container	1	0.15839	0.21167	0.5600	0.4543
	Bulk	1	0.70462	0.19771	12.7021	0.0004
	Break-Bulk	0	0	.	.	.
(1)	inferior	1	-1.51977	0.29050	27.3701	<.0001
	similar	1	-0.09134	0.24425	0.1399	0.7084
	superior	0	0	.	.	.
(2)	high	1	0.82095	0.22080	13.8240	0.0002
	low	1	-1.25693	0.30069	17.4734	<.0001
	medium	0	0	.	.	.
(3)	long-term	1	-0.55773	0.23673	5.5505	0.0185
	medium-term	1	-0.21544	0.24660	0.7632	0.3823
	short-term	0	0	.	.	.
(4)	high	1	-1.27423	0.26694	22.7856	<.0001
	low	1	0.39716	0.24895	2.5451	0.1106
	medium	0	0	.	.	.
(5)	high	1	-1.08716	0.25535	18.1261	<.0001
	low	1	0.17264	0.23518	0.5389	0.4629
	medium	0	0	.	.	.

(*) Trade type; (1) Market Access; (2) Perceived Benefits; (3) Resources Availability; (4) Business Risk; (5) Political Risk.

The results also suggest that political risk is a key dimension in the decision process. High political risk has a negative impact (-1.08716) on the decision to pursue an opportunity and this impact is statistically significant. Low levels of political risk have positive impact (0.17264) but statistically the impact is not significant. This finding indicates that port managers' main focus in their decision-making is on opportunities that are associated with high risk rather than those associated with low risk.

In general regional port managers show preferences for bulk opportunities (0.175839). Container opportunities are considered after bulk opportunity but statistically the part-worth utility for container opportunities is not significant. This may well explain why regional ports have been cautious in investing in container business and in involving themselves in a head-to-head competition with their adjacent metropolitan ports for container business.

Overall, the empirical results have shown remarkable consistency with the theoretical arguments discussed throughout the study. The signs of the coefficients are as expected and most coefficients are statistically significant.

For a useful summary of the discussion, Table 6.26 presents the determinants of opportunity choice based on the overall choice criteria ranked according to their relative importance or impact on opportunity choice.

Table 6.26 Determinants of opportunity choice based on the overall criteria and ranking according to their relative importance

Rank (Absolute Value)	Factor/Attribute	Factor/Attribute Level	Parameter Estimate
1	Market Access	Inferior	-1.51977
2	Business Risk	High	-1.27423
3	Perceived Benefits	Low	-1.25693
4	Political Risk	High	-1.08716
5	Perceived Benefits	High	0.82095
6	Resources Availability	Long-Term	-0.55773
7	Business Risk	Low	0.39716
8*	Resources Availability	Medium-Term	-0.21544
9*	Political Risk	Low	0.17264
10*	Market Access	Similar	-0.09134

* Statistically not significant at 5% level of confidence.

6.5 Summary

The objective of this chapter was to investigate how regional port managers actually choose valuable market opportunities in the pursuit of growth. The chapter sought to establish the determinants of opportunity choice and their relative importance. The opportunity choice modelling technique used in this chapter is novel and promising as a tool in modelling executive judgment at the strategic level.

Modelling opportunity choice with discrete choice is a major contribution to the port strategy literature for at least two reasons. First, it is the first research attempt to model opportunity choice within the framework of opportunity capture as the basis for defining effective strategy for regional port growth. Second, the discrete choice approach allowed us to examine the determinants of opportunity choice based on how choices are actually made. Earlier studies have focused on the perceptions of the decision-makers to determine the relative importance of strategy variables. While perceptions are important, they do not always define correctly the decisions that are actually made in a specific market context.

The results have demonstrated that it is possible to use decompositional methods to investigate the strategic choices that regional port managers make and that there is inconsistency between perception of the variables that influence the choice of an opportunity and the determinants of opportunity choice. The model results generally make intuitive sense; they are consistent with the theory and managerial practice and point to some sound behavioural and economic rationale on the part of evaluating managers. The theoretical and policy implications of the model results are discussed in the concluding chapter.

CHAPTER 7

Modelling Opportunity Choice 2: Exposing the Patterns of Decision-Making

7.1 Introduction

This chapter continues the discussion of opportunity choice; but as highlighted in Figure 7.1, its focus is on developing a decision support system that could be used by regional port managers to improve the effectiveness of their opportunity choice decisions.

In the previous chapters it was argued that the decision-making patterns are complex though it is important to understand them. They are not, however, revealed by the current modelling tools. This chapter introduces and discusses the implementation of a non-parametric classification tree methodology which is capable of revealing the patterns of decision-making and the predictive structure of opportunities which regional port managers are likely to choose in the pursuit of growth.

The chapter consists of four major sections. The first one, introduces the classification and regression trees (CART) methodology as a framework for modelling patterns of opportunity choice decision. The second section describes the implementation of a classification tree as a decision support system for opportunity choice. Section three explains how to interpret the classification tree developed as a decision support system to assist regional port managers to select valuable opportunities; and the final section analyses the overall performance of the decision support system for opportunity choice.

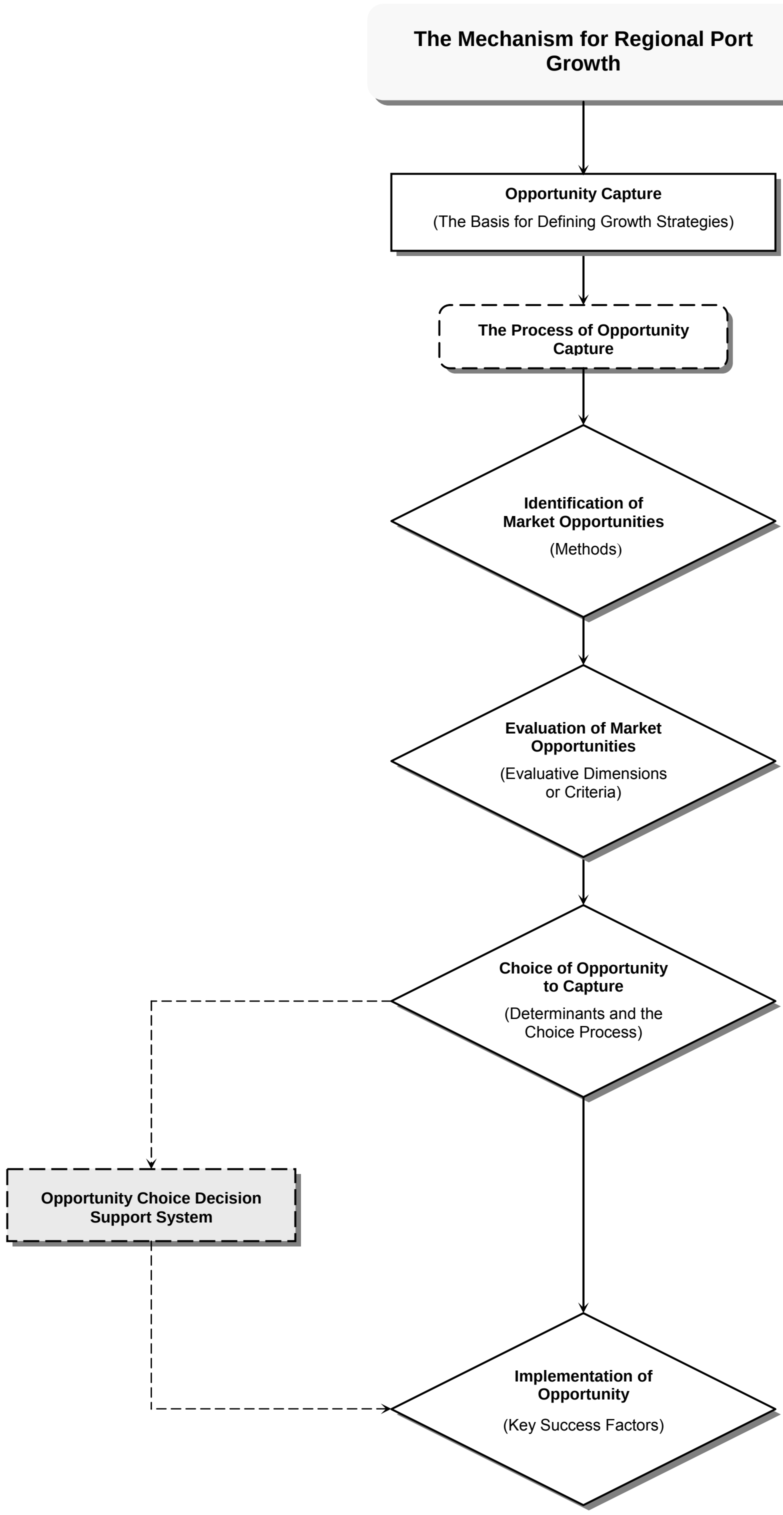


Figure 7.1 Opportunity capture and port growth: the mechanism

7.2 Exposing the Patterns of Opportunity Choice Decision: A Classification and Regression Trees (CART) Modelling Framework

The results of the choice modelling reported in the previous section suggest that the most attractive (optimal) opportunities – opportunities for which a regional port can deliver value to the customers and capture value for itself and hence attain competitive advantage – are those for which a regional port can provide superior access to markets relative to its adjacent metropolitan port. Such opportunities are perceived as having high economic and non-economic benefits and low business and political risk. For optimal opportunities, resources can be mobilized in the short-term. However, such opportunities are rare or simply do not exist and if they do exist, they are likely to attract intense competition and challenge the ability of a port to derive value.

In the real world, opportunities present themselves as a combination of a number of factors some of which maximize utility while others impact negatively on the prospects of the opportunity. For the decision-makers, the challenge is to select opportunities that are worth pursuing given the specific benefits and risk involved. But this task is complex, multifaceted and often requires expensive resources to be invested without assurance that the decisions being-made will maximize the expected benefits. For this reason, the use of decision support systems to help port managers to make better decisions is not only desirable but also important in the sense that it can help improve the quality of opportunity selection decisions.

In this section, the theoretical underpinnings of a decision support system which is based on a non-parametric decision-tree modelling technology known as CART (classification and regression trees) are discussed. The decision support system is implemented as a strategy tool to assist regional port managers reduce uncertainty and make informed market opportunity selection decisions.

7.2.1 CART methodology

CART methodology was first developed by Breiman *et al*. (1984) and later enhanced and implemented by Steinberg and Colla (1998) through a computer software known as

CART (Salford Systems 2002). Since then, CART has attracted a large number of researchers and practitioners in many fields focusing on classification problems.

In a general classification problem, one has *N* observations (a learning or training data set) of a categorical dependent variable with levels $j = 1, 2, 3,..., J$, and of *K* independent variables which may include both categorical and continuous variables. The objective of any classification method including CART is to use the information in the learning data in some optimal way to best classify observations into one of the *J* categories or to estimate the probability of belonging to each of these *J* categories.

What makes CART different from other classification methods is the multi-sequential search algorithm it uses to develop, optimise and present a classification tree. CART is a binary recursive partitioning methodology. It is binary because *parent nodes* are always split into exactly two *child nodes* and recursive because the process can be repeated by treating each child node as a parent. Unlike other classification methodologies such as AID (automatic interaction detection) and CHAID (chi-square automatic interaction detection) which require specification of rules to stop growing a tree, CART uses a very different and effective strategy that does not require any stopping rule to be specified upfront. CART allows the tree to grow until further splitting is impossible. After finding the maximal tree CART prunes away branches until it finds the best tree, based both on predictive accuracy and on a penalty applied to large trees. This method of choosing a tree gives better results than procedures such as CHAID that use a stopping rule.

CART is also the only decision tree proven to be a universal approximator. This means that given a dependent or target variable that is to be predicted and the independent or predictor variables $x_1,..., x_k$, CART is guaranteed to discover the true relationship between the target and predictors (Breiman *et al*. 1984) provided that there is provision of sufficient data. CART is data intensive with the ability to automatically separate relevant from irrelevant predictors and without the need for the analyst to specify the functional form of the model.

The key elements of a CART analysis are a set of rules for growing the tree, splitting each node in a tree, deciding when a tree is complete, assigning each terminal node to a class outcome, pruning, testing and selecting a tree.

Growing the tree

In CART, a classification tree is generated by partitioning the data into binary format based on the answers to questions (splitting rules) presented in the form of *Is CONDITION <= VALUE?* (eg. *Is AGE <= 65?*). CART always ask questions that have a 'yes' or 'no' answer.

A classification tree starts at the top with a *root node*. The question used to split a node always sends the ***yes*** answers to the left child node and the ***no*** answers to the right child node. Each child node is in turn split into other two child nodes. The challenge for CART is to find the best condition or variable (splitter) and the value or split to use to split the parent node into two child nodes – more generally referred to as the splitting rule. This process is computationally intensive but the number of splits is finite. There are at most *N* different splits for a continuous variable in a data set with sample size *N*. For a categorical variable with *L* levels, 2^{L-1} splits can be found. The key feature of this tree- growing step is to find the best split at every node. CART ranks in order each splitting rule on the basis of a quality-of-split criterion which measures how well the splitting rule separates the classes contained in the parent node. CART evaluates the goodness of any splitting rule using an impurity function.

There are a number of impurity functions (Breiman *et al*. 1984; Steinberg and Colla 1997) but the Gini index of diversity is the most popular. The Gini impurity index is defined as:

$$i(t) = 1 - \sum_{i=1}^{J} p^2(i)$$

where $j = 1,...,J$ is the number of classes or categories of dependent or target variable and $p(i), i = 1,...,J$ the proportion of cases falling into the J categories for any node *t*.

It is obvious that $i(t)$ has its maximum value $(J-1)/J$ when $p(1) = p(2) = ... = (J) = 1/J$ (i.e., a node which contains an equal proportion of every class is least pure) and its minimum value of *0* when one of the $p(j) = 1$ and all others equal *0* (i.e., a node which contains members of only one class is perfectly pure).

The best split is one that maximizes the decrease in impurity, that is

$$\Delta(t,s) = i(t) - p_L i(t_L) - p_R i(t_R)$$

where t denotes a node and t_L and t_R are partitioned child nodes. s is the splitting rule and p_L and p_R are the probabilities of a case going left and right. *i(t),* $i(t_L)$ and $i(t_R)$ are impurities of note *t,* t_L and t_R. *Δ(t,s)* denotes the improvement in impurity as the result of partition based on splitting rule s.

Once a best split is found, CART repeats the search process for each child node, continuing recursively until further splitting is impossible or stopped. Splitting is impossible if only one case remains in a particular node or if all the cases in that node are exact copies of each other (on predictor variables). CART also allows splitting to be stopped for several other reasons, including a condition in which a node has too few cases. The default for this lower limit is 10 cases, but may be set higher or lower to suit a particular analysis. The final tree is called the *maximal tree* and the final subsets of nodes resulting from splitting are the *terminal nodes* of the tree.

Assigning each terminal node to a class outcome

Once a terminal node is found the subsequent decision is how to classify all cases falling within it. One simple criterion often used is the plurality rule (Breiman *et al.* 1984) which determines the class assignment based on the group with the greatest percentage representation in a terminal node relative to the percentage distribution of the classes cases in the preceding parent node.

Specifically, if

$$p(j_0 \mid t) = \max_j p(j \mid t)$$

then t is designated as class j_0 terminal node.

The rules of class assignment can be modified from simple plurality to account for the costs of making a mistake in classification and to adjust for over- or under-sampling from certain classes.

Pruning the tree

Having grown a maximal tree by using splitting rules and stopping criteria, CART examines small trees obtained by pruning away branches of the maximal tree in a process carried out upward from a *tree sequence*, based both on minimising the loss of predictive accuracy and on a penalty applied to large trees (cost complexity). CART prunes away the 'weakest link nodes' – the nodes that add least to overall accuracy of the tree on learning or training data. The cost complexity is defined as:

$$R_\alpha(T) = R(T) + \alpha\overline{T}$$

Where α is the complexity parameter – the penalty imposed per additional node; $R(T)$ is the absolute misclassification cost; and $\overline{T}$ is the number of terminal nodes for a specific tree.

Testing the tree

Once the maximal tree has been grown and a set of sub-trees derived from it, CART determines the best tree by testing for error rates or cost. With sufficient data, the simplest method is to divide the sample into learning and test sub-samples. The learning sample is used to grow an overly large tree. The test sample is then used to estimate the rate at which cases are misclassified (possibly adjusted by misclassification costs). The misclassification error rate is calculated for the largest tree and also for every sub-tree. The best sub-tree is the one with the lowest or near lowest cost, which may be a relatively small tree.

When data are in short supply, CART employs the computer-intensive technique of cross-validation (Breiman *et al*. 1984; Salford Systems 2002). CART first grows a maximal tree on the entire learning sample and proceeds by dividing the learning sample into 10 roughly equal parts, each containing a similar distribution for the dependent variable. CART takes the first 9 parts of the data, constructs the largest possible tree, and uses the remaining 1/10 part as the test sample. The process continues until each part of the data has been used as a test sample. The results of the 10 mini-test samples are then combined to form error rates for trees of each possible size; these error rates are applied to the tree based on the entire learning sample.

Selecting the tree

Given a list of candidate trees, an optimal tree is selected based on minimal cost complexity criterion relative to other trees including the maximal tree.

7.3 Implementing a Classification Tree as Decision Support System for Market Opportunity Choice

In developing a CART decision support system for market opportunity selection the aim was twofold: first, to produce an accurate classifier of opportunity selection decisions that regional port managers make and second to uncover the patterns and predictive structure of the decision-making process.

Figure 7.2 shows the decision tree developed to help understand how regional port managers make opportunity selection decisions based on the overall assessment of key decision factors or criteria – access to markets, perceived benefits, availability of resources, business and political risk.

The tree was grown with CART version 5.0 (Salford Systems 2002) following the steps discussed in the previous section. The data set input consists of the 756 cases (observations) which were collected through the choice experiment that was a major component of the Internet-based survey used in this study. The distribution of the choice responses relative to 6 opportunity profiles for the 3 alternative investment opportunities (bulk, break-bulk and container) presented to a sample of 42 regional port managers is shown in Table 7.1 and the specification of initial model set up conditions in Table 7.2.

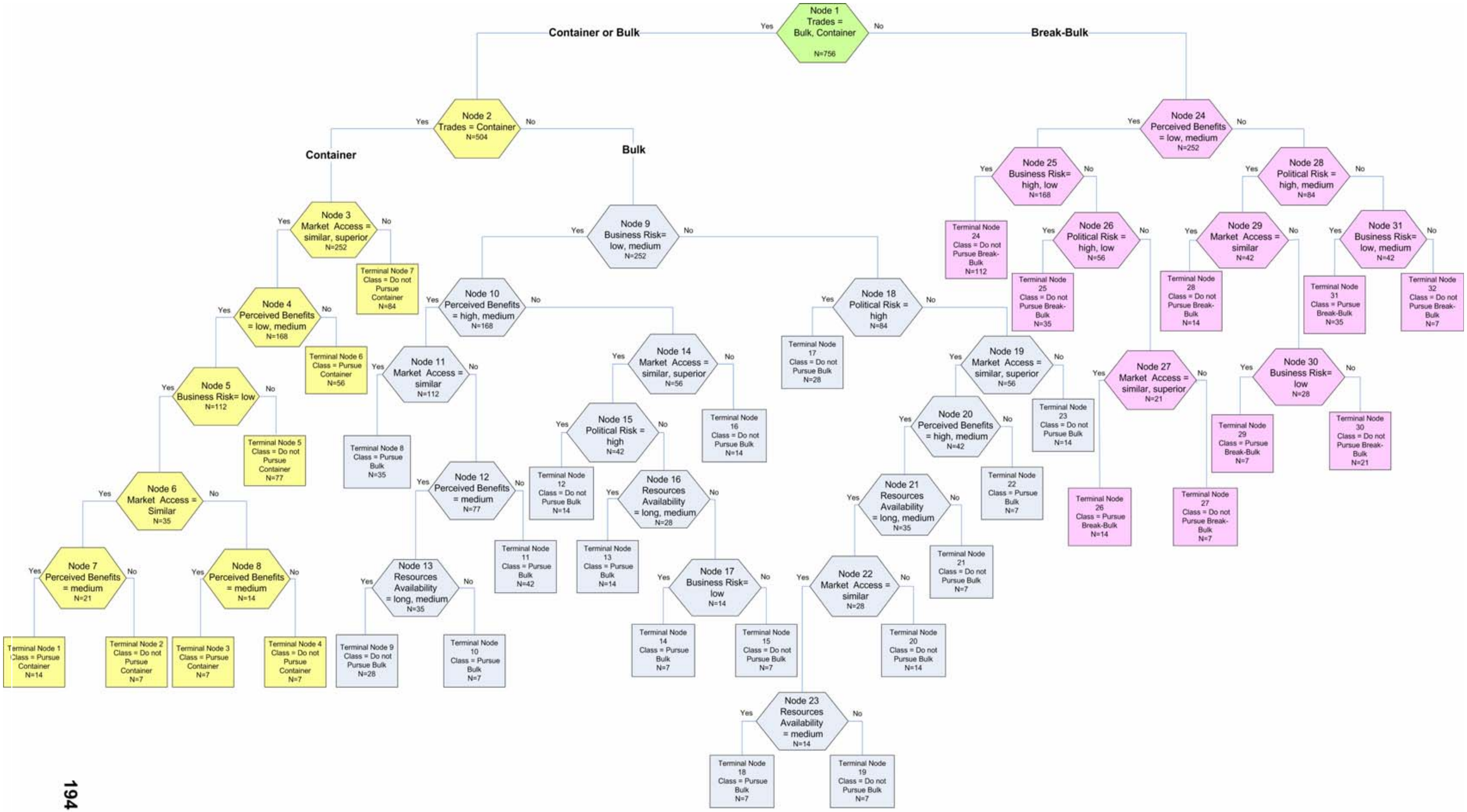


Figure 7.2 Opportunity Selection Decision Support System

Table 7.1 Frequency distribution of choice responses

Target/Dependent Variable: Choice(Pursue/Do not Pursue)
N Classes: 6

Data Value	N
Class 1: Do not Pursue Break-Bulk	179
Class 2: Do not Pursue Bulk	147
Class 3: Do not Pursue Container	178
Class 4: Pursue Break-Bulk	73
Class 5: Pursue Bulk	105
Class 6: Pursue Container	74
Total	756

Table 7.2 Option settings

Construction Rule	Gini (priors altered by costs)
Estimation Method	10-fold cross-validation
Misclassification Costs	User specified (see above).
Tree Selection	0.000 se rule
Linear Combinations	No
Initial value of the complexity parameter	= 0.000
Minimum size below which node will not be split	= 10
Node size above which sub-sampling will be used	= 756
Maximum number of surrogates used for missing values	= 5
Number of surrogate splits printed	= 5
Number of competing splits printed	= 5
Maximum number of trees printed in the tree sequence	= 10
Max. number of cases allowed in the learning sample	= 756
Maximum number of cases allowed in the test sample	= 0
Max # of nonterminal nodes in the largest tree grown	= 756
(Actual # of nonterminal nodes in largest tree grown	= 62)
Max. no. of categorical splits including surrogates	= 4536
Max. number of linear combination splits in a tree	= 0
(Actual number cat. + linear combination splits	= 210)
Maximum depth of largest tree grown	= 30
(Actual depth of largest tree grown	= 10)
Exponent for center weighting in split criterion	= 0.000
Maximum size of memory available	= 13500000
(Actual size of memory used in run	= 193232)

Table 7.3 shows that a sequence of 25 trees was generated as a result of pruning the maximal tree (tree 1) with 54 terminal nodes. It also indicates that the tree 11 with 32 terminal nodes is the optimal tree – the tree which is small and has the lowest or near lowest cross-validation misclassification cost (Figure 7.3). The optimal tree was retained as the final model and used as the decision tree support system to classify and predict market opportunities which regional port managers are most or least likely to pursue. Opportunities tagged as *do not pursue* are those that at the moment of the actual decision may be rejected or require further consideration. But even opportunities

classified as *pursue* may warrant further examination because the essence of a decision support system is to provide qualified information on which port managers can base their final decision.

Table 7.3 Tree sequence

Dependent variable: CHOICE

Tree	Terminal Nodes	Cross-Validated Relative Cost	Resubstitution Relative Cost	Complexity Parameter
1	54	0.338 +/- 0.021	0.253	0.000000
11**	32	0.303 +/- 0.021	0.264	0.001356
16	18	0.357 +/- 0.022	0.305	0.002793
17	15	0.373 +/- 0.022	0.316	0.003173
18	13	0.368 +/- 0.022	0.327	0.004287
19	9	0.389 +/- 0.022	0.359	0.006756
20	8	0.440 +/- 0.022	0.381	0.018791
21	6	0.460 +/- 0.021	0.430	0.020116
22	5	0.511 +/- 0.020	0.481	0.043054
23	4	0.564 +/- 0.015	0.540	0.048932
24	3	0.600 +/- 0.000	0.600	0.049964
25	1	1.000 +/- 0.000	1.000	0.166677

Initial misclassification cost = 0.833
Initial class assignment = Do not Pursue Break-Bulk

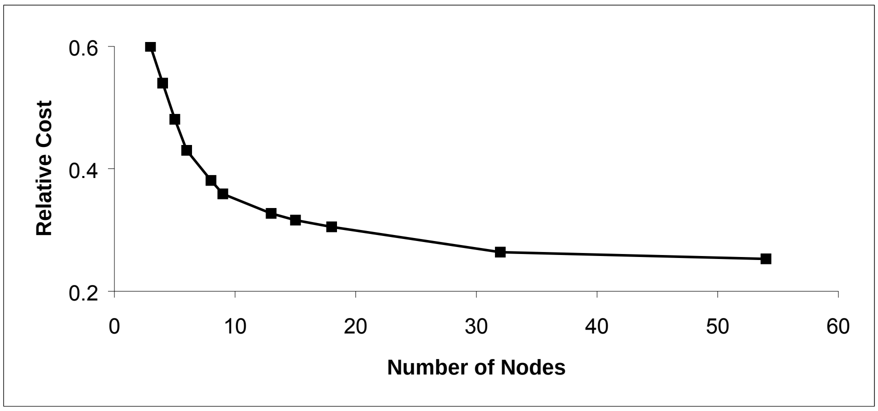


Figure 7.3 Error curve.

7.4 Interpreting the Classification Tree as an Opportunity Choice Decision Support System

CART automatically produces printed rules for reading the entire tree (Appendix 8) but a tree can be easily interpreted by following the methodology CART uses to grow the tree as explained before.

In Figure 7.2, there are two types of nodes: splitting or non-terminal nodes represented by hexagonal boxes and terminal nodes represented by rectangular boxes. Splitting nodes are nodes that can be further split into two child nodes. Terminal nodes are nodes that cannot be further split into child nodes and contain the decision outcome. In each splitting node the distribution of cases, the total number of cases, the node number and the splitting rules are presented. Equally, all this information (except for the splitting rules) can be displayed in each terminal node. In addition, in each terminal node the class name of the node is given.

Starting from the *root node* (node 1) at the top of the tree in Figure 7.2 and following the path through the yellow boxes (for illustration), it can be seen that if the answer to the question *Is Trade = Bulk or Container?* (splitting rule) is *yes* the case goes left, otherwise it goes right (if is it break-bulk). In this situation 504 cases were sent left while 252 cases went right. This decision is made entirely on the basis of a single variable or *splitter* which is chosen because it is the best variable that separates classes or reduces the impurity of the *child nodes*. For investment opportunities that are bulk or container, additional information is brought into the picture. First, trade is again consulted; if the investment opportunity is container, the case goes left; otherwise it goes right, in this case if it is bulk. Following the cases that were container and went left (252 cases in node 3) we see that if the access a regional port can offer to port customers is inferior to that offered at the metropolitan port the decision is *not to pursue* the opportunity (terminal node 7). As can be seen in Appendix 8, the decision rule of an opportunity falling into terminal node 7 is given on the basis that if the investment opportunity is container and the regional port can only provide inferior access to markets port managers should consider not to pursue such opportunity because the chances of them succeeding are slim. This result is very consistent with the findings from the fieldwork, literature and discrete choice modelling.

Second, container opportunities for which a regional port could offer superior or similar access to markets relative to the adjacent capital city port were sent left (168 cases in node 4) and further divided on the basis of the perceived benefits. Opportunities with low or medium benefits (112 cases) were sent left to the splitting node 5 while those with high perceived benefits were sent right to the terminal node 6 which was classified as *pursue container*. The decision rule for the terminal node 6 (Appendix 8) is given on the basis that if the trade is container and the access to markets that the regional port can offer to its customers is similar or superior relative to the adjacent metropolitan port and the perceived benefits are high, then regional port managers should consider pursuing the opportunity.

Cases that were sent to node 5 are further split based on business risk. Those which were assessed as having high business risk (77 cases) were sent right to the terminal node 5 and classified as *do not pursue container*. The decision rule for the terminal node 5 (Appendix 8) is given by the condition that if the trade is container and the access to markets that the regional port can offer to its customers is similar or superior relative to the adjacent metropolitan port but the perceived benefits are low or medium and the business is medium or high, regional port managers should consider not to pursue the opportunity.

In the splitting node 5, opportunities that were perceived as being exposed to low business risk (35 cases) were sent left to a splitting node 6. In this node no final decision could be reached and further evaluation was needed. Access to markets criterion was the best splitter found. It sent all opportunities for which the regional port could provide superior access to markets relative to the adjacent metropolitan port to right (splitting node 8) and all others (21 cases) to the left in splitting node 7.

Interestingly, even after the assessment of the opportunity on market access criterion has been made, it was felt that another criterion should be used before the final classification decision could be reached. In this case the perceived benefits criterion was used as a splitter for the situation where the regional port could offer similar access to markets as the metropolitan port (splitting node 7) and also for the situation in which the regional port was able to offer superior access to markets compared with that offered by its adjacent capital city port (splitting node 8). The result of this analysis produces four terminal nodes (node 1, 2, 3, and 4).

Following the decision pattern for the decision outcome in the terminal node 1 (pursue container) the decision rule (Appendix 8) is given by the condition that if the trade is container, the business risk is low, the access to markets that the regional port can offer is similar to that offered by the metropolitan port and the perceived benefits are medium then regional port managers should consider pursuing the opportunity.

The decision rule for the terminal node 2 (Appendix 8) is that if the trade is container, the business risk low, the access to markets that the regional port can offer to its customers is similar to that offered by the adjacent metropolitan port but the perceived benefits are low then regional port managers should consider not to pursue the opportunity.

The decision rule for the terminal node 3 (Appendix 8) is that if the trade is container, the business risk low, the access to markets that the regional port can offer to its customers is superior relative to the adjacent metropolitan port and the perceived benefits are medium then regional port managers should consider pursuing the opportunity.

The decision rule for the terminal node 4 (Appendix 8) is that if the trade is container, the business risk low, the access to markets that the regional port can offer to its customers is superior relative to the adjacent metropolitan port but the perceived benefits are low then regional port managers should consider not to pursue the opportunity.

To interpret the remaining decision patterns and outcomes throughout terminal nodes 8 to 32 a similar mechanism, based on binary partitioning is carried out until no further split is found, can be used. It is important to note that in developing a decision tree CART may not use all variables in the model as splitters but it always uses them during the iterative process of model building. Also, CART may use the same variable a number of times before reaching the final decision. Although it can be argued that the process of strategic decision-making can be represented as a sequential process in practice the process is iterative. Factors that have been considered in the early stage of the decision-making are generally reviewed when other subsequent factors are evaluated and when the final decision is to be made. By using a variable several times and in different stages of the decision-making process CART proves that strategic decisions are based on hierarchical information integration (Anderson 1974, 1981, 1982).

From Figure 7.2 it can be seen that for container opportunities CART only uses trades, market access, perceived benefits and business risk criteria to decide which opportunities have the highest probability of being pursued or not pursued, while for bulk and break-bulk opportunities it uses all criteria. Also, it can be seen for instance, that *market access* and *perceived benefits* intervene in two different stage of the tree analysis. This is so because the process through which the final decision outcome is reached is not linear but iterative and results from the interaction of the factors involved. A condition that is satisfactory in one stage may not be so in other stages. It may need to be revaluated and if necessary modified. The final selection decision outcome is based on the overall assessment of the opportunity profile which is represented by a combination of different levels of the decision factors.

7.5 Assessing the Overall Performance of the Classification Tree Decision Support System

The performance of the tree is best assessed through its prediction success matrix (McFadden 1979; Hensher and Johnson 1981; Breiman *et al*. 1984). It is possible that a classification tree predicts the learning sample well, while not necessarily performing well on new data. The predictive power derived from a test sample is, therefore, more reliable than the prediction from a learning sample. Table 7.4 gives the prediction success of a 10-fold cross validation test. Cases appearing on the diagonal of the matrix correspond to correct classification, while off-diagonal entries represent misclassification. The sum of off-diagonal entries is the overall misclassification. As a whole, the tree prediction success given by CART was 81.1 percent on the test data and 91.7 percent on the learning data; a relatively very good prediction in classification problems.

Table 7.4 Prediction success using test data

Actual Class	Total Cases	Percent Correct	Do not Pursue Break-Bulk N=189	Do not Pursue Bulk N=133	Do not Pursue Container N=175	Pursue Break-Bulk N=63	Pursue Bulk N=119	Pursue Container N=77
Do not Pursue Break-Bulk	179	86.59	155	0	0	24	0	0
Do not Pursue Bulk	147	72.79	0	107	0	0	40	0
Do not Pursue Container	178	83.71	0	0	149	0	0	29
Pursue Break-Bulk	73	58.90	30	0	0	43	0	0
Pursue Bulk	105	79.05	0	22	0	0	83	0
Pursue Container	74	68.92	0	0	23	0	0	51

CART produces a number of statistics and provides extensive information about the features of the tree and each node. This information can be accessed by navigating options available in CART 5.0 toolbar menu. One of the statistics of 'relevant importance' is that related to the variable 'importance'. Figure 7.4 displays the factor importance rankings. The scores reflect the contribution each variable makes in classifying or predicting the choice port managers make for a given opportunity profile. From Figure 7.4, 'Trades', the variable used to split the root nodes, is ranked as the most important.

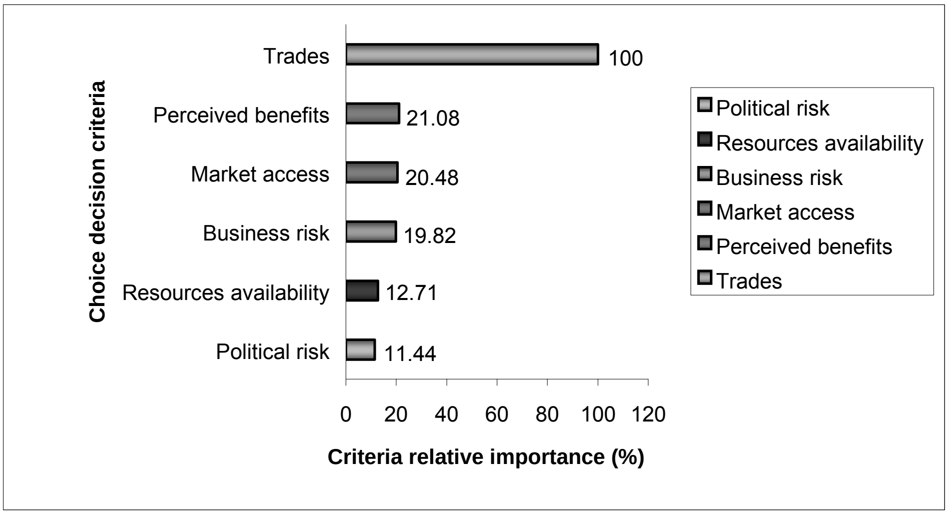


Figure 7.4 Relative importance of opportunity choice key decision factors

Regional port managers seem to have clear by defined preferences about investment opportunities which they regard as attractive and worth pursuing. Perceived benefits and access to markets are decisive criteria by which the value of an opportunity is judged.

Business risk is a major consideration and while the availability of resources and political risk ranked last they are important strategic variables. This result is consistent with the early findings.

The classification tree developed can also be used to predict the selection decisions on new opportunity profiles thus guiding regional port managers to make effective selection decisions. The process of using a CART tree to predict a decision outcome is known as dropping data down a tree (Salford Systems 2002`). Each observation is processed case by case, beginning at the root node. The splitting criteria are applied and in response to each *yes/no* question the case moves down left or right until it reaches a terminal node.

Table 7.5 contains the profiles of a few cases out of 756 which were chosen to illustrate how CART makes predictions, the decision patterns and the outcomes. Taking the case 573 as an example, we see that it reaches terminal node 6 (the negative sign in front of the node number indicates that the node is terminal) from node 1 after going through node 2, 3 and 4 and is classified as *pursue container* opportunity. Case 561 which ended up in node 5 was misclassified by the model as *do not pursue container* while the actual decision was to *pursue container* opportunity. The remaining and new cases can be interpreted in the same way.

Table 7.5 Using the decision support system to predict market opportunity choice

Case profile

CASEID	TRADES	A_M	P_B	A_R	B_R	P_R
200	Break-Bulk	inferior	low	medium	medium	low
51	Break-Bulk	superior	high	short	medium	high
426	Bulk	inferior	low	long	high	low
296	Bulk	similar	medium	short	medium	medium
561	Container	similar	low	long	high	low
573	Container	superior	high	short	high	medium

(A_M) Access to Markets; (P_B) Perceived Benefits; (A_R) Availability of Resources; (B_R) Business Risk; (P_R) Political Risk.

Case pattern and predicted outcome

CASEID	NODE	PATH_01	PATH_02	PATH_03	PATH_04	PATH_05	PATH_06	PATH_07	PATH_08	PATH_09	PATH_10	ACTUAL CHOICE	CORRECT	PREDICTED CHOICE
200	25	1	24	25	26	-25	0	0	0	0	0	Do not Pursue Break-Bulk	1	Do not Pursue Break-Bulk
51	30	1	24	28	29	30	-30	0	0	0	0	Pursue Break-Bulk	1	Pursue Break-Bulk
426	23	1	2	9	18	19	-23	0	0	0	0	Do not Pursue Bulk	1	Do not Pursue Bulk
296	8	1	2	9	10	11	-8	0	0	0	0	Pursue Bulk	1	Pursue Bulk
561	5	1	2	3	4	5	-5	0	0	0	0	Pursue Container	0	Do not Pursue Container
573	6	1	2	3	4	-6	0	0	0	0	0	Pursue Container	1	Pursue Container

7.6 Summary

The results in this chapter have demonstrated that it is possible to develop a decision support system based on theoretical and practical considerations of how decisions and strategic choices are made. Further, the results have shown that a decision support system based on a non-parametric classification tree can provide useful insights into decision-making about the choice of valuable market opportunities; and it can in fact assist regional port managers to make better or effective opportunity choice decisions. The cross-validation method used to test the performance of the decision tree indicated that the model was robust and likely to perform well on different data sets.

CHAPTER 8

Conclusions

8.1 The Study Focus

Simple observation of the economic health of many regional ports in Australia and of recent attempts to generate growth point not only to problems of 'strategy decay' (Hamel 2002) but also to the need for a more adequate understanding of the dynamics and mechanisms of growth as a basis for effective strategy definition. This need has become even more pressing in the light of the rationalisation of shipping networks and the restructuring of supply chains through selected ports – in Australia, most likely to be through metropolitan or capital city ports – and because of a growing recognition that regional ports may no longer be able to rely for growth on the benefits of exploiting bulk commodities.

This study has focused on the issue of regional port growth and more particularly on the issue of how regional ports in the shadow of metropolitan or capital city ports grow; and on what basis port managements define growth and development strategies.

8.2 The Research Findings

This study departs significantly from earlier studies of port growth in a number of ways but, particularly, it argues that opportunity capture is the key mechanism for regional port growth; and it develops a modelling framework for management decision-making and effective strategy definition using discrete choice modelling premised on behavioural and decision-making theory of how individuals actually make decisions and strategic choices (Ben-Akiva and Lerman 1991; Louviere *et al*. 2000).

8.2.1 Opportunity capture as the key mechanism for regional port growth

The literature has suggested a number of factors that attempt to explain why and how ports grow. Early spatial theory focused on factors such as the location of a port near the sources of raw materials or near markets, the savings in transportation costs and/or the size and density of hinterlands to explain how competitive advantage and growth is created. The theory offers useful insights but has serious limitations. Certainly a plethora of studies, often in the geographic and regional development literature, has described in much detail the way in which individual ports, or groups of ports, have grown; and many have sought to define more general principles. Few studies have focused particularly on issues related to the growth of ports in the shadow of metropolitan ports. In any case, no cohesive explanatory framework has emerged. Similarly, economic theory is useful in understanding aspects of competition and growth in the marketplace but for the most part provides limited insights into the more specific issues related to regional port growth.

This study has, however, found particular relevance in the insights and generic concepts in some areas of management literature, though rarely in specific, port-related applications. Of special importance are those concepts that focus on the relationships between strategy and the growth of firms and on the factors which influence effective strategic decision-making.

The literature offers a number of strategy directions that regional ports – like firms – can follow to seek positions of marketplace dominance and growth. It also argues that it is imperative not only to understand the nature of strategy but also the processes by which effective strategies are formulated and strategic management choices are made. In general, this literature suggests that strategies which focus on capturing market share (Buzzell *et al*. 1975) or on improving operational effectiveness lead to positions of marketplace dominance and growth. But, market share accumulation is the effect and not the cause of superior performance (Aaker and Day 1986; Jacobson and Aaker 1985); and operational effectiveness is relevant only if it is complemented with a strategic position for the firm which is based on the choice of a system of interlinked and self-reinforcing activities capable of creating and delivering superior value to customers relative to rivals (Porter 1996). The management perspective of strategies for growth also recognises the value of a firm's unique resources and core competences in promoting differentiation and competitive advantage; but while it places more emphasis on factors internal to the firm, it also admits that external linkages with other firms can be established and are beneficial – they may provide the firm (and a port) with the complementary resources it needs to compete more effectively for market dominance and growth.

The management literature also draws insights from behavioural and decision-making theory to argue that organisational growth results from the effectiveness of decisions and strategic choices that the key decision-makers within the firm endorse.

The contribution of the literature to our understanding of how a regional port achieves growth is an important one, at least at a generic level; but closer specification is necessary for a more appropriate and meaningful framework for explaining regional port growth. This study, in recognising this problem, argues that locational factors, market power, unique resources, core competences, and the quality of management are all important factors; but *the growth of a regional port depends, more critically, on the ability of its managers to exploit valuable market opportunities over time*. The study argues, therefore, that *opportunity capture is the key mechanism for regional port growth*.

This study finding has important theoretical implications. It underlines the notion that *opportunity capture* is the basis on which effective regional port growth strategies should be defined; and that understanding the process of *opportunity capture* is critical to competition for opportunity share and growth.

- **Effective strategies for port growth defined on the basis of opportunity capture**

The study findings suggest that the key to opportunity capture is the ability of a regional port to deliver value or competitive advantage to the shippers who demand and buy port services with the view of selling their own (Brooks 1995). The results also show that central to value delivery and value capture is the provision of superior access to markets for which shippers compete to deliver key benefits to their own customers and capture value or competitive advantage for themselves. The findings also suggest that superior value delivery through the provision of superior access to markets relative to capital city ports is the most effective strategy by which a regional port in the shadow of a capital city port can capture trade and involves a number of specific strategies (Table 5.4 and section 5.3.3). The most important of these are the provision of efficient land transport, efficient shipping services, flexible port services and port charges, cost-effective logistics service and the integration of a regional port in value-driven supply chains.

Note, especially, that although the provision of adequate infrastructure is a basic requirement for effective market access, the strategies that focus on the provision of superior access to markets are not infrastructure driven. They are based on the critical need to deliver superior value by satisfying the shippers' requirement for cost-effective access to the markets in which they compete; and are driven by market forces and competition, and the port's desire to appropriate and accumulate value (Cox 2002).

- **The effectiveness of opportunity capture**

Intuitively and conceptually, unexploited opportunities can be found in the marketspace; but not all regional port managers are able to identify and exploit them. Opportunities are not always obvious to all managers, nor do they come in a prepackaged, easily recognisable form. Moreover, opportunities known to all are likely to attract intense competition in which case success depends on the superiority of strategic resources that the port possesses or can develop and deploy; and on the approach that its managers adopt to capture opportunities. How do successful regional port managers capture valuable opportunities for growth?

The findings suggest that the effectiveness of opportunity capture can be explained by the processes which successful port managers use to understand the context in which opportunities exist and by their ability to identify, evaluate, select and implement those valuable opportunities.

Hamel and Prahalad (1994) suggest that an important source of valuable opportunities is the customer whose expressed and latent needs create demand for specific market offerings. Shane (2000) on the other hand argues that opportunities exist primarily because markets are imperfect, customer needs are systematically overlooked or not being well served, information is unevenly distributed among market participants, and market participants have different beliefs and value judgment about the relative value and usefulness of the resources which they possess. The empirical evidence indicates that successful regional port managers use a number of methods to identify market opportunities. Their use of social networks is the most effective, followed by the precise identification of shipper needs and effective strategic planning and trend analysis. Admittedly, 'luck' exists and chance events may offer valuable opportunities that can be exploited profitably by regional port managers. Interestingly, however, port managers in this study made little use of formal environmental scanning techniques, as the literature has suggested (Smeltzer *et al*. 1988; Pearce *et al*. 1982; Lenz and Engledow 1986). It might be argued that, like small firms, regional ports may lack resources to conduct a systematic analysis of the environment in the search for valuable market opportunities.

The *identification* of opportunities is an important process; but of even more importance is the ability of port managers to determine which opportunity from a range of opportunities, to seize. In short, the challenge posed to port managers is to ensure that the *most valuable opportunities* are chosen and implemented. This is facilitated by a painstaking evaluation and selection process.

Regional port managers evaluate and then choose which valuable opportunities to capture based on a number of key factors and criteria that are defined on the basis of the perceived desirability or attractiveness and feasibility or implementability of a market opportunity. The results of the study suggest that the criteria which regional port managers use to evaluate and choose valuable market opportunities are effective market access, the perceived benefits the opportunity promises to deliver (economic and non-economic), the availability of resources to enable capture the opportunity and the business and political risk involved. An opportunity is perceived as worth pursuing if there is a perception that the regional port can provide superior (or at least similar) access to markets relative to the competing metropolitan neigbour port. In addition, the opportunity has to be perceived as being beneficial, low risk in both the business and political sense and that it can be implemented because the required financial and technical resources are available or can be acquired in the short-term.

The assessment of market opportunities based on these evaluative criteria reveals that the most important factor is market access (Table 5.9 and 5.10). Perceived benefits are ranked second, followed by business risk and the availability of resources. Political risk was seen to be the least significant criterion although it was seen to be a major factor in the decision to *seize* an opportunity. When the criteria were analysed in a decision context in which regional port managers were required to make an actual choice of the market opportunity they were willing to capture, the results were however, somewhat different. Political risk was perceived to be relatively more important than was the availability of resources (Table 6.26). More specifically, a high level of political risk was seen to have a stronger negative effect on the attractiveness of the opportunity than the availability of resources in the long-term.

Numerous authors have argued that current methods of examining the determinants of choice decisions were inadequate. Verma and Pullman (1998) noted that perceived importance of a relevant factor does not automatically legitimise the factor as a determinant (Brooks 1985). For a factor to be a determinant it should be important and also be able to discriminate the choice preference among competing alternatives (Aaker and Day 1980). Determinants are based on the actual behaviour, rather than on formed perceptions alone. In a specific decision situation a number of influences come into play and affect the decision outcome which may not quite reflect the earlier perceptions. This study confirms the Verma and Pullman (1998) findings.

A final factor that is critical to the effectiveness of opportunity capture is the way in which valuable opportunities are implemented once identified and selected. Port managements that are able to create and deliver the desired value to shippers are more likely to be successful in implementing opportunities. The ability to do so is closely related to their capability to mobilize relevant resources. The extent of investment needed to attract trade also influences the port's ability to capture trade but more significantly, opportunities can be successfully implemented if port managers compete in markets in which they can develop some competitive advantage and if they compete for trades that are expected to be viable long enough to allow the port to earn positive returns on resources invested.

8.2.2 Modelling management decision-making at the strategic level

In the real world, the growth of a regional port is determined by the strategies which regional port managers use to compete for opportunities and by the quality of the decisions they make. Understanding how the decisions are made and why port managers seem to favour certain actions over others have important theoretical implications – it is critical to our understanding of why some ports and not others are able to capture valuable opportunities and achieve growth.

Current approaches to study executive judgment have not been satisfactory, partly because most of them focus on the perceptions rather than the actual behaviour of economic agents. To our knowledge, only few studies have attempted to establish the difference between the importance of the key decision factors and the factors that are the determinants of the strategic choices that the executives make (Brooks 1984, 1985; Aaker and Day 1980; Verma and Pullman 1998). Most studies of decision-making have not been based on the theory of behaviour and decision-making to investigate how decision-makers actually make decisions and strategic choices.

This study departs from current approaches and demonstrates that it is possible to model the determinants of opportunity choice (Section 6.3 of Chapter 6) using discrete choice modelling based on random utility theory (RUT) (Ben-Akiva and Lerman 1991). The RUT posits the existence of a latent construct called 'utility' or satisfaction, pleasure, usefulness or well-being that exists in an individual's head and predicts that in a specific decision situation, when people are faced with choice among available alternatives, they choose or select those alternatives that give them most satisfaction, or net-benefits or utility (Ben-Akiva and Lerman 1991; Louviere *et al*. 2000).

Discrete choice methods are capable of using revealed preference data to model the determinants of choice and their relative importance. In the absence of revealed preference data or when the interest is to study future situations and *ex ante* behaviour, there is a strong justification to use stated preference data to investigate the determinants of strategic choices in a specific decision context. In the presence of new market opportunities, for example, stated choice methods can inform us about which opportunities are most likely to be selected and captured. Louviere *et al*. (2000) have demonstrated that stated preference methods extend the scope of revealed preferences by providing insights into problems and decision situations that may come into existence.

The results of opportunity choice modelling have also demonstrated that it is possible and indeed plausible to use stated choice methods to investigate the determinants of opportunity choices that regional port managers make. The model results make intuitive sense and point to sound behavioural and economic 'bounded-rationale' on the part of evaluating managers.

8.3 A Final Note

What strategies should regional ports – ports in the shadow of metropolitan or capital city ports – pursue? Should they capture niche markets which cannot be served by the larger, neighbour port? Should they act as an 'overflow' port, with cheaper land? Should they diversify from bulk handling into container or neo-bulk opportunities?

This study finds *ad hoc, knee-jerk* approaches to strategy definition unsatisfactory; it urges a return to first principles and offers a cohesive conceptual framework for defining strategies for regional port growth. It has argued that port growth will result from the effective definition and implementation of strategies that deliver superior value to shippers and stakeholders and to the port authority itself on a sustainable basis. It has further argued that only those opportunities for growth (among a range of possible opportunities) that will allow superior value delivery are worth pursuing.

Understanding the process of opportunity capture – how opportunities are identified, evaluated, selected and implemented – is central; and understanding the mechanisms and the processes of effective decision-making are further critical to the definition of growth strategies. This conceptualisation provides a rigorous framework and well-defined analytical processes and filtering mechanisms of how port managements should approach the issue of regional port development and points to the direction for future research.

References

Aaker, D.A. and Day, G.S. (1986) *Marketing Research: Private and Public Sector Decisions*, John Wiley and Sons, Toronto: 203.

Aaker, D.A. and Day, G.S. (1986) The perils of high-growth markets, *Strategic Management Journal* 7: 409-421.

Allison, C.W., Chell, E. and Hayes, J. (2000) Intuition and entrepreneurial behaviour, *European Journal of Work and Organizational Psychology* 9 (1): 31-43.

Amit, R. and Schoemaker, P.J.H. (1993) Strategic assets and organizational rent, *Strategic Management Journal* 14 (1): 33-47.

Amoako, J. (2002) Forecasting Australia's international container trade, *Paper presented at 25th Australian Transport Research Forum, Canberra October 2002.*

Amram, M. and Kulatilaka, N. (1999a) Uncertainty: The new rules for strategy, *Journal of Business Strategy (*May/June): 25-29.

Amram, M. and Kulatilaka, N. (1999b) *Real Options: Managing Strategic Investment in an Uncertain World*, Boston, Massachusetts: Harvard Business School Press.

Anderson, N.H. (1974) Information integration theory: A brief survey, In Contemporary Developments in Mathematical Psychology, (Editions), D. Krantz, R. Atkinson, D. Luce and P. Suppes: 236-305. San Francisco: W.H. Freeman.

Anderson, N.H. (1981) *Foundations of Information Integration Theory*, New York: Academic Press.

Anderson, N.H. (1982) *Methods of Information Integration,* New York: Academic Press.

Avery, P. (2002) *Strategies for Containers Ports*, A Cargo Systems Report, London: IIR Publication Limited.

Babbie, E. (1995) *The Practice of Social Research*, 7th Edition, Wadsworths Publishing Co., New York.

Bagozzi, R.P. (1994) Measurement in marketing research: Basic principles of questionnaire design, in Bagozzi, R.P. (Edition), *Principles of Marketing Research*, United Kingdom, Blackwell.

Bain, J.S. (1948) Economies of scale, concentration, and the condition of entry in twenty manufacturing industries, *American Economic Review* 44: 15-39.

Bain, J.S. (1948) Price and production policies. In H.S. Ellis (Editions), *A Survey of Contemporary Economics* 1: 129-73. Homewood: Irwin.

Bain, J.S. (1951) Relation of profit rate to industry concentration: American manufacturing 1936-1940, *Quarterly Journal of Economics* 65: 293-323.

Baker, T. and Gimpl, M.L. (1988) What's new? Opportunities and strategies for businesses, *Marketing Intelligence and Planning* 6 (3): 14-21.

Barney, J. (1991) Firm resources and sustained competitive advantage, *Journal of Management* 17 (1): 99-120.

Barringer, B.R. and Bluedorn A.C. (1999) The relationship between corporate entrepreneurship and strategic management, *Strategic Management Journal* 20: 421-444.

Ben-Akiva, M.E. and Lerman, T. (1985) *Discrete Choice Analysis: Theory and Application to Travel Demand*, MIT Press, Cambridge.

Ben-Akiva, M.E. and Lerman, T. (1991) *Discrete Choice Analysis,* MIT Press, Cambridge, MA.

Bengtsson, S.K. and Kock, S. (2000) 'Coopetition' in business networks – to cooperate and compete simultaneously*, Industrial Marketing Management* 29: 411-426.

Berenson, M.L. and Levine, D.M. (1996) *Basic Business Statistics: Concepts and Applications*, 6th Edition, Prentice Hall International Edition.

Berg, B.L. (1995) *Qualitative Research Methods for Social Sciences*, 2nd Edition, Allyn and Bacpon, Boston.

Bower, D. (1999*) Constructing the client-computer interface: Guidelines for design and implementation of Web-based surveys* (Summary Report No. 99-115). Pullman, WA: Washington State University, Social & Economic Sciences Research Center.

Bradely, M.A. and Kroes, E. (1990) Forecasting issues in stated preference survey research, *Selecting Readings in Transport Survey Methodology*, Eucalyptus Press.

Bradley, M.A. and Daly, A.J. (1991) Estimation of logit choice models using mixed stated preference and revealed preference information, paper presented at the *6th International Conference on Travel Behaviour*, Quebec, May.

Brazell, J. and Louviere, J. (1997) Respondents help, learning and fatigue, *Paper presented at INFORMS Marketing Science Conference, University of California at Berkeley, March.*

Brealey, R.A. and Myers, S.C. (1996) *Principles of Corporate Finance*, 5th Edition, IE: McGraw Hill.

Breiman, L., Freidman, J.H., Olshen, R.A.. and Stone, C.J. (1984) *Classification and Regression Trees*, California: Wadsworth International Group.

Brennan, M., Seymour, P. and Gendall, P. (1993) The effectiveness of monetary incentives in mail surveys: further data, *Marketing Bulletin* 4: 43-51.

Brooks, M.R. (1984) An alternative theoretical approach to the evaluation of liner shipping Part I. Situational factors, *Maritime Policy and Management* 11 (1): 35-43.

Brooks, M.R. (1985) An alternative theoretical approach to the evaluation of liner shipping Part II. Choice criteria, *Maritime Policy and Management* 12 (2): 145-155.

Brooks, M.R. (1995) Globalization and liner shipping, *Paper Prepared for the Australian Bureau of Transport (September)*.

Brooks, M.R. (1998) Competition in liner shipping: Are national policies appropriate? *Ocean Yearbook,* Volume 13: 142-166.

Brooks, M.R. (2000) *Sea Change in Liner Shipping: Regulation and Managerial Decision-Making in a Global Industry*, Oxford: Pergamon Press.

Brooks, M.R., Blundel, R.G. and Bidgood, C.I. (1993) Strategic alliances in global container industry, in Refik Culpan (ed.), *Multinational Strategic Alliances*, Binghamton, NY: Haworth Press, 221-248.

Brown, L. (1997) *Competitive Marketing Strategy for Australasia*, Melbourne: Nelson.

Brown, T.E., Davidsson, P. and Wiklund, J. (2001) An operationalization of Steven's conceptualization of entrepreneurship as opportunity-based firm behavior, *Strategic Management Journal* 22: 953-968.

Bruner II, G.C. and Hensel, P.J. (1994) *Marketing Scales Handbook: A Compilation of Multi-Item Measures*, Chicago: American Marketing Association.

Butz, H.E. and Goodstein, L.D. (1996) Measuring customer value: Gaining the strategic advantage*, Organizational Dynamics* 24 (Winter): 63-77.

Buzzell, R.D., Bradley, T.G. and Ralph, G.M.S. (1975) Market share – a key to profitability, *Harvard Business Review*, January-February: 97-107.

Byrd, J., Hickman, K. and Hunter, H. (1997) Diversification: A broader perspective, *Business Horizons*, (March-April): 40-44.

Campbell, A. (1992) Brief case: Why do companies over-diversify? *Long Range Planning* 25 (5): 114-116.

Casson, M. (1982) *The Entrepreneur*, Totowa, NJ: Barnes & Noble Books.

Cerit, A.G. (2000) Maritime transport as an area of competitive advantage in international marketing, *International Journal of Maritime Economics* 2 (1): 49-67.

Cerit, A.G. (2002) Ports and community effects: Analysis of the impact of marketing public relations, *Paper presented at IAME Conference Panama 2002*.

Chaneski, W.S. (1996) Discovering those business growth opportunities, *Modern Machine Shop* 69 (49): 46-48.

Collis, D.J. and Montgomery, C. (1995) Competing on resources: Strategy in the 1990s, *Harvard Business Review* (July-August): 118-128.

Collis, D.J. and Montgomery, C. (1998) Creating corporate advantage, *Harvard Business Review* 76 (3) 70-83.

Conner, K.R. (1991) A historical comparison of resource-based theory and five schools of thought within industrial organization economics: Do we have a new theory of the firm? *Journal of Management* 17 (1): 121-154.

Cooper, D.R. and Emory, C.W. (1995) *Business Research Methods*, 5th Edition, Irwin.

Cos, J. (1996) *Your Opinion Please! How to Build the Best Questionnaires in the Field of Education*, California, Corwin Press.

Covin, J.G. (1991) Entrepreneurial versus conservative firms: A comparison of strategies and performance, *Journal of Management Studies* 28: 439-446.

Covin, J.G. and Slevin, D.P. (1991) A conceptual model of entrepreneurship as firm behavior, *Entrepreneurship Theory and Practice* (Fall): 7-23.

Cox, A.., Ireland, P., Lonsdale, C., Sanderson, J. and Watson, G. (2002) *Supply Chains, Markets and Market Power*, Routledge, London.

Cukrowski, J. and Fischer M.M. (2000) Theory of comparative advantage: Do transportation costs matter? *Journal of Regional Science* 40 (20: 311-322.

Cullinane, K. and Toy, N. (2000) Identifying influential attributes in freight route/mode choice decisions: a content analysis, *Transportation Research Part E* 36: 41-53.

Cyert, R.M and March, J.G (1963) *A Behavioural Theory of the Firm*, Prentice-Hill, Englewood Cliffs, NJ.

Das, T.K. and Teng, B.S. (1997) Time and entrepreneurial risk behavior, *Entrepreneurship Theory and Practice* 22 (2): 69-88.

Davidsson, P. (1991) Continued entrepreneurship: Ability, need, and opportunity as determinants of small firm growth, *Journal of Business Venturing* 6: 405-429.

Day, G.S. (1994) The capabilities of market-driven organizations, *Journal of Marketing* 58 (October) 37-52.

Day, G.S. and Nedungadi P. (1994) Managerial representations of competitive advantage, *Journal of Marketing* 58 (April 1994): 31-44.

Day, G.S. and Wensley R. (1988) Assessing advantage: A framework for diagnosing competitive superiority, *Journal of Marketing* 52 (April): 1-20.

Deephouse, D.L. (2000) Media reputation as a strategic resources: an integration of mass communication and resource-based theories, *Journal of Management* 26: 1091-1112.

DeMaio, T.J. (1984) Social desirability and survey measurement: A review. In Turner and E. Martin (Editions) *Surveying subjective phenomena,* Volume 2: 257-282, New York: Russell Sage.

D'Este G.M. and Meyrick, S. (1992) Carrier selection in a ro/ro ferry trade Part 1. Decision factors and attitudes, *Maritime Policy and Management* 19 (2): 115-126.

Dickson, P.R. and Giglierano, J.J. (1986) Missing the boat and sinking the boat: A conceptual model of entrepreneurial risk*, Journal of Marketing* 50 (3): 58-70.

Dillman, D.A. (2000) *Mail and Internet Surveys: The Tailored Design Method*, 2nd Edition, John Wiley and Sons, Inc.

Dillman, D.A., Tortora, R.D. and Bowker, D. (1998) *Principles for constructing Web surveys: An initial statement* (Technical Report No. 98-50) Pullman, WA: Washington State University, Social & Economic Sciences Research Center.

Dowling, M.M. and Summers, P.M. (1998) Total factor productivity and economic growth: *Issues for Asia, Economic Record* 74 (225): 170-185.

Drewe, P. and Janssen, B. (1998) What port for the future? From 'mainports' to ports as nodes of logistics networks, *Accessibility, Trade and Locational Behaviour*, Ashgate Publishing Limited, England (12): 241-264.

Dutton, G. (1997) What business are we in*? Management Review* 86 (8): 54-57.

Eisenhardt, K.M. and Zbaracki, M.J. (1992) Strategic decision-making, *Strategic Management Journal* 13: 17-37.

Evans, D.S. (1987) Tests of alternative theories of firm growth, *Journal of Political Economy* 95 (4): 657-674.

Everett, S. (1998) *Reforming ports: Issues in the privatization debate*, Working Paper ITS-WP-98-9, Institute of Transport Studies, The University of Sydney.

Everett, S. (2002) Deregulation, competitive pressures and the emergence of intermodalism, *Paper presented at IAME Conference Panama 2002*.

Ferreira, J. (1996) Corporate entrepreneurship: A strategic and structural perspective, *Corporate Entrepreneurship: 59-71*.

Fills, I. (2003) Image, reputation and identity issues in the arts and crafts organisation, *Corporate Reputation Review: An International Journal*: 25-40.

Fleming, D.K. (1987) The port community: An American view, *Maritime Policy and Management* 10 (3): 207-210.

Fleming, D.K. (1993) Port rivalry, co-operation, merger, *Maritime Policy and Management* 14 (4): 321-336.

Fleming, D.K. and Baird, A.J. (1999) Some reflections on port competition in the United States and Western Europe, *Maritime Policy and Management* 26 (4): 384-392.

Flor, L. and Defilippi, E. (2002) Port infrastructure: An access model for the essential facility, *Paper presented at IAME Conference Panama 2002*.

Forrest, Ed. (1999) *Internet Marketing Research: Resources and Techniques*, Sydney, McGraw-Hill.

Frazer, L. and Lawley, M. (2000) *Questionnaire Design and Administration: A Practical Guide*, John Wiley and Sons Australia, Ltd.

Frunio, A. (1988) *Co-operation and Competition in Global Economy: Issues and Strategies* (MA: Balinger).

Gendall, Ph. (1998) A framework for questionnaire design: Labaw revisited, *Marketing Bulletin* 9 (May): 28-39.

Gilmour, P. (1976) Some policy implications of subjective factors in the modal choice for freight movements, *The Logistics and Transportation Review* 12 (1): 39-57.

Gluck, F.W. and Kaufman, S.P. (1980) Strategic management for competitive advantage, *Harvard Business Review* 58 (4): 154-161.

Goss, R.O. (1990a) Economic policies and seaports 1: The economic functions of seaports, *Maritime Policy and Management* 17 (3): 207-219.

Goss, R.O. (1990b) Economic policies and seaports 2: The diversity of port policies, *Maritime Policy and Management* 17 (3): 221-234.

Goss. R.O. (1990c) Economic policies and seaports: 3. Are port authorities necessary? Seaports, *Maritime Policy and Management* 17 (4): 257-271.

Goss. R.O. (1990d) Economic policies and seaports: 4. Strategies for port authorities, *Maritime Policy and Management* 17 (4): 273-287.

Greenberg, M.G. (1972) *Multidimensional Scaling*, in Robert Feber Editions, Handbook of Marketing Research, Edited by R. Feber, McGraw-Hill, Inc. NY.

Greenberg, M.G. (1986) Commentary, *Marketing Science* 5 (4): 298-321.

Greene, P. and Srinivasan, V. (1978) Conjoint analysis in consumer research: Issues and outlook, *Journal of Consumer Research* 1 : 61-8.

Gregori, T.R. (1987) Resources are not; they become: An institutional theory, *Journal of Economic Issues* 21 (3): 1241-1263.

Grimm, C.M. and Smith K.G. (1997) *Strategy As Action: Industry Rivalry and Coordination*, West Publishing St. Paul, MN.

Gulati, R., Nitin, N. and Akbar, Z. (2000) Strategic networks, *Strategic Management Journal* 21: 203-215.

Haezendonck, E. (2001) *Essays on Strategy Analysis for Seaports,* Garant Publishers.

Hague Consulting Group [HCG] (1991) *A Stated Preferences Analysis*, The Hague.

Hall, W.K. (1980) Survival strategies in a hostile environment, *Harvard Business Review* (October): 75-85.

Hamel, G. (2002) Leading the Revolution, Harvard Business School Press, Boston, Massachusetts.

Hamel, G. and Heene, A. (1994) *Competence-Based Competition*, New York: John Wiley.

Hamel, G. and Prahalad, C.K. (1989) Strategic intent, *Harvard Business Review* (May-June): 63-76.

Hamel, G. and Prahalad, C.K. (1994) *Competing for the Future*, Harvard Business School Press.

Hamel, G., Y.L., Doz, Prahalad, C.K. (1989) Collaborate with your competitors-and win, *Harvard Business Review* 67: 133-139.

Hamermesh, R.G., Anderson, M. and Harris, J. (1978) Strategies for low market share business, *Harvard Business Review* 56 (May-June): 95-102.

Hamilton, H.R. (1974) Screening business development opportunities, *Business Horizons* 17 (4): 13-24.

Haralambides, H.E. (2002) Competition, excess capacity, and the pricing of port infrastructure, *International Journal of Maritime Economics* 4: 324-347.

Haynes, K.E., Hsing, Y.M. and Stough, R.R. (1997) Regional port dynamics in the global economy: The case of Kaohsiung, Taiwan, *Maritime Policy and Management* 24 (1): 93-113.

Hayuth, Y. (1981) Containerization and the load center concept, *Economic Geography* 57: 160-157.

Hayuth, Y. (1987) Changes on the waterfront: A model-based approach, *The Professional Geographer* 40 (3): 53-64.

Hayuth, Y. and D.K. Fleming (1994) Concepts of strategic commercial location: The case of container ports, *Maritime Policy Management* 21 (3): 187-193.

Heaver, T.D. (1995) The implications of increased competition among ports for port policy and management, *Maritime Policy and Management* 22 (2): 125-133.

Heene, A. and Sanchez, R. (1996) *Competence-Based Strategic Management*, New York: John Wiley.

Hensher, D.A. (1994) *Stated preference analysis of travel choices: the state of practice*, ITS Working Paper ITS-WP-93-6, prepared for a Special Issue of *Transportation* on The Practice of Stated Preference Methods.

Hensher, D.A. and Barnard, P.O. (1990) The orthogonality issue in stated choice designs, in Fischer, M., Nijikamp, P. and Papageorgiou, Y. (Editions) *Spatial Choices and Processes*, North-Holland, Amsterdam, 265-278.

Hensher, D.A. and Bradley, M.A. (1993) Using stated response data to enrich revealed preference discrete choice models, *Marketing Letters* 4 (2): 139-151.

Hensher, D.A. and Johnson, L.W. (1981) *Applied Discrete Choice Modelling*, John Wiley & Sons, New York.

Hensher, D.A. and Louviere, J.J. (1983) Identifying individual preferences for international fares, *Journal of Transport Economics and Policy* XVII (2): 225-245.

Higgins, B. and Savoie, D.J. (1995) *Regional Development Theories and their Applications*, Transaction Publishers, Somerset, NJ.

Hilling, D. and Hoyle, B.S. (1984) Spatial approach to port development, *Seaport Systems and Spatial Change*, John Wiley & Sons Ltd.

Hills, G.E. and Shrader, R.C. (1998) Successful entrepreneurs' insights into opportunity recognition, *Frontiers of Entrepreneurship Research*, MA: Babson Park: 54.

Hirschman, A.O. (1958) *Strategy of Economic Development*, New Haven, Conn.: Yale University Press.

Hitt, M.A., Ireland, R.D., Camp, S.M. and Sexton, D.L. (2001) Strategic entrepreneurship: Entrepreneurial strategies for wealth creation, *Strategic Management Journal* 22 (June-July): 479-491.

Holmstrom, B.R. and Tirole, J. (1989) The theory of the firm. In R. Schmalenesee and R.D. Willig (Editions). *Handbook of Industrial Organization* 1: 61-133. Amsterdam: North Holland.

Holsti, O.R. (1963) *Content Analysis*. In: Lindsey, G., Aronson, E. (Editions), The Handbook of Social Psychology, Addison-Wesley, Reading, MA.

Horowitz, J.L., Koppelman, F.S. and Lerman, S.R (1986) *A Self-Instructing Course in Disaggregate Mode Choice Modeling*, Federal Transit Administration, Washington, D.C.

Hotelling, H. (1929) Stability in competition, *Economic Journal* 39: 41-57.

Howard, E.B.J. and Goodstein, L.D. (1996) Measuring customer value: Gaining the strategic advantage, *Organizational Dynamics* 24 (Winter): 63-77.

Hunt, S.B. (1997) Resource-advantage theory: An evolutionary theory of competitive firm behavior? *Journal of Economic Issues* 31 (1): 59-77.

Hunt, S.B. (2000) *A General Theory of Competition*, UK: Sage Publications, Inc.

Hunt, S.B. and Morgan, R.M. (1995) The comparative advantage theory of competition, *Journal of Marketing* 59 (April): 1-15.

Illersis, S. and Philippe, J. (1993) Introduction: The role of services in regional economic growth, *Service Industries Journal* 13 (2): 3-10.

Ireland, R.D., Hitt, M.A., Camp, S.M. and Sexton, D.L. (2001) Integrating entrepreneurship and strategic management actions to create firm wealth, *Academy of Management Executive* 15 (1): 49-63.

Jacobson, R. (1988) Distinguishing among competing theories of the market share effect, *Journal of Marketing* 52 (October): 68-80.

Jacobson, R. and Aaker, D.A. (1985) Is market share all that it's cracked up to be? *Journal of Marketing* 49 (4): 11-22.

Jauch, L.R., Osborn, R.N. and Martin, T.N. (1980) Structural content analysis of cases: A complementary method for organizational research*, Academy of Management Review* 5 (4): 517-525.

Jiang, J.J. and Klein, G. (1999) Project selection criteria by strategic orientation, *Information and Management* 36: 63-75.

Johnson, R.M. and Orme, B.K. (1996) How many questions should you ask in choice-based conjoint studies? *Paper presented to the American Marketing Association's Advanced Research Techniques Forum, Beaver Creek, Colo. (June)*.

Kanter, R.M. (1994) Collaborative Advantage: Successful partnerships manage the relationship not just the deal, *Harvard Business Review* (July-August): 96-108.

Keh, H.T., Foo, M.D., and Lim, B.C. (2002) Opportunity evaluation under risky conditions: The cognitive processes of entrepreneurs, *Entrepreneurship Theory and Practice* 27 (2): 125-149.

Kharti, N. and Ng, H.A. (2000) The role of intuition in strategic decision-making, *Human Relations* 53 (1): 57-86.

Kinnear, T.C., Taylor, J.R., Johnson, L., and Armstrong, R. (1994) *Australian Marketing Research*, McGraw-Hill Book Company, Sydney.

Kirzner, I. (1997) Entrepreneurial discovery and competitive market process: An Austrian approach, *Journal of Economic Literature* 35: 60-85.

Kotler, Ph. (1994) *Marketing Management*, 8th Edition, Prentice-Hall International, Inc.

Kottler, R.E. (1998) Skeptics beware: Web interviewing has arrived and is established. Embrace it or be left behind. *Paper presented at the meeting of the Market Research Society, Birmingham, AL.*

Kozan, E. and Wong, A. (2002) An optimization model for export and import container process in seaport terminals, *Paper presented at 25th Australian Transport Research Forum, Canberra October 2002*.

Krueger, N.F. (2000) The cognitive infrastructure of opportunity emergence, *Entrepreneurship Theory and Practice* (Spring): 5-23.

Krueger, N.F. and Brazeal, D.V. (1994) Entrepreneurial potential and potential entrepreneurs, *Entrepreneurship Theory and Practice* (Spring): 91-104.

Kuby, M. and Reid N. (1992) Technological change and the concentration of the US general cargo port system: 1970-88, *Economic Geography* 68: 272-289.

Kuhfeld, W.F. (2003) *Marketing Research Methods in SAS*, SAS 9.1 Edition, SAS Institute Inc., Cary, NC, USA.

Lambert, D.M., Lewis, M.C. and Stock, J.R. (1993) How shippers select and evaluate general commodities LTL motor carriers, *Journal of Business Logistics* 14 (1): 131-143.

Lechner, C. and Dowling, M. (2003) Firm networks: external relationships as sources for the growth and competitiveness of entrepreneurial firms, *Entrepreneurship and Regional Development* 15: 1-26.

Lee, H., Smith, K.G., Grimm, C.M. and August Schomburg, A. (2000) Timing, order and durability of new product advantages with imitation, *Strategic Management Journal* 21 (1): 23-30.

Lenz, R.T and Englewood, J.L (1986) Environmental analysis units and strategic decision-making: A field of leading edge corporations, *Strategic Management Journal* 7: 68-89.

Lloyd, P. and Dicken, P. (1997) *Location in Space: A Theoretical Approach to Economic Geography,* New York: Harper and Row.

Lloyd's List Daily Commercial News (2003) Carr cuts the freight cake, October 6, 2003: 3-5.

Lloyd's List Daily Commercial News (2003) Morris rejects plan for Enfield Intermodal terminal, *Lloyd's List DCN Newswire*, News, February 19, 2003.

Lorange, P. (2001) Strategic re-thinking in shipping companies, *Maritime Policy and Management* 28 (1): 23-32.

Louviere, J.J. (1984) Hierarchical information integration: A new method for the design and analysis of complex multiattribute judgment problems. *In Advances in Consumer Research*, Vol XI, ed. Th. C. Kinnear, pp. 148-55. Provo, Utah: Association for Consumer Research.

Louviere, J.J. (1988) *Analysing decision-making: metric conjoint analysis*, Sage University Paper No. 67, Newbury Park, Beverly Hills.

Louviere, J.J. (1993) Conjoint analysis, in R. Bagozzi (ed) *Handbook of Marketing Research*, Academic Press, New York.

Louviere, J.J. (1996) *Stated preference modelling with transport demand and policy analysis applications*, a paper presented at the Institute of Transport Studies Transport Policy Workshop seminar, University of Sydney.

Louviere, J.J. (2000) Why stated preference discrete choice modeling is not conjoint analysis (and what SPDCM is): 1-11*, Memetrics White Paper July 2000.*

Louviere, J.J. and Woodworth, G.G. (1983) Design and analysis of simulated consumer choice or allocation experiments; an approach based on aggregate data, *Journal of Marketing Research* 20: 350-67.

Louviere, J.J., Hensher, D.A.. and Swait, J.D. (2000) *Stated Choice Methods: Analysis and Application*, Cambridge University Press.

Louviere, J.J., Meyer, R., Bunch, D., Carson, R., Dellaert, B., Hanemann, W.M., Hensher, D. and Irwin, J. (1999) Combining sources of preference data for modelling complex decision processes, *Marketing Letters* 10 (3): 187-217.

Lundy, C.C. (1982) Small ports in Northern Ireland: A method of study, *Maritime Policy and Management* 9 (4): 273-277.

Machlup, F. (1979) Theories of the firm, marginalist, behavioural, managerial, in E. Mansfield (ed) *Microeconomics: Selected Readings,* 3rd Edition, W.W. Norton and Company, New York: 99-114.

Magala, M. (2002) Development strategies for ports in the shadow of capital city ports: A conceptual framework, *Paper accepted for presentation at the IAME Conference Panama 2002*.

Mahoney, J.T. and Pandian, J.R. (1992) The resource based view within the conversation of strategic management, *Strategic Management Journal* 13:L 363-380.

Mansfield, E. (1979) *Microeconomics: Selected Readings,* 3rd Edition, W.W. Norton and Company, New York.

Markides, C.C. (1997) To diversify or not to diversify, *Harvard Business Review* 75 (6): 93-99.

Martellato D. and Nijkamp P. (1998) *Accessibility, Trade and Locational Behaviour: an introduction*, Ashgate Publishing Limited, England (1): 1-16.

Martin, J. and Thomas, B.J. (2001) The container terminal community, *Maritime Policy and Management* 28 (3): 279-292.

Maunsell, M. (2000) Victorian ports strategic study, *Final Report January 2000*, Department of Infrastructure and Department of Treasury and Finance, Victoria, Australia.

Mauri, A. and Michales, M.P. (1998) Firm and industry effects within strategic management, *Strategic Management Journal* 19: 211-221.

McCline, R.L., Bhat, S. and Baj, Pam. (2000) Opportunity recognition: An exploratory investigation of a component of the entrepreneurial process in the context of the health care industry, *Entrepreneurship Theory and Practice* (Winter): 81-94.

McFadden, D. (1974) Conditional logit analysis of qualitative behaviour, in D.A. Hensher and L. Johnson (1981) A*pplied Discrete Choice Modelling*, Croom Helm, London.

McKiernan, P. (1992) *Strategies of Growth,* Series in Analytical Management, London and New York: Routledge.

Melbourne Port Corporation (2001) *Review of Port Reform Stage*, Melbourne Port Corporation.

Mersha, T. and Adlakha, V. (1991) A locational choice approach for professional service firms, *Journal of Professional Services Marketintg* 6 (2): 59-67.

Meyrick and Associates (1998) Measures to promote effective and efficient container port practices, *Final Report prepared for the Marine and Ports Group of the Australian Transport Council*, Meyrick and Associates and Tasman Asia Pacific.

Mintzberg, H. and Waters, J.A. (1982) Tracking strategy in an entrepreneurial firm, *Academy of Management Journal* 25 (3): 465-499.

Mintzberg, H. and Waters, J.A. (1985) The emerging paradigm of strategic behavior, *Strategic Management Journal* 8: 501-515.

Miyajima, M. and Kwak, S. (1989) Economic analysis of interport competition in container cargo: Peripheral ports versus Tokyo Bay ports, *Maritime Policy and Management* 16 (1): 47-55.

Montgomery, D.C. (2001) *Design and Analysis of Experiments*, 5th Edition, John Wiley and Sons, Inc.

Mooney, G., Giesbrecht, L. and Shettle, C. (1993) *To pay or not to pay: That is the question*, Paper presented at the meeting of the American Association for Public Opinion Research, St. Charles, IL.

Myrdal, G. (1957) *Economic Theory of Underdeveloped Regions,* London: Duckworth.

Narver, J.C. and Slater, S.F. (1990) The effect of a market orientation on business profitability, *Journal of Marketing* 54 (October): 20-35.

Newcastle Port Corporation (2003) *Annual Report* 2002-2003.

Nicholas, E. and Sedivi, B. (1998) Economic data collection via the Web: A Census Bureau case study. *Paper presented at the meeting of the American Statistical Association, Dallas, TX.*

Notteboom, T.E. and Winkelmans, W. (2001) Structural changes in logistics: How will port authorities face the challenge? *Maritime Policy and Management* 28 (1): 71-89.

O'Brien, T.C. and Fadem, T.J. (1999) Identifying new business opportunities, *Research Technology Management* (September-October): 15-19.

Ohmae, K. (1989) Managing in a borderless world, *Harvard Business Review* (May-June): 152-161.

Ohmae, K. (1992) The global logic of strategic alliances, London: Collins.

Ottoo, R.E. (2000) *Valuation of Corporate Growth Opportunities: A Real Options Approach*, Garland Publishing.

Palepu, K.G., Healy, P.M.and Bernard, V.L. (1996) *Business Analysis and Valuation Using Financial Statements*, South-Western College Publishing.

Panayides, Ph.M. (2003) Competitive strategies and organizational performance in ship management, *Maritime Policy and Management 30 (*2): 123-140.

Panayides, Ph.M. and Cullinane, K. (2002) Competitive advantage in liner shipping: A review and research agenda, *International Journal of Maritime Economics* 4: 189-209.

Panayides, Ph.M. and Gray, R. (1999) An empirical assessment of relational competitive advantage in professional ship management. *Maritime Policy and Management 26 (*2): 111-125.

Pearce II, J.A., Bruce L.C. and Fred R.D. (1982) Environmental scanning for small and growing firms, *Journal of Small Business Management* (July): 27-34.

Penrose, E. (1959) *The Theory of the Growth of the Firm*, Oxford, Basil Blackwell.

Perroux, F. (1955) Note on the notion of growth pole, *Economie Appliquée* 17: 307-20.

Persson, G. and Virum, H. (2001) Growth strategies for logistics service providers: A case study, *The International Journal of Logistics Management* 12 (1): 53-64.

Peteraf, M.A. (1993) The cornerstones of competitive advantage: A resource-based view, *Strategic Management Journal* 14: 179-191.

Pfeffer, J. (1992) Understanding power in organizations, *California Management Review* (Winter): 29-50.

Phillips, L. (1987) Building market-focused organizations (Mimeo).

Port Kembla Port Corporation (2003) *Annual Report* 2002-2003.

Porter, M.E. (1980) *Competitive Strategy,* The Free Press, New York and London.

Porter, M.E. (1985) *Competitive Strategy*, *Techniques for Analyzing Industries and Competitors New* York: Free Press.

Porter, M.E. (1996) What is strategy? *Harvard Business Review* (November-December): 61-78.

Porter, M.E. (1997) *Michael Porter 1997 Australia and New Zealand Tour*, Institute for International Research, 10th-11th April.

Porter, M.E. (1998) *On Competition*, Harvard Business School Press, Boston.

Porter, M.E. (1998) *The Competitive Advantage of Nations,* Macmillan Press Ltd.

Prahalad, C.K. (1993) A strategy for growth: The role of core competences in the corporation, *Research Technology Management* 36: 40-47.

Prahalad, C.K. (1998) Managing discontinuities: The emerging challenges, *Research Technology Management*, Inc. (May-June): 14-22.

Prahalad, C.K. and Hamel, G. (1990) The core competence of the corporation, *Harvard Business Review* (May-June): 79-91.

Priem, R.L. (1992) An application of metric conjoint analysis for the evaluation of top managers individual strategic making processes, *Strategic Management Journal* 13 (Summer): 143-152.

Priem, R.L. and Harrigan, D.A. (1994) Exploring strategic judgment: Methods for testing the assumptions of prescriptive contingency theories, *Strategic Management Journal* 15: 311-324.

Reggiani, A. (1998) Accessibility, trade and locational behaviour*, Trade and Locational Behaviour*, Ashgate Publishing Limited, England (1): 1-14.

Reggiani, A. (1998) The concept of accessibility revisited, *Accessibility, Trade and Locational Behaviour*, Ashgate Publishing Limited, England (2): 17-40.

Robinson, R. (1998) Asian hub/feeder nets: The dynamics of restructuring, *Maritime Policy and Management* 25 (1): 21-40.

Robinson, R. (2002) Integrated and intermodal freight systems: A conceptual framework, *Paper presented at IAME Conference Panama 2002*.

Robinson, R. (2002) Ports as elements in value-driven chain systems: The new paradigm, *Maritime Policy and Management* 29 (3): 241-255.

Robinson, R. (2003) Port authorities: Defining functionality within a value-driven chain paradigm, *Paper presented at IAME Conference in Busan, Korea 3-5 September 2003*.

Rockwood, T.H., Sangster, R.L. and Dillman, D.A. (1997) The effect of response categories on survey questionnaires: Context and mode effects, *Sociological Methods and Research* 26: 118-140.

Romer, D. (1996) *Advanced Macroeconomics*, McGraw-Hill.

Rude, D.E. (1991) Policy capturing, function measurement, and conjoint analysis: A comparative analysis, a paper presented at the *Annual Meeting of Southwestern Academy of Management*, Houston, Texas.

Rumelt, R.P. (1991) How much does industry matter? *Strategic Management Journal* 12: 167-85.

Rumelt, R.P. and Wensely (1980) *In search of the market share effect*, Working Paper MGL-61, University of California, Los Angels.

Sabate, J.M.F. and Puente, E.Q. (2003) Empirical analysis of the relationship between corporate reputation and financial performance: A survey of the literature*, Corporate Reputation Review* 6 (2): 161-175.

Salford Systems (2002) *CART for Windows: An Implementation of the Original CART Methodology by Salford Systems*, San Diego, California, USA: Salford Systems.

Sanchez R., Thomas, H. and Heene, A. (1996) *Dynamics of Competence-Based Competition*, New York: Elsevier Science.

Sarantakos, S. (1993) *Social Research*, McMillan, Australia.

Scheer, F.M. (1974) Economies of scale and industrial concentration, i*n Industrial Concentration: The New Learning*, Harvey Goldschmid Editions, Boston: Little, Brown and Company: 16-54.

Schere, J. (1982) Tolerance of ambiguity as a discriminating variable between entrepreneurs and managers, *Proceedings*: 404-408, New York, Academy of Management.

Schmalensee, R. (1985*)* Do markets differ much? *The American Review 75 (3): 341-352*.

Schumpeter, J.A. (1950) *Capitalism, Socialism and Democracy* (3rd ed.) New York. Harper & Row.

Shane, S. (2000) Prior knowledge and the discovery of entrepreneurial opportunities, *Organization Science* 11 (4): 448-469.

Shane, S. and Venkataraman, S. (2000) The promise of entrepreneurship as a field of research, *Academy of Management Review* 25 (1): 217-226.

Shapiro, C. (1989) The theory of business strategy, *Rand Journal of Economics* 20:125-37.

Sharp, D. (1987) *Combat protectionism with global alliances*, The Wall Street Journal, 1 June: 22.

Shepherd, D.A. and Krueger, N.F. (2002) An intensions-based model of entrepreneurial teams' social cognition, *Entrepreneurship Theory and Practice* (Winter): 167-185.

Singleton, R.A, Straits, B.C. and Straits, M.M. (1993) *Approaches to Social Research*, 2nd Edition, Oxford University Press, Oxford, UK.

Slack, B. (1985) Containerization, inter-port competition and port selection, *Maritime Policy and Management* 12 (4): 293-303.

Slack, B. (1993) Pawns in the game: Ports in the global transportation system, *Growth and Change* 24 (Fall): 579-588.

Slack, B., Comotois, C. and McCalla, R.J. (2002) Strategic alliances in the container industry: a global perspective, *Maritime Policy and Management* 29 (1): 65-76.

Sletmo, G.K. (1999) Port life cycles: Policy and strategy in the global economy, *International Journal of Maritime Economics* 1(1): 11-38.

Slevin, P.D. and Covin, J.G. (1998) Time, growth, complexity and transitions: Entrepreneurial challenges for the future, *Entrepreneurship Theory and Practice* (Winter): 53-69.

Smeltzer, L.R., Fann, G.L. and Nikolaisen, V.N. (1988) Environmental scanning practices in small business, *Journal of Small Business Management* (July): 55-62.

Solow, R.M. (1956) A contribution to the theory of economic growth, *Quarterly Journal of Economics* 70 (February): 65-94.

Song, D.-W. (2003) Port co-opetition in concept and practice, *Maritime Policy and Management* 30 (1): 29-44.

Steinberg, D. and Colla, P. (1997) *CART* (Classification and Regression Trees), Salford Systems 1997.

Stevenson, H.H. and Jarillo, J. C. (1990) A paradigm of entrepreneurship: entrepreneurial management, *Strategic Management Journal* 11: 17-27.

Stevenson, H.H., Roberts, M. J. and Grousbeck, H. I. (1989) *New Business Ventures and the Entrepreneur*, Irwin, Homewood, IL.

Stigler, G. (1966) *The Theory of Price*, New York: Macmillan Publishing Company.

Stopford, M. (1997) *Maritime Economics,* Routledge, New York and London.

Szymanski, D.M., Bharadwaj, S.G. and Varadarajan, P.R. (1993) An analysis of the market share-profitability relationship, *Journal of Marketing* 57 (July) 1-18.

Taylor, S.L. and Cosenza, R.M. (1997) Limitless vs. sustainable growth strategies: What's the answer to the corporate growth dilemma? *Business Forum, Spring/Fall* 22 (2/3): 29-33.

Thompson, A. and Strickland, A.J. (1992) *Strategy Formulation and Implementation: Tasks of the General Manager*, 5th Edition, Morewood IL: Irwin.

Thurstone, L. (1927) A law of comparative judgment, *Psychological Review* 34: 273-286.

Tirole, J. (1989) *The Theory of Industrial Organization*, The MIT Press.

Train, K. (1985) *Qualitative Choice Analysis: Theory, Econometrics and Application to Automobile Demand*, Houghton Mufflin, Boston, Mass.

Traù, F. (1996) *Why do firms grow?* Working Paper WP 26 - March, ESRC Centre for Business Researcher, University of Cambridge.

Trott, P. (1998) Growing business by generating genuine business opportunities: A review of recent thinking, *Journal of Applied Management Studies* 7 (2): 211-222.

Valentine, V.F. and Gray, R. (2002) An organisational approach to port efficiency, *Paper presented at IAME Conference Panama 2002*.

Varadarajan, P. (1983) Intensive growth opportunities: An extended classification, *California Management Review*, 25 (3): 118-132.

Venkataraman, S. (1997) The distinctive domain of entrepreneurship research: An editor's perspective, in J. Katz and R. Brockhaus Editions, *Advances in entrepreneurship, firm emergence, and growth* 3: 119-138, Greenwich, CT: JAI Press.

Verma, R. and Pullman, M.E. (1998) An analysis of supplier selection process, *Omega* 26 (6): 739-750.

Victorian Sea Freight Industry Council (2001) *Future Directions*, *A Report to the Minister for Ports*.

Washington, L. (1997) How much is enough? *Black Enterprise* 28 (3): 50-51.

Weber, A. (1929) *Theory of the Location of Industries,* Chicago: University of Chicago Press.

Weber, R.P. (1990) *Meta Analysis, Quantitative Applications in the Social Sciences* No. 59, Sage Publications, London.

Weinzimmer, L.G. (2000) A replication and extension of organizational growth determinants, *Journal of Business Research* 48: 35-41.

Weinzimmer, L.G., Fry, F.L. and Nystrom, P.C. (1996) The search for opportunities by small business owners, *Journal of Small Business Strategy*: 1-14.

Weinzimmer, L.G., Nystrom, P.C. and Freeman, S. J. (1998) Measuring organizational growth: Issues, consequences and guidelines, *Journal of Management* 24 (2): 235-262.

Wensley, R. (1982) PIMS: New horizons or false dawn, *Strategic Management Journal* 3 (April-June): 147-158.

Winter, S.G. (2000) The satisficing principle in capability learning, Strategic Management Journal, 21: 981-996.

Woo, C.Y. and Cooper, A.C. (1981) Strategies of effective low share businesses, *Strategic Management Journal* 2: 301-318.

Woo, C.Y. and Cooper, A.C. (1982) The surprising case for low market share, *Harvard Business Review* (November-December): 106-113.

Woodruff, R.B. (1996) *Know your Customer: New Approaches to Understanding Customer Value and Satisfaction*, Blackwell Publishers, Inc., Cambridge, Massachusetts, USA..

Woodruff, R.B. and Burns, M.J. (1992) Delivering value to consumers: Implications for strategy development and implementation, *American Marketing Association* Winter: 209-216.

Woodruff, R.B. and Gardial, S.F. (1996) *Know Your Customer: New Approaches to Understanding Customer Value and Satisfaction*, Blackwell Publishers, Inc., Cambridge Massachusetts, USA..

Yellott, J. I. Jr. (1977) The relationship between Luce's choice axiom, Thurstone's theory of comparative judgment, and the double exponential distribution, *Journal of Mathematical Psychology* 15: 109-144.

Zweig, J. (1998) Diversification pitfalls, *Money* 27 (10): 85-89.

Appendix 1

Interview Invitation Letter

TOLL
LOGISTICS

Ports & Resources Division
19 Nelson Street
Cardiff NSW 2285
PO Box 205
Cardiff NSW 2285
Telephone (02) 4902 5303
Facsimile (02) 4956 5083
Email graeme_sargent@toll.com.au

15 January 2002

Address:

Dear,

Invitation to a PhD Research Interview with Mateus Magala

Toll Logistics has been sponsoring PhD studies for Mateus Magala. His thesis research is focusing on the trade development opportunities related to Australia's major regional ports located near capital city ports. He is being supervised by Professor Ross Robinson, Foundation Chair in Transport Systems – Intermodal Transport, University of Victoria – a well renowned advocate port intermodal systems.

Toll's has provided Mateus with broad based assistance and now he needs to explore our network of contacts so that he can consolidate his research work and complete his thesis. As your organisation is a participant in the State export/import chain you have been identified as a possible candidate for an interview (refer attached outline). I trust that you will be able to afford Mateus around 60-90 minutes of your time so that he can complete this phase of his research.

Mateus will make phone contact with you in the near future to seek your cooperation and will then make an appointment to see you at a mutually suitable time.

Thank you in anticipation.

Yours sincerely

Graeme Sargent
National Development Manager
Toll Logistics
Port and Resources Division

Appendix 2

Semi-Structured Personal Interview

Australia, February 2002

Research Objective: To develop growth strategies for regional ports, which are in the shadow of Australian capital city ports.

PART A: ABOUT COMPETITION BETWEEN REGIONAL PORTS IN THE SHADOW OF METROPOLITAN PORTS AND METROPOLITAN PORTS

In this section you are invited to share with us your knowledge about how regional ports, particularly those that face competitively strong penalties (e.g. by being adjacent to metropolitan ports, i.e. in the shadow of metropolitan ports), sustain trades and compete for growth. Ports in this category include: Newcastle, Port Kembla, Geelong, Portland, Gladstone, Flinders Ports, Burnie, Launceston, Bunbury, Portland, Sydney Ports, Port of Melbourne, Fremantle.

PART B: ISSUES ABOUT THE VALUE DESIRED BY SHIPPERS IN CONTAINERS, BREAK BULK, AND BULK TRADES.

- You are invited in this section to tell us about what you consider as being the most important factors (key dimensions) that define superior value shippers seek from a port supply chain in the quest for commercial sustainability and competitive advantage.

PART C: ISSUES ON HOW REGIONAL PORT MANAGERS IDENTIFY, EVALUATE, SELECT AND IMPLEMENT VALUABLE MARKET OPPORTUNITIES IN THE SHADOW OF THEIR ADJACENT CAPITAL CITY PORTS.

In this section you are invited to walk us through your own experience about:

- How regional port managers go about identifying or discovering valuable business opportunities that emerge over time.

- The criteria regional port managers use to assess and select valuable market opportunities in the quest for growth.

- The key factors that determine the ability of regional ports to implement/seize valuable market opportunities.

Appendix 3

Stated Choice Experiment and Choice Modelling

Multinomial Logit – Discrete Choice Modelling

```
/**************************************************************************************/
/* Design Number 1                                                                    */
/*                                                                                    */
/* Selection of Valuable Market Opportunities Based on Market Access Criterion        */
/**************************************************************************************/

*options ls=256 nocenter;


/********************/
/* 1. Design Set Up */
/********************/

percentmktruns(2**18)
percentmktorth;

proc sort data=mktdeslev out=list(drop=x:);
   by descending x2;
   where n=36;
   run;

proc print data=list;
run;


/**************************************/
/* 2. Designing the Choice Experiment */
/**************************************/

percentlet m = 3;
percentlet n = 6;
percentlet blocks = 6;
percentmktex(2**18 &blocks, n=&n * &blocks, seed=7654321)


/***************************/
/* 3. Examining the Design */
/***************************/

percentmkteval;

percentmktex(2**18, n=&n * &blocks, init=randomized(drop=x19), options=check, examine=i v)

ods exclude 'variance matrix' (persist);
ods output  'variance matrix' (persist match_all)=v;
percentmktex(2**18, n=&n * &blocks, init=randomized(drop=x19), options=check, examine=v)

proc format;
   value zer -1e-8 - 1e-8 = " 0      ";
   run;
proc print data=v(drop=_:) label;
   format _numeric_ zer7.4;
   label rowname="00"x;
   id rowname;
   run;


/************************************/
/* 4. Generating the Questionnaire */
/************************************/

options ls=90 ps=60 nodate nonumber;

data randomized;
   set randomized(rename=(x19=block));
   run;

proc sort data=randomized;
   by block;
   run;

data _null_;

array trades[&m]           $ 10   _temporary_ ("Container" "Bulk" "Break-Bulk");
array logistic_service[2]  $ 23   _temporary_ ("cost ineffctv & partial" "cost effctv & total");
array labour_force[2]      $ 14   _temporary_ ("inflex & ineff" "flex & effic");
array handling_fac[2]      $ 16   _temporary_ ("underdeveloped & ineff" "developed & effic");
array land_trans[2]        $ 17   _temporary_ ("sgmnt,unrlb,ineff" "intgrt,rlb,effic");
array shipping_serv[2]     $ 13   _temporary_ ("unrlb & ineff" "rlb & effic");
array storage_fac[2]       $ 19   _temporary_ ("underdeveloped & ineffctv" "developed & effect");
array x[18];
file print linesleft=ll;

set randomized;
by block;

if first.block then
do;
          choice = 0;
          put _page_;
          put @50 "Form: " block " Subject: _________" //;
end;
choice+1;
```

```
if ll < 19 then put _page_;
put choice 2. ") Circle only one choice of "
          "trade opportunity to pursue based on your assessment of market access factors:" /;
do trade = 1 to &m;
          put "    " trade 1. ") " trades[trade] +(-1) "; Regional port provides " logistic_service[x[trade]]
               "logistic solution;" "has " labour_force[x[&m + trade]] "labour force; provides " handling_fac[x[2*&m +
               trade]] "cargo handling facilities ;provides " land_trans[x[3*&m + trade]] " land transport; is
               serviced by " shipping_serv[x[4*&m + trade]] "shipping service and provides " storage_fac[x[5*&m +
               trade]] " storage facilities." /;
          end;
put /;
run;


/**********************************/
/* 5. Generating Artificial Data */
/**********************************/

data temp;
array trades[&m]              _temporary_ (-1 2 1);
array logistic_service[2]     _temporary_ (-2 3);
array labour_force[2]         _temporary_ (-1 1);
array handling_fac[2]         _temporary_ (-2 1);
array land_trans[2]           _temporary_ (-2 2);
array shipping_serv[2]        _temporary_ (-2 2);
array storage_fac[2]          _temporary_ (-1 2);
array u[&m];
array x[18];

do rep = 1 to 5;
          n=0;
          do i = 1 to &blocks;
                    k+1;
                    put k 2. +1 i 2. +2 @@;
                    do j=1 to &n; n+1;
                       set randomized point=n;
                       do trade = 1 to &m;
                          u[trade] =  trades[trade] + logistic_service[x[trade]] + labour_force[x[&m + trade]] +
                                      handling_fac[x[2*&m + trade]] + land_trans[x[3*&m + trade]] +
                                      shipping_serv[x[4*&m + trade]] + storage_fac[x[5*&m + trade]] + 2*normal(7);
                          end;
                       u&m = 0 + 3*normal(7);
                       m=max(of u1 - u&m);
                       if abs(u1-m) < 1e-4 then c=1;
                       else if abs(u2-m) < 1e-4 then c=2;
                       else c = 3;
                       put +(-1) c @@;
                       end;
                   end;
          end;
stop;
run;


/***************************/
/* 6. Entering Choice Data */
/***************************/


data results;  /* 6 by 6 blocks */
input subject form (choose1-choose&n) (1.) @@;
cards;
1   1 221223  2 2 232223  3 3 213221  4 4 212213  5 5 121322  6 6 322231
7   1 221313  8 2 222333  9 3 212131 10 4 221213 11 5 121322 12 6 123231
13 1 211322 14 2 232333 15 3 212121 16 4 331212 17 5 121322 18 6 112221
19 1 211232 20 2 222321 21 3 213323 22 4 332222 23 5 121322 24 6 122221
25 1 221333 26 2 212131 27 3 222123 28 4 332213 29 5 121322 30 6 111231
;
run;


/*****************************/
/* 7. Processing Choice Data */
/*****************************/

percentmktkey(x1-x18)

data key;
input trades $ 1-10 (logistic_service labour_force handling_fac land_trans shipping_serv storage_fac) ($);
cards;
Container           x1 x4 x7 x10 x13 x16
Bulk                x2 x5 x8 x11 x14 x17
Break-Bulk          x3 x6 x9 x12 x15 x18
;
run;

percentmktroll(design=randomized, key=key, alt=trades, out=rolled)

proc print data=randomized(obs=2) ;
   var x1-x18;
   id block;
   run;

proc print data=rolled(obs=12) noobs split="_";
run;
```

```
proc format;
   value logserv              1="cost ineffctv & partial"
                              2="cost effectv & total";

   value labforc              1="inflex & ineff"
                              2="flex & effic";

   value handfac              1="underdeveloped & inefficient"
                              2="developed & efficient";

   value lndtrans             1="sgmnt,unrlb,ineff"
                              2="intgrt,rlb,effic";

   value shipserv             1="unrlb & ineff"
                              2="rlb & effic";

   value storfac              1="underdeveloped & ineffctv"
                              2="developed & effective";
run;

data rolled2;
   set rolled;
   format logistic_service logserv. labour_force labforc. handling_fac handfac.land_trans lndtrans. shipping_serv
          shipserv. storage_fac storfac.;
   run;

proc print data=rolled2(obs=12) noobs split="_";
run;


/**************************************************/
/* 8. Merging Choice Data with the Choice Design */
/**************************************************/

percentmktmerge(design=rolled2, data=results, out=res2, blocks=form, nsets=&n, nalts=&m, setvars=choose1-choose&n)

proc print data=res2(obs=24) split="_";
run;


/*****************************************************/
/* 9. Binary Coding for the Multinomial Logit Model */
/*****************************************************/

proc transreg design=5000 data=res2 nozeroconstant norestoremissing;
   model class(trades / zero=none order=data)
         class(logistic_service labour_force handling_fac land_trans shipping_serv storage_fac / zero=none
              order=formatted) / lprefix=0;
   output out=coded(drop=_type_ _name_ intercept);
   id subject set form c;
   run;

proc print data=coded(obs=6) split="_" noobs;
   id trades;
   var subject set form c logistic_service labour_force handling_fac land_trans shipping_serv storage_fac;
   run;

proc print data=coded(obs=6) label split="_";
   id trades;
   var lo: lab: ha: lan: sh: st:;
   run;


/*********************************************/
/* 10. Fitting the Multinomial Logit Model */
/*********************************************/

percentphchoice(on)
options ps=200;
proc phreg data=coded brief;
   model c*c(2)=&_trgind / ties=breslow;
   strata subject set;
   run;
```

Multinomial Logit – Discrete Choice Modelling

```
/**************************************************************************************/
/* Design Number 2                                                                    */
/*                                                                                    */
/* Selection of Valuable Market Opportunities Based on Perceived Benefits Criterion */
/*                                                                                    */
/**************************************************************************************/

*options ls=256 nocenter;


/********************/
/* 1. Design Set Up */
/********************/

percentmktruns(3**15)
percentmktorth;

proc sort data=mktdeslev out=list(drop=x:);
   by descending x3;
   where n=36;
   run;

proc print data=list;
run;


/**************************************/
/* 2. Designing the Choice Experiment */
/**************************************/

percentlet m = 3;
percentlet n = 6;
percentlet blocks = 6;
percentmktex(3**15 &blocks, n=&n * &blocks, seed=7654321)


/***************************/
/* 3. Examining the Design */
/***************************/

percentmkteval;

percentmktex(3**15, n=&n * &blocks, init=randomized(drop=x16),options=check, examine=i v)

ods exclude 'variance matrix' (persist);
ods output 'variance matrix' (persist match_all)=v;
percentmktex(3**15, n=&n * &blocks, init=randomized(drop=x16), options=check, examine=v)

proc format;
value zer -1e-8 - 1e-8 = " 0      ";
run;

proc print data=v(drop=_:) label;
   format _numeric_ zer7.4;
   label rowname="00"x;
   id rowname;
   run;


/************************************/
/* 4. Generating the Questionnaire */
/************************************/

options ls=80 ps=60 nodate nonumber;

data randomized;
set randomized(rename=(x16=block));
run;

proc sort data=randomized;
   by block;
   run;

data _null_;

array trades[&m]               $ 10 _temporary_ ("Container" "Bulk" "Break-Bulk");
array business_growth[3]       $ 6  _temporary_ ("low" "medium" "high");
array finance_roi[3]           $ 6  _temporary_ ("low" "average" "high");
array social_return[3]         $ 6  _temporary_ ("low" "satisfactory" "high");
array r_econ_dev[3]            $ 6  _temporary_ ("low" "considerable" "very high");
array enviro_return[3]         $ 6  _temporary_ ("low" "satisfactory" "high");
array x[15];
file print linesleft=ll;

set randomized;
by block;

if first.block then
do;
          choice = 0;
          put _page_;
          put @50 "Form: " block " Subject: _________" //;
end;
choice+1;
```

```
if ll < 19 then put _page_;
put choice 2. ") Circle only one choice of "
          "trade opportunity to pursue based on your assessment of economic benefit factors:" /;
do trade = 1 to &m;
          put "    " trade 1. ") " trades[trade] +(-1) "; Opportunity promises " business_growth[x[trade]]
              "business growth, " finance_roi[x[&m + trade]] " financial returns," social_return[x[2*&m + trade]] "
              social returns," r_econ_dev[x[3*&m + trade]] "regional economic development and " enviro_return[x[4*&m +
              trade]] " environmental returns." /;
          end;
put /;
run;


/*********************************/
/* 5. Generating Artificial Data */
/*********************************/

data temp;
array trades[&m]                  _temporary_ (-1 2 1);
array business_growth[3]       8  _temporary_ (-4 1 4);
array finance_roi 3]           6  _temporary_ (-5 1 5);
array social_return[3]         7  _temporary_ (-2 1 2);
array r_econ_dev[3]            6  _temporary_ (-3 1 3);
array enviro_return[3]         6  _temporary_ (-1 0 1);
array u[&m];
array x[15];

do rep = 1 to 5;
          n=0;
          do i = 1 to &blocks;
                    k+1;
                    put k 3. +1 i 2. +1 @@;
                              do j=1 to &n; n+1;
                       set randomized point=n;
                       do trade = 1 to &m;
                          u[trade] =  trades[trade] + business_growth[x[trade]] + finance_roi[x[&m + trade]] +
                                      social_return[x[2*&m + trade]] + r_econ_dev[x[3*&m + trade]] +
                                      enviro_return[x[4*&m + trade]] + 2*normal(7);
                          end;
                       u&m = 0 + 3*normal(7);
                       m=max(of u1 - u&m);
                       if abs(u1-m) < 1e-4 then c=1;
                       else if abs(u2-m) < 1e-4 then c=2;
                       else c = 3;
                       put +(-1) c @@;
                       end;
                   end;
          end;
stop;
run;


/***************************/
/* 6. Entering Choice Data */
/***************************/

data results;  /* 6 by 6 blocks */
input subject form (choose1-choose&n) (1.) @@;
cards;
1  1 132221  2 2 211222  3 3 223221  4 4 222312  5 5 231222  6 6 322121
7  1 132211  8 2 231331  9 3 221221 10 4 121232 11 5 221221 12 6 322121
13 1 312222 14 2 231321 15 3 221221 16 4 122232 17 5 221221 18 6 222121
19 1 132222 20 2 211321 21 3 223321 22 4 322232 23 5 321123 24 6 322121
25 1 132222 26 2 211231 27 3 221221 28 4 122212 29 5 331222 30 6 222121
;
run;


/*****************************/
/* 7. Processing Choice Data */
/*****************************/

percentmktkey(x1-x15)

data key;
input trades $ 1-10 (business_growth finance_roi social_return r_econ_dev enviro_return)($);
cards;
Container           x1 x4 x7 x10 x13
Bulk                x2 x5 x8 x11 x14
Break-Bulk          x3 x6 x9 x12 x15
;
run;



percentmktroll(design=randomized, key=key, alt=trades, out=rolled)

proc print data=randomized(obs=2) ;
   var x1-x15;
   id block;
   run;

proc print data=rolled(obs=12) noobs split="_";
run;
```

```
proc format;
   value fmt                             1="low"
                                         2="medium"
                                         3="high";
run;

data rolled2;
   set rolled;
   format business_growth finance_roi social_return r_econ_dev enviro_return fmt.;
   run;

proc print data=rolled2(obs=12) noobs split="_";
run;


/**************************************************/
/* 8. Merging Choice Data with the Choice Design */
/**************************************************/

percentmktmerge(design=rolled2, data=results, out=res2, blocks=form,
              nsets=&n, nalts=&m, setvars=choose1-choose&n)

proc print data=res2(obs=24) split="_";
run;


/*****************************************************/
/* 9. Binary Coding for the Multinomial Logit Model */
/*****************************************************/

proc transreg design=5000 data=res2 nozeroconstant norestoremissing;
   model class(trades / zero=none order=data)
         class(business_growth finance_roi social_return r_econ_dev enviro_return / zero=none order=formatted)
              /lprefix=0;
   output out=coded(drop=_type_ _name_ intercept);
   id subject set form c;
   run;

proc print data=coded(obs=6) split="_" noobs;
    id trades;
   var subject set form c business_growth finance_roi social_return r_econ_dev enviro_return;
   run;

proc print data=coded(obs=6) label split="_";
   id trades;
   var tr: bu: fi: so: r_: bu: en:;
   run;


/*******************************************/
/* 10. Fitting the Multinomial Logit Model */
/*******************************************/

percentphchoice(on)
options ps=200;
proc phreg data=coded brief;
   model c*c(2)=&_trgind / ties=breslow;
   strata subject set;
   run;
```

Multinomial Logit – Discrete Choice Modelling

```
/*****************************************************************************************/
/* Design Number 3                                                                       */
/*                                                                                       */
/* Selection of Valuable Market Opportunities Based on Resources Availability Criterion   */
/*                                                                                       */
/*****************************************************************************************/

*options ls=256 nocenter;

/*******************/
/* 1. Design Set Up */
/*******************/

percentmktruns(3**12)
percentmktorth;

proc sort data=mktdeslev out=list(drop=x:);
   by descending x3;
   where n=36;
   run;

proc print data=list;
run;


/**************************************/
/* 2. Designing the Choice Experiment */
/**************************************/

percentlet m = 3;
percentlet n = 6;
percentlet blocks = 6;
percentmktex(3**12 &blocks, n=&n * &blocks, seed=7654321)


/***************************/
/* 3. Examining the Design */
/***************************/

percentmkteval;

percentmktex(3**12, n=&n * &blocks, init=randomized(drop=x13), options=check, examine=i v)

ods exclude 'variance matrix' (persist);
ods output 'variance matrix' (persist match_all)=v;
percentmktex(3**12, n=&n * &blocks, init=randomized(drop=x13), options=check, examine=v)


proc format;
   value zer -1e-8 - 1e-8 = " 0      ";
   run;

proc print data=v(drop=_:) label;
format _numeric_ zer7.4;
label rowname="00"x;
id rowname;
run;


/**********************************/
/* 4. Generating the Questionnaire */
/**********************************/

options ls=80 ps=60 nodate nonumber;

data randomized;
   set randomized(rename=(x13=block));
   run;

proc sort data=randomized;
by block;
run;

data _null_;

array trades[&m]              $ 10 _temporary_ ("Container" "Bulk" "Break-Bulk");
array financial_res[3]        $ 12 _temporary_ ("huge" "modest" "small");
array technical_res[3]        $ 12 _temporary_ (" long-term " "medium term" " short-term ");
array skills_competences[3]   $ 11 _temporary_ ("long-term" "medium term" "short-term");
array time_to_implement[3]    $ 11 _temporary_ ("long-term" "medium term" "short-term");
array x[12];
file print linesleft=ll;

set randomized;
by block;


if first.block then
do;
          choice = 0;
          put _page_;
          put @50 "Form: " block " Subject: _________" //;
end;
```

```
choice+1;

if ll < 19 then put _page_;
put choice 2. ") Circle only one choice of "
          "trade opportunity to pursue based on your assessment of
          availability of resources factors:" /;
do trade = 1 to &m;
          put "    " trade 1. ") " trades[trade]
              +(-1)  ";Requires " financial_res[x[trade]] "investment,technical resources " "can be mobilized in the "
              technical_res[x[&m + trade]] "skills competences and can be developed" " in the"
              skills_competences[x[2*&m + trade]] "and can be implemented in the " time_to_implement
              [x[3*&m + trade]] +(-1) "." /;
          end;
put /;
run;


/*********************************/
/* 5. Generating Artificial Data */
/*********************************/

data temp;
array trades[&m]              _temporary_ (-1 2 1);
array financial_res[3]      8 _temporary_ (-4 0 5);
array technical_res[3]      8 _temporary_ (-2 0 2);
array skills_competences[3] 8 _temporary_ (-1 0 3);
array time_to_implement[3]  8 _temporary_ (-1 0 2);
array u[&m];
array x[12];

do rep = 1 to 5;
          n=0;
          do i = 1 to &blocks;
                    k+1;
                    put k 3. +1 i 2. +1 @@;
                    do j=1 to &n; n+1;
                       set randomized point=n;
                       do trade = 1 to &m;
                          u[trade] =  trades[trade] + financial_res[x[trade]] + technical_res[x[&m + trade]] +
                                      skills_competences[x[2*&m + trade]] + time_to_implement[x[3*&m + trade]] +
                                      2*normal(7);
                          end;
                       u&m = 0 + 3*normal(7);
                       m=max(of u1 - u&m);
                       if abs(u1-m) < 1e-4 then c=1;
                       else if abs(u2-m) < 1e-4 then c=2;
                       else c = 3;
                       put +(-1) c @@;
                       end;
                    end;
          end;
stop;
run;


/***************************/
/* 6. Entering Choice Data */
/***************************/

data results;  /* 9 by 4 blocks */
input subject form (choose1-choose&n) (1.) @@;
cards;
 1 1 233123  2 2 132212  3 3 322211  4 4 211223  5 5 231321  6 6 211222
 7 1 232123  8 2 332332  9 3 222211 10 4 211221 11 5 221231 12 6 232322
13 1 212122 14 2 232312 15 3 121211 16 4 231232 17 5 222321 18 6 212322
19 1 232122 20 2 222312 21 3 121212 22 4 231222 23 5 221122 24 6 231222
25 1 232123 26 2 322132 27 3 122213 28 4 232233 29 5 231322 30 6 211122
;
run;


/*****************************/
/* 7. Processing Choice Data */
/*****************************/

percentmktkey(x1-x12)

data key;
input trades $ 1-10 (financial_res technical_res skills_competences time_to_implement) ($);
cards;
Container           x1 x4 x7 x10
Bulk                x2 x5 x8 x11
Break-Bulk          x3 x6 x9 x12
;
run;
percentmktroll(design=randomized, key=key, alt=trades, out=rolled)

proc print data=randomized(obs=2) ;
   var x1-x12;
   id block;
   run;

proc print data=rolled(obs=12) noobs split="_";
run;
```

```
proc format;
   value resource                    1="huge"
                                     2="modest"
                                     3="small";

   value invest                      1="long term"
                                     2="medium term"
                                     3="short term";
run;

data rolled2;
   set rolled;
   format financial_res technical_res resource. skills_competences time_to_implement invest.;
   run;

proc print data=rolled2(obs=12) noobs split="_";
run;


/*************************************************/
/* 8. Merging Choice Data with the Choice Design */
/*************************************************/

percentmktmerge(design=rolled2, data=results, out=res2, blocks=form, nsets=&n, nalts=&m, setvars=choose1-choose&n)

proc print data=res2(obs=24) split="_";
run;


/****************************************************/
/* 9. Binary Coding for the Multinomial Logit Model */
/****************************************************/

proc transreg design=5000 data=res2 nozeroconstant norestoremissing;
   model class(trades / zero=none order=data)
         class(financial_res technical_res skills_competences time_to_implement / zero=none order=formatted) /
              lprefix=0;
   output out=coded(drop=_type_ _name_ intercept);
   id subject set form c;
   run;

proc print data=coded(obs=6) split="_" noobs;
id trades;
   var subject set form c financial_res technical_res skills_competences time_to_implement;
   run;

proc print data=coded(obs=6) label split="_";
   id trades;
   var tr: fi: te: sk: ti:;
   run;


/*******************************************/
/* 10. Fitting the Multinomial Logit Model */
/*******************************************/

percentphchoice(on)
options ps=200;
proc phreg data=coded brief;
   model c*c(2)=&_trgind / ties=breslow;
   strata subject set;
   run;
```

Multinomial Logit – Discrete Choice Modelling

```
/*****************************************************************************/
/* Design Number 4                                                           */
/*                                                                           */
/* Selection of Valuable Market Opportunities Based on Business Risk Criterion */
/*                                                                           */
/*****************************************************************************/

*options ls=256 nocenter;

/*********************/
/* 1. Design Set Up */
/*********************/

percentmktruns(3**12)
percentmktorth;

proc sort data=mktdeslev out=list(drop=x:);
   by descending x3;
   where n=36;
   run;

proc print data=list;
run;


/****************************************/
/* 2. Designing the Choice Experiment */
/****************************************/

percentlet m = 3;
percentlet n = 6;
percentlet blocks = 6;
percentmktex(3**12 &blocks, n=&n * &blocks, seed=7654321)


/****************************/
/* 3. Examining the Design */
/****************************/

percentmkteval;

percentmktex(3**12, n=&n * &blocks, init=randomized(drop=x13), options=check, examine=i v)

ods exclude 'variance matrix' (persist);
ods output 'variance matrix' (persist match_all)=v;
percentmktex(3**12, n=&n * &blocks, init=randomized(drop=x13), options=check, examine=v)

proc format;
value zer -1e-8 - 1e-8 = " 0      ";
run;

proc print data=v(drop=_:) label;
format _numeric_ zer7.4;
label rowname="00"x;
id rowname;
run;


/*************************************/
/* 4. Generating the Questionnaire */
/*************************************/

options ls=80 ps=60 nodate nonumber;

data randomized;
   set randomized(rename=(x13=block));
   run;

proc sort data=randomized;
by block;
run;

data _null_;

array trades[&m]                  $ 10 _temporary_ ("Container" "Bulk" "Break-Bulk");
array comm_success[3]             $ 8  _temporary_ ("low" "moderate" "high");
array organisational_fit[3]       $ 10 _temporary_ ("negative impact" "no impact on" "enhances");
array competition[3]              $ 11 _temporary_ ("high" "moderate" "low");
array mgt_support[3]              $ 11 _temporary_ ("low" "medium" "high");
array x[12];
file print linesleft=ll;

set randomized;
by block;


if first.block then
do;
          choice = 0;
          put _page_;
          put @50 "Form: " block " Subject: _________" //;
end;
choice+1;
```

```
if ll < 19 then put _page_;
put choice 2. ") Circle only one choice of "
          "trade opportunities on business risk criteria:" /;
do trade = 1 to &m;
          put "    " trade 1. ") " trades[trade] +(-1)  ";Commercial success is " comm_success[x[trade]]
              +(-1)"," organisational_fit[x[1*&m + trade]]"organisational profit and growth objectives, attracts "
              competition[x[2*&m + trade]] " levels of competition and has " mgt_support[x[3*&m + trade]]
              "management support and committment." /;
          end;
put /;
run;


/*********************************/
/* 5. Generating Artificial Data */
/*********************************/

data temp;
array trades[&m]                      _temporary_ (-1 2 1);
array comm_success[3]              8  _temporary_ (-4 1 4);
array organisational_fit[3]        8  _temporary_ (-3 1 3);
array competition[3]               8  _temporary_ (-2 1 2);
array mgt_support[3]               8  _temporary_ (-1 0 1);
array u[&m];
array x[12];

do rep = 1 to 5;
          n=0;
          do i = 1 to &blocks;
                    k+1;
                    put k 3. +1 i 2. +1 @@;
                    do j=1 to &n; n+1;
                       set randomized point=n;
                       do trade = 1 to &m;
                          u[trade] =  trades[trade] + comm_success[x[trade]] + organisational_fit[x[&m + trade]] +
                                      competition[x[2*&m + trade]] + mgt_support[x[3*&m + trade]] + 2*normal(7);
                          end;
                       u&m = 0 + 3*normal(7);
                       m=max(of u1 - u&m);
                       if abs(u1-m) < 1e-4 then c=1;
                       else if abs(u2-m) < 1e-4 then c=2;
                       else c = 3;
                       put +(-1) c @@;
                       end;
                    end;
          end;
stop;
run;


/***************************/
/* 6. Entering Choice Data */
/***************************/

data results;  /* 9 by 4 blocks */
input subject form (choose1-choose&n) (1.) @@;
cards;
1  1 232123  2 2 132322  3 3 322211  4 4 213223  5 5 231321  6 6 311222
7  1 232123  8 2 332332  9 3 222211 10 4 231221 11 5 221221 12 6 112322
13 1 212122 14 2 132332 15 3 121211 16 4 231231 17 5 221321 18 6 112322
19 1 232121 20 2 222312 21 3 123211 22 4 233222 23 5 221322 24 6 121322
25 1 232123 26 2 322132 27 3 122213 28 4 232231 29 5 231322 30 6 111122
;
run;


/*****************************/
/* 7. Processing Choice Data */
/*****************************/

percentmktkey(x1-x12)

data key;
input trades $ 1-10 (comm_success organisational_fit competition mgt_support) ($);
cards;
Container           x1 x4 x7 x10
Bulk                x2 x5 x8 x11
Break-Bulk          x3 x6 x9 x12
;
run;


percentmktroll(design=randomized, key=key, alt=trades, out=rolled)

proc print data=randomized(obs=2) ;
   var x1-x12;
   id block;
   run;

proc print data=rolled(obs=12) noobs split="_";
run;
```

```
proc format;
   value comm                     1="low"
                                  2="moderate"
                                  3="high";

   value org                      1="negative impact"
                                  2="no impact on"
                                  3="enhances";

   value comp                     1="high"
                                  2="moderate"
                                  3="low";


   value mgt                      1="low"
                                  2="medium"
                                  3="high";
   run;

data rolled2;
   set rolled;
   format comm_success comm. organisational_fit org. competition comp. mgt_support mgt.;
run;

proc print data=rolled2(obs=12) noobs split="_";
run;


/**************************************************/
/* 8. Merging Choice Data with the Choice Design */
/**************************************************/

percentmktmerge(design=rolled2, data=results, out=res2, blocks=form, nsets=&n, nalts=&m, setvars=choose1-choose&n)

proc print data=res2(obs=24) split="_";
run;


/****************************************************/
/* 9. Binary Coding for the Multinomial Logit Model */
/****************************************************/

proc transreg design=5000 data=res2 nozeroconstant norestoremissing;
   model class(trades / zero=none order=data)
         class(comm_success organisational_fit competition mgt_support / zero=none order=formatted) / lprefix=0;
   output out=coded(drop=_type_ _name_ intercept);
   id subject set form c;
   run;

proc print data=coded(obs=6) split="_" noobs;
id trades;
   var subject set form c comm_success organisational_fit competition mgt_support;
   run;

proc print data=coded(obs=6) label split="_";
  id trades;
  var tr: comm: or: comp: mg:;
  run;


/********************************************/
/* 10. Fitting the Multinomial Logit Model */
/********************************************/

percentphchoice(on)
options ps=200;
proc phreg data=coded brief;
   model c*c(2)=&_trgind / ties=breslow;
   strata subject set;
   run;
```

Multinomial Logit – Discrete Choice Modelling

```
/*********************************************************************************/
/* Design Number 5                                                               */
/*                                                                               */
/* Selection of Valuable Market Opportunities Based on Political Risk Criterion */
/*                                                                               */
/*********************************************************************************/

*options ls=256 nocenter;


/********************/
/* 1. Design Set Up */
/********************/

percentmktruns(3**9)
percentmktorth;

proc sort data=mktdeslev out=list(drop=x:);
   by descending x3;
   where n=36;
   run;

proc print data=list;
run;


/**************************************/
/* 2. Designing the Choice Experiment */
/**************************************/

percentlet m = 3;
percentlet n = 6;
percentlet blocks = 6;
percentmktex(3**9 &blocks, n=&n * &blocks, seed=7654321)


/***************************/
/* 3. Examining the Design */
/***************************/

percentmkteval;

percentmktex(3**9, n=&n * &blocks, init=randomized(drop=x10), options=check, examine=i v)

ods exclude 'variance matrix' (persist);
ods output 'variance matrix' (persist match_all)=v;
percentmktex(3**9, n=&n * &blocks, init=randomized(drop=x10), options=check, examine=v)


proc format;
   value zer -1e-8 - 1e-8 = " 0      ";
   run;

proc print data=v(drop=_:) label;
format _numeric_ zer7.4;
label rowname="00"x;
id rowname;
run;


/************************************/
/* 4. Generating the Questionnaire */
/************************************/

options ls=80 ps=60 nodate nonumber;

data randomized;
   set randomized(rename=(x10=block));
   run;

proc sort data=randomized;
by block;
run;

data _null_;

array trades[&m]          $ 10 _temporary_ ("Container" "Bulk" "Break-Bulk");
array govt_support[3]     $ 10 _temporary_ ("low" "sufficient" "high");
array comm_support[3]     $ 10 _temporary_ ("low" "sufficient" "high");
array reg_require[3]      $ 9  _temporary_ ("stringent" "flexible" "minimal");
array x[9];
file print linesleft=ll;

set randomized;
by block;
if first.block then
do;
          choice = 0;
          put _page_;
          put @50 "Form: " block " Subject: _________" //;
end;
choice+1;

if ll < 19 then put _page_;
put choice 2. ") Circle only one choice of "
```

```
         "trade opportunity to pursue based on your assessment of
      political risk factors:" /;
do trade = 1 to &m;
         put "    " trade 1. ") " trades[trade]
                  +(-1)  ";Government support is " govt_support[x[trade]] ",
           community support is " comm_support[x[&m + trade]] "and
           regulatory requirements are " reg_require[x[2*&m + trade]]
           +(-1) "." /;
         end;
put /;
run;


/*********************************/
/* 5. Generating Artificial Data */
/*********************************/

data temp;
array trades[&m]                _temporary_ (-1 2 1);
array govt_support[3]  8  _temporary_ (-2 1 2);
array comm_support[3]  8  _temporary_ (-1 0 1);
array reg_require[3]   8  _temporary_ (-1 1 2);
array u[&m];
array x[12];

do rep = 1 to 5;
         n=0;
         do i = 1 to &blocks;
                  k+1;
                  put k 3. +1 i 2. +1 @@;
                  do j=1 to &n; n+1;
                     set randomized point=n;
                     do trade = 1 to &m;
                        u[trade] =  trades[trade] + govt_support[x[trade]] + comm_support[x[&m + trade]] +
                                    reg_require[x[2*&m + trade]] + 2*normal(7);

                        end;
                     u&m = 0 + 3*normal(7);
                     m=max(of u1 - u&m);
                     if abs(u1-m) < 1e-4 then c=1;
                     else if abs(u2-m) < 1e-4 then c=2;
                     else c = 3;
                     put +(-1) c @@;
                     end;
                   end;
        end;
stop;
run;


/***************************/
/* 6. Entering Choice Data */
/***************************/

data results;  /* 9 by 4 blocks */
input subject form (choose1-choose&n) (1.) @@;
cards;
1  1 122123  2 2 132212  3 3 232322  4 4 222112  5 5 222223  6 6 321221
7  1 122313  8 2 132323  9 3 232122 10 4 221213 11 5 222231 12 6 233212
13 1 322322 14 2 232312 15 3 222322 16 4 232132 17 5 222221 18 6 231212
19 1 122222 20 2 223312 21 3 213322 22 4 222122 23 5 221123 24 6 221222
25 1 122323 26 2 233132 27 3 222122 28 4 232113 29 5 223222 30 6 221232
;
run;


/*****************************/
/* 7. Processing Choice Data */
/*****************************/

percentmktkey(x1-x9)

data key;
input trades $ 1-10 (govt_support comm_support reg_require) ($);
cards;
Container           x1 x4 x7
Bulk                x2 x5 x8
Break-Bulk          x3 x6 x9
;
run;


percentmktroll(design=randomized, key=key, alt=trades, out=rolled)

proc print data=randomized(obs=2) ;
var x1-x9;
id block;
run;

proc print data=rolled(obs=12) noobs split="_";
run;
```

```
proc format;
   value support                       1="low"
                                       2="sufficient"
                                       3="high";

   value require                       1="stringent"
                                       2="flexible"
                                       3="minimal";
   run;

data rolled2;
   set rolled;
   format govt_support comm_support support. reg_require require.;
   run;

proc print data=rolled2(obs=12) noobs split="_";
run;


/**************************************************/
/* 8. Merging Choice Data with the Choice Design */
/**************************************************/

percentmktmerge(design=rolled2, data=results, out=res2, blocks=form, nsets=&n, nalts=&m, setvars=choose1-choose&n)

proc print data=res2(obs=24) split="_";
run;


/*****************************************************/
/* 9. Binary Coding for the Multinomial Logit Model */
/*****************************************************/

proc transreg design=5000 data=res2 nozeroconstant norestoremissing;
   model class(trades / zero=none order=data)
         class(govt_support comm_support reg_require / zero=none order=formatted) / lprefix=0;
   output out=coded(drop=_type_ _name_ intercept);
   id subject set form c;
   run;

proc print data=coded(obs=6) split="_" noobs;
id trades;
   var subject set form c govt_support comm_support reg_require;
   run;

proc print data=coded(obs=6) label split="_";
   id trades;
   var tr: go: co: re:;
   run;


/********************************************/
/* 10. Fitting the Multinomial Logit Model */
/********************************************/

percentphchoice(on)
options ps=200;
proc phreg data=coded brief;
   model c*c(2)=&_trgind / ties=breslow;
   strata subject set;
   run;
```

Multinomial Logit – Discrete Choice Modelling

```
/*************************************************************************************/
/* Design Number 6                                                                   */
/*                                                                                   */
/* Selection of Valuable Market Opportunities Based on the Overall Decision Criteria */
/*                                                                                   */
/*************************************************************************************/

*options ls=256 nocenter;


/********************/
/* 1. Design Set Up */
/********************/

percentmktruns(3**15)
percentmktorth;

proc sort data=mktdeslev out=list(drop=x:);
   by descending x3;
   where n=36;
   run;

proc print data=list;
run;


/***************************************/
/* 2. Designing the Choice Experiment */
/***************************************/

percentlet m = 3;
percentlet n = 6;
percentlet blocks = 6;
percentmktex(3**15 &blocks, n=&n * &blocks, seed=7654321)


/***************************/
/* 3. Examining the Design */
/***************************/

percentmkteval;

percentmktex(3**15, n=&n * &blocks, init=randomized(drop=x16), options=check, examine=i v)

ods exclude 'variance matrix' (persist);
ods output 'variance matrix' (persist match_all)=v;
percentmktex(3**15, n=&n * &blocks, init=randomized(drop=x16), options=check, examine=v)

proc format;
    value zer -1e-8 - 1e-8 = " 0      ";
run;

proc print data=v(drop=_:) label;
format _numeric_ zer7.4;
label rowname="00"x;
id rowname;
run;


/************************************/
/* 4. Generating the Questionnaire */
/************************************/

options ls=80 ps=60 nodate nonumber;

data randomized;
   set randomized(rename=(x16=block));
   run;

proc sort data=randomized;
by block;
run;

data _null_;

array trades[&m]                 $ 10 _temporary_ ("Container" "Bulk"  "Break-Bulk");
array market_access[3]           $ 8  _temporary_ ("inferior" "similar" "superior");
array economic_benefit[3]        $ 6  _temporary_ ("low" "medium" "high");
array resource_availability[3]   $ 7  _temporary_ ("long" "medium" "short");
array business_risk[3]           $ 6  _temporary_ ("high" "medium" "low");
array political_risk[3]          $ 6  _temporary_ ("high" "medium" "low");
array x[15];
file print linesleft=ll;

set randomized;
by block;


if first.block then
do;
          choice = 0;
          put _page_;
          put @50 "Form: " block " Subject: _________" //;
end;
```

```
choice+1;

if ll < 19 then put _page_;
put choice 2. ") Circle only one choice of "
       "trade opportunity to pursue based on your assessment of key decision factors:" /;
do trade = 1 to &m;
          put "    " trade 1. ") " trades[trade]
              +(-1) "; Regional port provides " market_access[x[trade]] "access to markets than "
              "the capital city port; has " economic_benefit[x[&m + trade]] "economic benefits; Resources can be"
              "mobilized in the " resource_availability[x[2*&m + trade]] "term; has " business_risk[x[3*&m + trade]]
              "business risk and " political_risk[x[4*&m + trade]] " political risk." /;
          end;
put /;
run;


/*********************************/
/* 5. Generating Artificial Data */
/*********************************/

data temp;
array trades[&m]                   _temporary_ (-1 2 1);
array market_access[3]          8  _temporary_ (-1 0 1);
array economic_benefit[3]       6  _temporary_ (0 1 3);
array resource_availability[3]  7  _temporary_ (-2 0 1);
array business_risk[3]          6  _temporary_ (-1 1 3);
array political_risk[3]         6  _temporary_ (0 1 2);
array u[&m];
array x[15];

do rep = 1 to 5;
          n=0;
          do i = 1 to &blocks;
                    k+1;
                    put k 3. +1 i 2. +1 @@;
                    do j=1 to &n; n+1;
                       set randomized point=n;
                       do trade = 1 to &m;
                          u[trade] = trades[trade] + market_access[x[trade]] +  economic_benefit[x[&m + trade]]+
                                     resource_availability[x[2*&m + trade]]+ business_risk[x[3*&m + trade]] +
                                     political_risk[x[4*&m + trade]] + 2*normal(7);
                                end;
                          u&m = 0 + 3*normal(7);
                          m=max(of u1 - u&m);
                          if abs(u1-m) < 1e-4 then c=1;
                          else if abs(u2-m) < 1e-4 then c=2;
                          else c = 3;
                          put +(-1) c @@;
                       end;
                    end;
          end;
stop;
run;


/***************************/
/* 6. Entering Choice Data */
/***************************/

data results;  /* 6 by 6 blocks */
input subject form (choose1-choose&n) (1.) @@;
cards;
1   1 231223  2 2 132222  3 3 323222  4 4 112213  5 5 222222  6 6 222221
7   1 222213  8 2 121321  9 3 221212 10 4 122213 11 5 222232 12 6 222222
13 1 312212 14 2 223122 15 3 121212 16 4 112212 17 5 222212 18 6 212222
19 1 212212 20 2 223122 21 3 121322 22 4 122222 23 5 221122 24 6 222222
25 1 222213 26 2 223131 27 3 121222 28 4 122213 29 5 223222 30 6 212222
;
run;


/*****************************/
/* 7. Processing Choice Data */
/*****************************/

percentmktkey(x1-x15)

data key;
input trades $ 1-10 (market_access economic_benefit resource_availability business_risk political_risk) ($);
cards;
Container           x1 x4 x7 x10 x13
Bulk                x2 x5 x8 x11 x14
Break-Bulk          x3 x6 x9 x12 x15
;
run;

percentmktroll(design=randomized, key=key, alt=trades, out=rolled)

proc print data=randomized(obs=2) ;
   var x1-x15;
   id block;
   run;

proc print data=rolled(obs=12) noobs split="_";
run;
```

```
proc format;
   value access                        1="inferior"
                                       2="same"
                                       3="superior";

   value econben                       1="low"
                                       2="medium"
                                       3="high";

   value resavail                      1="long"
                                       2="medium"
                                       3="short";

   value busrisk                       1="high"
                                       2="medium"
                                       3="low";

   value polrisk                       1="high"
                                       2="medium"
                                       3="low";
   run;

data rolled2;
   set rolled;
   format market_access access. economic_benefit econben. resource_availability resavail. business_risk busrisk.
          political_risk polrisk.;
   run;

proc print data=rolled2(obs=12) noobs split="_";
run;


/**************************************************/
/* 8. Merging Choice Data with the Choice Design */
/**************************************************/

percentmktmerge(design=rolled2, data=results, out=res2, blocks=form, nsets=&n, nalts=&m, setvars=choose1-choose&n)

proc print data=res2(obs=24) split="_";
run;


/*****************************************************/
/* 9. Binary Coding for the Multinomial Logit Model */
/*****************************************************/

proc transreg design=5000 data=res2 nozeroconstant norestoremissing;
   model class(trades / zero=none order=data)
         class(market_access economic_benefit resource_availability business_risk political_risk / zero=none
              order=formatted) / lprefix=0;
   output out=coded(drop=_type_ _name_ intercept);
   id subject set form c;
   run;

proc print data=coded(obs=6) split="_" noobs;
id trades;
   var subject set form c market_access economic_benefit resource_availability business_risk political_risk;
   run;

proc print data=coded(obs=6) label split="_";
   id trades;
   var tr: ma: ec: re: bu: po:;
   run;

/****************************************************************************/
/* 10.Fitting the Multinomial Logit Model with Alternative Specific Effects */
/****************************************************************************/

percentphchoice(on)
options ps=200;
proc phreg data=coded brief;
   model c*c(2)=&_trgind / ties=breslow;
   strata subject set;
   run;
```

Appendix 4

Internet-Based Survey

Integrated Freight Systems Research Unit
Faculty of Science, Engineering and Technology
VICTORIA UNIVERSITY

SURVEY
of Port
Authorities &
Port Service Providers

HOW A REGIONAL PORT IN THE SHADOW OF A CAPITAL CITY PORT
EXPLOITS OPPORTUNITIES FOR GROWTH

WELCOME TO OUR SURVEY!

This survey is a vital part of a PhD research program at Victoria University in Melbourne. It seeks to understand the basis for effective growth strategies for *major regional ports that have developed in the shadow of capital city ports in Australia.*

The survey is divided into two parts. Part I asks questions about perceptions and actions of regional port managers in the quest for competitive advantage and growth. In this section, virtually all questions require that you indicate in a rating scale the answer that best represents your own experience, opinion, preference, perception or strategy.

In Part II an experiment is presented. It is designed to help us learn about how managers of regional ports make decisions about which opportunities to pursue when competing for growth in the shadow of capital city ports. There are a number of hypothetical market situations scenarios that are shown. In each scenario you are asked to evaluate potential opportunities in bulk, container and break-bulk trades and choose one that you would most likely pursue to achieve competitive advantage and growth. Basically, you are asked to trade-off or compare the available options or opportunity profiles on a range of factors and then choose the one you most like. The survey ends with few general questions about yourself and your organisation.

If you get stuck somewhere in the survey please do not hesitate to call Mateus Magala on **(02) 95570390 or (02) 41232 0535** for assistance.

Please complete the survey as directed in each section and question. All responses will be treated confidentially. To submit your response, select the **SUBMIT** button in your screen at the end of the survey.

We would appreciate it if you could complete the survey as soon as possible and preferably no later than February 7, 2003. **THANK YOU!**

PART I

SECTION A. STRATEGIC MOTIVES AND REGIONAL PORT STRATEGIES

A1. **How important are the following *motives* when a regional port competes with a neighbour capital city port for opportunities?**
(Please use the following rating scale to tick the number which best represents your answer.)

1 = Irrelevant
2 = Not important
3 = Moderately important
4 =Very Important
5 = Vital

Profitable growth of trade	1	2	3	4	5
Protect market share	1	2	3	4	5
Improve financial performance of the port	1	2	3	4	5
Make use of port assets	1	2	3	4	5
Image of the port as an economic driver for regional growth	1	2	3	4	5
Facilitate regional economic growth	1	2	3	4	5

A2. **How important are the following strategies for a regional port which competes with a capital city port?**
(Please use the following rating scale to tick the number which best describes your answer to each response item as suggested below.)

1 = Irrelevant
2 = Not important
3 = Moderately important
4 =Very Important
5 = Vital

Provision of cost-effective logistics service	1	2	3	4	5
Provision of efficient cargo handling facilities	1	2	3	4	5
Provision of adequate storage facilities	1	2	3	4	5
Provision of vacant land for business development	1	2	3	4	5
Provision of efficient land transport	1	2	3	4	5
Provision of efficient shipping service	1	2	3	4	5
Improvement of financial returns	1	2	3	4	5
Improvement of environmental returns	1	2	3	4	5
Improvement social returns	1	2	3	4	5
Provision of competitive port charges	1	2	3	4	5
Provision of a lesser congested market access alternative	1	2	3	4	5
Provision of more customer value through flexible port services & charges	1	2	3	4	5
Compete head to head with adjacent metropolitan port	1	2	3	4	5
Exploiting diseconomies and weaknesses of metropolitan ports	1	2	3	4	5
Cooperating with adjacent the capital city port	1	2	3	4	5
Competing as a stand alone business entity	1	2	3	4	5
Competing as part of value-driven supply chains	1	2	3	4	5

A3. **In competing with the capital city ports, how likely is it that the regional port pursue the following opportunities?**

(Please use the following rating scale to indicate the likelihood of pursuing opportunities in trades presented below.)

1 = Very unlikely
2 = Unlikely
3 = Don't know
4 = Likely
5 = Very likely

Opportunities in break-bulk trade	1	2	3	4	5
Opportunities in container trade	1	2	3	4	5
Opportunities in bulk trade	1	2	3	4	5

SECTION B. IDENTIFICATION OF MARKET OPPORTUNITIES

B1. **To what extent do you use each of the following methods to discover market opportunities?**
(Please use the following rating scale to tick for each of f the following statements the number which best describes your opinion.)

1 = Not at all
2 = Seldom
3 = To some extent
4 = Often
5 = To a great extent

Accidentally/ Chance	1	2	3	4	5
Established formal search process	1	2	3	4	5
Identification of trends in trades	1	2	3	4	5
Identification of shipper needs	1	2	3	4	5
Broad environmental scanning	1	2	3	4	5
Value chain analysis	1	2	3	4	5
Intuitive reaction (gut-feeling)	1	2	3	4	5
Strategic planning	1	2	3	4	5
Marketing Research	1	2	3	4	5
Approaches from port users	1	2	3	4	5

B2. **To what extent do you search for market opportunities in the following markets?**
(Please use the following rating to tick for each of the following markets the number which best describes the scale of your search for opportunities.)

1 = Not at all
2 = Seldom
3 = To some extent
4 = Often
5 = To a great extent

Immediate region or hinterland	1	2	3	4	5
Intra-states trades	1	2	3	4	5
Inter-states trades	1	2	3	4	5
Overseas markets	1	2	3	4	5
Adjacent metropolitan area	1	2	3	4	5

B3. **How much do you agree or disagree with each of the following explanations about why some regional ports and not others search more the environment for valuable market opportunities.**
(Please use the following rating scale to tick for each of the following statements the number which best describes your propensity to search for opportunities.)

1 = Strongly disagree
2 = Disagree
3 = Neither agree nor disagree
4 = Agree
5 = Strongly agree

They have relatively more resources than others	1	2	3	4	5
They want to reduce competitive pressure	1	2	3	4	5
They have proactive management	1	2	3	4	5
They pursue growth as the main goal	1	2	3	4	5
They want to portray a good image	1	2	3	4	5
They are willing to take more risk than others	1	2	3	4	5
They compete more on the provision of superior value to shippers rather than on internal efficiencies only	1	2	3	4	5
They scan more the environment for opportunities using systematic and well established search procedures	1	2	3	4	5
They have better network relationships	1	2	3	4	5
They strive to compete as key members of value-driven supply chains	1	2	3	4	5

SECTION C. EVALUATION OF MARKET OPPORTUNITIES

INSTRUCTION: In this section we would like you to evaluate a range of strategic factors affecting your decision to pursue or not pursue potential opportunities that may be available for regional ports, which compete for growth *in the shadow of capital city ports* in break-bulk, container and bulk trades. In each question use the scale provided to indicate your best response.

C1. **How important are the following general criteria when you evaluate valuable market opportunities?**
(Please use the following rating scale to tick one number for each statement.)

1 = Irrelevant
2 = Not important
3 = Moderately important
4 =Very Important
5 = Vital

Attractiveness

Access to markets that the regional port can provide to shippers compared to the metropolitan port	1	2	3	4	5
Perceived benefits that the opportunity is likely to deliver	1	2	3	4	5
The overall importance of the above criterion	1	2	3	4	5

Implementability

Availability of resources	1	2	3	4	5
Business risk involved	1	2	3	4	5
Political risk involved	1	2	3	4	5
The overall importance of the above criteria	1	2	3	4	5

C3. **How important are the following factors when regional port managers evaluate strategic opportunities with BULK TRADES?**
(Please tick only one number for each factor.)

1 = Irrelevant
2 = Not important
3 = Moderately important
4 =Very Important
5 = Vital

Market Access Criterion

Cost-effectiveness of the logistics service	1	2	3	4	5
Productive labour force	1	2	3	4	5
Efficient cargo handling facilities	1	2	3	4	5
Adequate storage facilities	1	2	3	4	5
Efficient land transport	1	2	3	4	5
Efficient shipping service	1	2	3	4	5
The overall importance of the above criterion	1	2	3	4	5

Perceived Benefits Criterion

Potential business growth	1	2	3	4	5
Potential financial returns	1	2	3	4	5
Potential regional development benefits	1	2	3	4	5
Potential Social returns	1	2	3	4	5
Potential Environmental returns	1	2	3	4	5
The overall importance of the above criterion	1	2	3	4	5

Resources Availability Criterion

Financial resources	1	2	3	4	5
Technical resources	1	2	3	4	5
Relevant skills and core competences	1	2	3	4	5
Time to implementation	1	2	3	4	5
The overall importance of the above criteria	1	2	3	4	5

Business Risk Criterion

Potential commercial success	1	2	3	4	5
Fit with organisational profit and growth objectives	1	2	3	4	5
Top management support & commitment	1	2	3	4	5
Level of competition that the opportunity will attract	1	2	3	4	5
The overall importance of the above criterion	1	2	3	4	5

Political Risk Criterion

Government support & commitment	1	2	3	4	5
Community acceptance & support	1	2	3	4	5
Regulatory requirements	1	2	3	4	5
The overall importance of the above criterion	1	2	3	4	5

C4. **How important are the following factors when regional port managers evaluate strategic opportunities with BREAK-BULK TRADES?**
(Please tick only one number for each factor.)

1 = Irrelevant
2 = Not important
3 = Moderately important
4 =Very Important
5 = Vital

Market Access Criterion

Cost-effectiveness of the logistics service	1	2	3	4	5
Productive labour force	1	2	3	4	5
Efficient cargo handling facilities	1	2	3	4	5
Adequate storage facilities	1	2	3	4	5
Efficient land transport	1	2	3	4	5
Efficient shipping service	1	2	3	4	5
The overall importance of the above criterion	1	2	3	4	5

Perceived Benefits Criterion

Potential business growth	1	2	3	4	5
Potential financial returns	1	2	3	4	5
Potential regional development benefits	1	2	3	4	5
Potential Social returns	1	2	3	4	5
Potential Environmental returns	1	2	3	4	5
The overall importance of the above criterion	1	2	3	4	5

Resources Availability Criterion

Financial resources	1	2	3	4	5
Technical resources	1	2	3	4	5
Relevant skills and core competences	1	2	3	4	5
Time to implementation	1	2	3	4	5
The overall importance of the above criterion	1	2	3	4	5

Business Risk Criterion

Potential commercial success	1	2	3	4	5
Fit with organisational profit and growth objectives	1	2	3	4	5
Top management support & commitment	1	2	3	4	5
Level of competition that the opportunity will attract	1	2	3	4	5
The overall importance of the above criterion	1	2	3	4	5

Political Risk Criterion

Government support & commitment	1	2	3	4	5
Community acceptance & support	1	2	3	4	5
Regulatory requirements	1	2	3	4	5
The overall importance of the above criterion	1	2	3	4	5

C4. **How important are the following factors when regional port managers evaluate strategic opportunities in CONTAINER TRADES?**
(Please tick only one number for each factor.)

1 = Irrelevant
2 = Not important
3 = Moderately important
4 =Very Important
5 = Vital

Market Access Criterion

Cost-effectiveness of the logistics service	1	2	3	4	5
Productive labour force	1	2	3	4	5
Efficient cargo handling facilities	1	2	3	4	5
Adequate storage facilities	1	2	3	4	5
Efficient land transport	1	2	3	4	5
Efficient shipping service	1	2	3	4	5
The overall importance of the above criterion	1	2	3	4	5

Perceived Benefits Criterion

Potential business growth	1	2	3	4	5
Potential financial returns	1	2	3	4	5
Potential regional development benefits	1	2	3	4	5
Potential Social returns	1	2	3	4	5
Potential Environmental returns	1	2	3	4	5
The overall importance of the above criterion	1	2	3	4	5

Resources Availability Criterion

Financial resources	1	2	3	4	5
Technical resources	1	2	3	4	5
Relevant skills and core competences	1	2	3	4	5
Time to implementation	1	2	3	4	5
The overall importance of the above criterion	1	2	3	4	5

Business Risk Criterion

Potential commercial success	1	2	3	4	5
Fit with organisational profit and growth objectives	1	2	3	4	5
Top management support & commitment	1	2	3	4	5
Level of competition that the opportunity will attract	1	2	3	4	5
The overall importance of the above criterion	1	2	3	4	5

Political Risk Criterion

Government support & commitment	1	2	3	4	5
Community acceptance & support	1	2	3	4	5
Regulatory requirements	1	2	3	4	5
The overall importance of the above criteria	1	2	3	4	5

PART II

SECTION D. SELECTION OF VALUABLE MARKET OPPORTUNITIES: THE CHOICE EXPERIMENT

INSTRUCTION: In this section we would like you to consider some hypothetical market decision-making situations related to the evaluation and selection of opportunities to pursue in the context of competition of regional ports for bulk, break-bulk and container trades against their adjacent capital city ports. In every situation or scenario we ask you to evaluate the profile of each potential opportunity on a given criteria and then select one you believe *regional ports in the shadow of capital city ports* would pursue if their objective was to gain competitive advantage and achieve growth.

In general there are 5 key factors – access to markets that regional ports can provide to shippers compared to capital city ports; the economic benefits that a given opportunity promises to deliver; the resource that will be required to implement such an opportunity; and the potential business and political risks involved - that are hypothesised to influence your decisions as to which opportunity profiles you would most likely select in pursuing the quest for competitive advantage and growth.

Based on these factors a number of scenarios are sequentially presented, first on each of the 5 criteria individually and then on 5 criteria combined. In each case you are asked to evaluate the scenarios on given criteria and then choose the opportunity you would most likely pursue if your objective were to promote the growth of a regional port that is *in the shadow of a capital city port*.

D1. **How much do you agree or disagree with each of the following statements about your decision-making when selecting strategic opportunities to pursue?**
(Please use the following rating scale to tick the number which best describes your answer to each response item below.)

1 = Strongly disagree
2 = Disagree
3 = Neither agree or disagree
4 = Agree
5 = Strongly agree

The selection of strategic opportunities is guided by my knowledge and experience rather than a formal process	1	2	3	4	5
Only a small number of factors affect the final decision about which opportunity to pursue	1	2	3	4	5
A strategic opportunity is selected on the basis of its overall performance taking into account all aspects related to its attractiveness and implementability; the relative performance in particular aspects is not as important	1	2	3	4	5

Choice of a market opportunity based on your assessment of
MARKET ACCESS FACTORS

BLOCK No.1 SCENARIO No. 1

Opportunity Profile	Container Trade Opportunity 1	Bulk Trade Opportunity 2	Break-Bulk Trade Opportunity 3
MARKET ACCESS FACTORS			
Logistics Service	*Regional port can provide a cost-effective & total logistic service*	*Regional port can provide a cost-effective & total logistic service*	*Regional port can only provide a cost-ineffective & partial logistic service*
Labour Force	*Has limited skills, is inflexible and inefficient*	*Has sufficient skills, is flexible and efficient*	*Has sufficient skills, is flexible and* efficient
Cargo Handling Facilities	*Regional port can provide developed and efficient cargo handling facilities*	*Regional port can only provide underdeveloped and inefficient cargo handling facilities*	*Regional port can provide developed and efficient cargo handling facilities*
Land Transport	*Regional port can only provide a segmented, unreliable and inefficient land transport*	*Regional port can provide an Integrated, reliable and efficient land transport*	*Regional port can only provide a segmented, unreliable and inefficient land transport*
Shipping Service	Regional port can secure a reliable and efficient shipping service	Regional port can secure a reliable and efficient shipping service	Regional port can secure a reliable and efficient shipping service
Storage Facilities	*Regional port can provide developed and effective storage facilities*	*Regional port can provide developed and effective storage* facilities	*Regional port can provide developed and effective storage* facilities
1. If these were opportunities available to your regional port, which one would you most likely pursue? *(Tick only one box in this row)*	**1** ☐	**2** ☐	**3** ☐

Choice of a market opportunity based on your assessment of
PERCEIVED BENEFITS FACTORS

BLOCK No.1 SCENARIO No. 1

Opportunity Profile	Container Trade Opportunity 1	Bulk Trade Opportunity 2	Break-Bulk Trade Opportunity 3
PERCEIVED BENEFITS FACTORS			
Potential Business Growth	Medium	Medium	High
Potential Financial Returns	Average	Low	High
Potential Social Returns	Satisfactory	Satisfactory	High
Regional Development Benefits	Considerable	Low	Very High
Potential Environmental Returns	High	High	Satisfactory
1. If these were opportunities available to your regional port, which one would you most likely pursue? *(Tick only one box in this row)*	**1** ☐	**2** ☐	**3** ☐

Choice of a market opportunity based on your assessment of RESOURCES AVAILABILITY FACTORS

BLOCK No.1 SCENARIO No. 1

Opportunity Profile	Container Trade Opportunity 1	Bulk Trade Opportunity 2	Break-Bulk Trade Opportunity 3
RESOURCES AVAILABILITY FACTORS			
Financial Resources	Requires huge investment	Requires huge investment	Requires small investment
Technical Resources	Can be mobilized in the short-term	Can be mobilized in the long-term	Can be mobilized in the long-term
Relevant Skills & Core Competences	Can be developed in the short-term	Can be developed in the short-term	Can be developed in the long-term
Time to Implementation	Can be implemented in the short-term	Can be implemented in the short-term	Can be implemented in the long-term
1. If these were opportunities available to your regional port, which one would you most likely pursue? *(Tick only one box in this row)*	1 ☐	2 ☐	3 ☐

Choice of a market opportunity based on your assessment of BUSINESS RISK FACTORS

BLOCK No.1 SCENARIO No. 1

Opportunity Profile	Container Trade Opportunity 1	Bulk Trade Opportunity 2	Break-Bulk Trade Opportunity 3
BUSINESS RISK FACTORS			
Potential Commercial Success	High	High	Low
Fit with Organisational Profit and Growth Objectives	May have negative impact on organisational objectives	It is likely to enhance organisational objectives	It is likely to enhance organisational objectives
Potential Level of Competition that the Opportunity will Attract	Low	Low	High
Top Management Support and Commitment	High	High	Low
1. If these were opportunities available to your regional port, which one would you most likely pursue? *(Tick only one box in this row)*	1 ☐	2 ☐	3 ☐

Choice of a market opportunity based on your assessment of POLITICAL RISK FACTORS

BLOCK No.1 SCENARIO No. 1

Opportunity Profile	Container Trade Opportunity 1	Bulk Trade Opportunity 2	Break-Bulk Trade Opportunity 3
POLITICAL RISK FACTORS			
Expected Government Commitment and Support	Sufficient	Low	Low
Expected Community Acceptance and Support	Sufficient	Sufficient	High
Regulatory Requirements	Minimal	Stringent	Minimal
1. If these were opportunities available to your regional port, which one would you most likely pursue? *(Tick only one box in this row)*	**1** ☐	**2** ☐	**3** ☐

Choice of a market opportunity based on your assessment of OVERALL KEY DECISION CRITERIA

BLOCK No.1 SCENARIO No. 1

Opportunity Profile	Container Trade Opportunity 1	Bulk Trade Opportunity 2	Break-Bulk Trade Opportunity 3
KEY DECISION CRITERIA			
ACCESS TO MARKETS	Regional port can provide similar access to markets as the adjacent capital city port	Regional port can provide similar access to markets as the adjacent capital city port	Regional port can provide superior access to markets than the adjacent capital city port
POTENTIAL ECONOMIC BENEFITS	Medium economic benefits	Low economic benefits	High economic benefits
AVAILABILITY OF REQUIRED RESOURCES	Resources can be mobilized in the medium term	Resources can be mobilized in the medium term	Resources can be mobilized in the short term
BUSINESS RISK INVOLVED	Medium	Low	High
POLITICAL RISK INVOLVED	High	High	Medium
1. If these were opportunities available to your regional port, which one would you most likely pursue? *(Tick only one box in this row)*	**1** ☐	**2** ☐	**3** ☐

SECTION E. IMPLEMENTATION OF VALUABLE OPPORTUNITIES

E1. How important are each of the following factors when a regional port exploits valuable market opportunities?
(Please use the following rating scale to indicate for each of the following factors the relative importance.)

1 = Irrelevant
2 = Not important
3 = Moderately important
4 =Very Important
5 = Vital

Ability to mobilize relevant resources	1	2	3	4	5
Type of markets in which to compete for available opportunities (e.g., bulk, break-bulk, etc.)	1	2	3	4	5
Opportunity has not yet been identified by competitors	1	2	3	4	5
Ability of the regional port to deliver and capture value	1	2	3	4	5
Anticipated viability of a new trade	1	2	3	4	5
Extent of capital improvements needed at the port to attract the trade	1	2	3	4	5
Management commitment and support (other management issues may be attracting management's time and efforts)	1	2	3	4	5

SECTION F. ABOUT YOURSELF AND YOUR ORGANISATION

F1. Which best describes your business
(Please tick only one.)

Regional port service provider	1
Regional port authority	2

F2. Which best describes your current managerial position?

CEO	1	
Managing Director	2	
General manager	3	
Business development manager	4	
Marketing manager	5	
Operations manager	6	
Logistics manager	7	
Finance manager	8	
Sales manager	9	
Other	10	Specify…………………

F3. Are you involved in the process of selection of strategic opportunities for regional ports?

Yes	1
No	2

F4. How long have you been involved with the process of exploiting market opportunities in:

	Never	1 – 3 years	4 – 6 years	7 – 10 years	More than 10 years
Bulk trades	1	2	3	4	5
Container trades	1	2	3	4	5
Break-bulk trades	1	2	3	4	5

F5. To what extent is the top management involved in the pursuit of market opportunities in your organisation:
(Please use the following rating scale to tick for each of the following statements the number which best describes your opinion.)

1 = Not at all
2 = To some extent
3 = To a moderate extent
4 = To a considerable extent
5 = To a great extent

Top management involvement	1	2	3	4	5

F6. **Do you agree or disagree with the idea of your organisation having a corporate manager in charge of opportunities management?**
(Please use the following rating scale to tick the number which best describes your answer to each response item below.)

Strongly disagree	1
Disagree	2
Neither agree nor disagree	3
Agree	4
Strongly agree	5

F7. **What is your gender?**

Female	1
Maele	2

*****

THANK YOU VERY MUCH FOR SPENDING TIME TO PROVIDE YOUR RESPONSES TO HELP THIS IMPORTANT SURVEY!

Appendix 5

Internet-Based Survey Invitation Letter 1

VICTORIA UNIVERSITY

Integrated Freight Systems Research Unit
Faculty of Science, Engineering and Technology
PO Box 14428
Melbourne City
MC 8001 Australia
Werribee Campus
Hoppers Lane, Werribee
Telephone (03) 9216 8047
Facsimile (03) 9216 8074
Email: ross.robinson@vu.edu.au

06 January 2003

Address:

Dear,

Invitation to Assist in a Study of How the Major Regional Ports in Australia Compete for Growth in the Shadow of Capital City Ports

A few days from now you will receive by email a request to fill out a brief survey for an important research project being conducted within the intermodal freight systems management program at Victoria University and as a vital part of a PhD research program.

The objective of the survey is to learn, from experienced business leaders like yourself, about what strategies regional ports, particularly those that are in the shadow of capital city ports, should pursue to effectively compete for growth.

The survey will be conducted by our PhD student, Mateus Magala who can be contacted on (02) 95570390 or via email on mateus.magala@vu.edu.au for any assistance. It should not take more than 45 minutes of your time. It is a self-administered Internet survey and has been designed to provide you with the simplest way of responding.

Your survey answers will be dealt with as simple statistics. They will not be attributable to any person or port agency. No individual will be identified and when you complete and submit the survey your name will be electronically deleted from the mailing list leaving no connection between your answers and you.

I hope that you will make a very special effort to complete the survey and look forward to your assistance and contribution.

With very best wishes,
Sincerely,

Professor Ross Robinson
Foundation Chair in Transport Systems – Intermodal Transport
Integrated Freight Systems Research Unit
Faculty of Science, Engineering and Technology

Appendix 6

Internet-Based Survey Invitation Letter 2

VICTORIA UNIVERSITY

Integrated Freight Transport Research Unit
Faculty of Science, Engineering and Technology
PO Box 14428
Melbourne City
MC 8001 Australia
Werribee Campus
Hoppers Lane, Werribee
Telephone (03) 9216 8047
Facsimile (03) 9216 8074
Email: mateus.magala@vu.edu.au

28 January 2003

Dear,

A while ago I sent a letter inviting you to take part in a PhD Internet Survey on how regional ports that are in the shadow of capital city ports in Australia compete for growth.

The Survey is now ready and you can access it by logging onto the following Internet website address: http://www.trolleytracker.com.au/survey/intro1.html. We believe the survey will not take more than 45 minutes of your precious time and you can access it virtually from anywhere through the Internet.

Please follow the instruction to fill and submit the survey. For a successful submission no question should be left unanswered. If by mistake a question is not answered you will be asked to go back to the questionnaire and complete your answers before the submission can take place.

If you find any difficulties with the survey please contact Mateus Magala for assistance on: 02-9557 3090 or 0141232 0535 or mateus.magala@vu.edu.au

We anticipate our gratitude for your kind support to our research efforts!

With very best wishes,
Sincerely,

Professor Ross Robinson
Foundation Chair in Transport Systems – Intermodal Transport
Integrated Freight Transport Systems Research Unit
Faculty of Science, Engineering and Technology

Appendix 7

Relative Importance of the Factors Used to Evaluate Market Opportunities for a Specific Market Context

The analysis that follows examines the significance of the criteria used to evaluate market opportunities examined for specific market contexts – bulk, break-bulk and container.

- **Relative importance of criteria used to evaluate market opportunities in the context of bulk markets**

Table A7.1 shows the relative importance regional port managers attach to market access factors when evaluating bulk opportunities.

Table A7.1 The relative importance of factors used to evaluate bulk market opportunities based on market access criterion

Factors used for market access criterion	Rank	Percentage of respondents with particular response* 1	2	3	4	5	Mean Response	S.D.
Logistic service	3	—	—	14.29	35.71	50.00	4.36	0.73
Labour force/stevedoring††	6	2.38	7.14	16.67	45.24	28.57	3.90	0.98
Cargo handling facilities	1	—	—	4.76	40.48	54.76	4.50	0.59
Storage facilities	2	—	—	2.38	47.62	50.00	4.48	0.55
Land transport	4	—	—	7.14	64.29	28.57	4.21	0.56
Shipping service††	5	2.38	2.38	23.80	42.86	28.58	3.93	0.92
Overall importance of access to market criterion		—	—	7.14	59.53	33.33	**4.26**	0.58

*1: Irrelevant; 2: Not important; 3: Moderately important; 4: Very important; 5: Vital

††Pairwise comparisons show the means of 'Productive labour force' and 'Efficient cargo shipping service' to be statistically different (less significant) from the other four variables at the 5% level of significance.

The results suggest that *cargo handling facilities* is the most important factor (4.5), followed by storage facilities (4.48) and the quality of logistic service provided (4.36). For these three factors at least 50 percent of port managers said that they were vital if a regional port was to have any chance to succeed. While *cargo handling facilities* was rated relatively higher than the other three, statistically there was not any significant difference. This suggests that focusing on strategies to improve efficiency and effectiveness the variables *cargo handling facilities*, *storage facilities* and *logistics service* are of equal importance.

The ability of a regional port to secure an efficient shipping service was rated 3.93 and ranked last from the list of all factors, suggesting that port managers perceptions is that a regular bulk shipping service will be available if there is cargo. Competition between bulk carriers is significant and this promotes the existence of efficient bulk carriers which compete for cargo in all ports around the world.

The existence of an efficient labour force rated between 'moderately important' and 'very important' (3.90). Port costs can be considerable where the labour force is inefficient and the port is often confronted with industrial disputes. The recent waterfront reforms in Australia and elsewhere are directed to promote improved productivity and better workplace relations (Everett 1998). Finally, the access to markets is rated as a very important factor through which a regional port can deliver competitive advantage to shippers and capture value for itself (4.26).

Table A7.2 illustrates the responses with the respect to the importance of perceived benefits when port managers evaluate bulk opportunities.

Table A7.2 The relative importance of factors used to evaluate bulk market opportunities based on perceived benefits criterion

		Percentage of respondents with particular response*						
Factors used for perceived benefits criterion	Rank	1	2	3	4	5	Mean Response	S.D.
Business growth potential†	2	—	—	9.52	52.38	38.10	4.29	0.63
Financial returns†	1	—	—	4.76	45.24	50.00	4.45	0.59
Potential regional development benefits	3	—	9.52	33.33	42.86	14.29	3.62	0.85
Potential social returns	5	4.76	26.19	38.10	23.81	7.14	3.02	1.00
Potential environmental returns	4	4.76	11.90	50.00	19.05	14.29	3.26	1.01
Overall importance of perceived benefits criterion		—	—	14.28	69.05	16.67	**4.02**	0.56

*1: Irrelevant; 2: Not important; 3: Moderately important; 4: Very important; 5: Vital

†Pairwise comparisons show the mean of 'Financial returns' and 'Business growth potential' to be statistically different (more significant) from the other three variables at the 5% level of significance.

The results clearly suggest that financial returns and the potential for the business to grow are the most important factors (4.45 and 4.29 respectively). In both cases more that 90 percent of the respondents said that they were at least 'very important' if not 'vital'. This finding supports the early discussion on port management strategic motives when pursuing opportunities and on perceived benefits being both economic and non-economic. Environmental and social returns were considered moderately important (3.26 and 3.02 respectively). Again, this result supports the argument that organisations and regulators are progressively incorporating social responsibility factors in their overall strategy and performance objectives and measurements (Melbourne Port Corporation 2001; Victoria Sea Freight Industry Council 2001). The results also show that overall the perceived benefits criterion is rated as 'very important' (4.02).

To implement an opportunity resources are required – though for an entrepreneurial organisation, resources need not be limited to those the organisation controls at the time (Stevenson and Jarillo 1990; Brown *et al*. 2001). Essential resources can be acquired or developed. Table A7.3 shows that for regional ports to implement successfully valuable bulk opportunities, financial resources and unique skills and competences are critical (4.19 and 3.90 respectively).

Table A7.3 The relative importance of factors used to evaluate bulk market opportunities based on resources availability criterion

		Percentage of respondents with particular response*						
Factors used for resources availability criterion	Rank	1	2	3	4	5	Mean Response	S.D.
Financial resources†	1	—	4.76	9.52	47.62	38.10	4.19	0.80
Technical resources	3	2.38	4.76	19.05	52.38	21.43	3.86	0.89
Relevant skills and core competences	2	—	7.14	14.29	59.52	19.05	3.90	0.79
Time to implementation	4	—	26.a9	26.19	47.62	16.67	3.71	0.86
Overall importance of availability of resources criterion		—	4.76	19.05	59.52	16.67	**3.88**	0.74

*1: Irrelevant; 2: Not important; 3: Moderately important; 4: Very important; 5: Vital

†Pairwise comparisons show the mean of 'Financial resources' to be statistically different (more significant) from the other three variables at the 5% level of significance.

Financial resources support the search activities, basic investment and the acquisition and development of other resources. On the other hand unique resources and core competences underpin the uniqueness of the value a port can offer. However, often initiatives fail to come to fruition not because of lack of economic and technical resources but because of the timing which is wrong. Some initiatives need to be implemented in the short term while others may still be competitive in the long-term. Failing to understand this is a perfect recipe for disaster.

Researchers have argued that time is a valuable resource and is a key dimension for any dynamic process (Slevin and Covin 1998; Das and Teng 1998). Researchers in real options (Amram and Kulatilaka 1999b) suggest that within the time constraint factors delaying or abandon an initiative altogether is a valuable option that should be exercised. The empirical results suggest that regional port managers perceive time to implementation as important factor (3.71) when assessing opportunities in bulk markets, however, it is significantly less important than the others.

Table A7.4 shows the relative importance of business risk factors for opportunities in bulk markets.

Table A7.4 The relative importance of factors used to evaluate bulk market opportunities based on business risk criterion

Factors used for business risk criterion	Rank	Percentage of respondents with particular response* 1	2	3	4	5	Mean Response	S.D.
Potential for commercial success	1	—	—	4.76	45.24	50.00	4.45	0.59
Fit with profit and growth organisational objectives	2	—	2.38	7.14	50.00	40.48	4.29	0.70
Management support & commitment	3	—	2.38	11.90	42.86	42.86	4.26	0.76
Competition that the opportunity†† will attract	4	2.38	7.14	23.81	45.24	21.43	3.76	0.95
Overall importance of business risk criterion		—	2.38	14.29	59.52	23.81	**4.05**	0.69

*1: Irrelevant; 2: Not important; 3: Moderately important; 4: Very important; 5: Vital

††Pairwise comparisons show the mean of 'Competition that the opportunity will attract' to be statistically different (less significant) from the other three variables at the 5% level of significance.

All factors are perceived as 'very important', although the risk of commercial failure is relatively more important (4.45) than other factors and was ranked first with 50 percent of respondents saying that they believe that this factor is 'vital'. Often opportunities do not yield desirable outcomes because during their implementation demand conditions change as customer tastes and preferences shift over time. It is important to note that respondents were unanimous in saying that it was 'very important' for the opportunity to be aligned with profit and growth organisational objectives if it was to be successfully implemented. The support and commitment that top management devotes to the process of exploiting market opportunities in particular in bulk business is regarded by port managers as a very important factor (4.26) if the business risk is to be minimized. Less concern, however, was expressed relative to the potential competition the opportunity is expected to attract. This result can be interpreted to mean that port managers are prepared to face the intense competition that is generally linked with very attractive opportunities. Overall the business risk criterion was rated as 'very important' by more than 59 percent of the respondents.

The last evaluative criterion is the political risk. Table A7.5 shows that overall the criterion was rated between 'moderately important' and 'very important' (3.67) with more than 57 percent of respondents saying that it is more than moderately important.

Table A7.5 The relative importance of factors used to evaluate bulk market opportunities based on political risk criterion

		Percentage of respondents with particular response*						
Factors used for political risk criterion	Rank	1	2	3	4	5	Mean Response	S.D.
Government support	2	2.38	14.29	28.57	23.81	30.95	3.67	1.14
Community support	3	2.38	14.29	30.95	33.33	19.05	3.52	1.04
Regulatory requirements	1	—	7.14	23.81	42.86	26.19	3.88	0.89
Overall importance of political risk criterion		—	7.14	35.71	40.48	16.67	**3.67**	0.85

*1: Irrelevant; 2: Not important; 3: Moderately important; 4: Very important; 5: Vital
Note: Pairwise comparisons show that the means of political risk factors are not statistically different from one another.

Regulatory requirements ranked first (3.88) and community support last (3.52) but all rated above moderately important. It has been argued that stringent regulations have a negative effect on businesses flexibility and undermine the success of business opportunities. On the other hand, light regulations may facilitate the implementation of opportunities because they impose less penalty on the port's resources and initiatives.

Government support to the port industry is critical, particularly where new port developments are concerned and the required investment is significant and attracts diversified interests from stakeholders. In such circumstances the government may act to help reduce tensions among stakeholders and also to provide the port with part of the funds needed to implement an initiative. It is not surprising that port managers rated this factor as second (3.67) in importance from the list of factors related to political risk.

No less important factor is the support from community which was perceived as 'moderately important' (3.67) reflecting the fact that although communities do not participate directly in business decisions they are a major and growing force. The ability to influence the outcomes of initiatives in both positive and negative ways. The results for this factor were widely variable but skewed toward a favourable assessment as more than 80 percent of respondents rated it as no less than moderately important. Overall no factor was statistically more significant than others.

- **Relative importance of criteria used to evaluate market opportunities in the context of break-bulk markets**

Table A7.6 shows the results of the evaluation of market access factors in the context of break-bulk opportunities.

The results indicate that logistics service is the most important factor (4.43). More than 92 percent of the respondents think that the quality of logistics service provided is no less than a 'very important' factor and 50 percent think that it is 'vital'.

Table A7.6 The relative importance of factors used to evaluate break-bulk market opportunities based on market access criterion

Factors used for market access criterion	Rank	Percentage of respondents with particular response*					Mean Response	S.D.
		1	2	3	4	5		
Logistics service	1	—	—	7.14	42.86	50.00	4.43	0.63
Labour force/stevedoring	5	—	4.76	11.91	47.62	35.71	4.14	0.81
Cargo handling facilities	2	—	—	7.14	47.62	45.24	4.38	0.62
Storage facilities	4	—	2.38	11.90	38.10	47.62	4.31	0.78
Land transport	3	—	—	11.90	45.24	42.86	4.31	0.68
Shipping service	6	—	2.38	16.67	50.00	30.95	4.10	0.76
Overall importance of market access criterion		—	—	7.14	54.76	38.10	**4.31**	0.60

*1: Irrelevant; 2: Not important; 3: Moderately important; 4: Very important; 5: Vital
Note: Pairwise comparisons show that the means of market access factors are not statistically different from one another.

This finding is important because unlike bulk cargoes that are linked to a single or few shippers' logistics arrangements, break-bulk may be linked to a considerable number of shippers and logistics networks. The challenge is how to provide efficient and effective logistics to a widespread number of customers. More important is the fact that in such circumstances the port that provides a total and integrated logistics service wins the business. Port managers also held the view that the existence of efficient and adequate cargo handling facilities was a 'very important' factor (4.38) to smooth the access to markets through the port. Similarly, land transport and storage facilities were regarded as 'very important' (4.31) factors that facilitate an efficient and an effective access to markets. Although labour force and shipping line rated relatively lower (4.14 and 4.10) than other factors, they were still 'very important' and were not statistically different from others. Overall, the access to market criterion was rated 4.31 and as 'very important' by at least 55 percent of port managers.

Table A7.7 reports the relative importance of factors regional port managers use to assess the benefits of an opportunity in the context of break-bulk activities.

Table A7.7 The relative importance of factors used to evaluate break-bulk market opportunities based on perceived benefits criterion

Factors used for economic benefit criterion	Rank	Percentage of respondents with particular response* 1	2	3	4	5	Mean Response	S.D.
Business growth potential†	2	—	—	11.90	47.62	40.46	4.29	0.67
Financial returns†	1	—	—	11.90	45.24	42.86	4.31	0.68
Potential regional development benefits	3	—	7.14	42.86	35.71	14.29	3.57	0.83
Potential social returns	4	—	23.81	38.10	30.95	7.14	3.21	0.89
Potential environmental returns	5	7.14	16.67	40.48	26.19	9.52	3.14	1.04
Overall importance of perceived benefits		—	—	23.81	57.14	19.05	**3.95**	0.66

*1: Irrelevant; 2: Not important; 3: Moderately important; 4: Very important; 5: Vital

†Pairwise comparisons show the mean of 'Financial returns' and 'Business growth potential' to be statistically different (more significant) from the other three variables at the 5% level of significance.

The results indicate that overall the criterion is 'very important' (3.95) but financial returns should be attractive enough to justify the port's commitment to the opportunity. Also, unless the potential for growth is considerable investing in break-bulk opportunities may not be rewarding. Business growth potential and financial returns were statistically different from others and were rated as 'very important' (4.29 and 4.31 respectively) followed by the potential the opportunity promises to bring to regional development (3.57). The potential environmental benefits ranked last (3.14) but still significant enough to be considered 'moderately important' as were the potential social returns (3.21). All results accord with our expectations and theory and are significant in the sense that regional port management should focus on them when evaluating market opportunities to pursue.

Table A7.8 shows the results of assessment of importance of resources factors which are critical to determine whether a break-bulk market opportunity is implementable or not.

Table A7.8 The relative importance of factors used to evaluate break-bulk market opportunities based on resources availability criterion

Factors used for resources availability criterion	Rank	Percentage of respondents with particular response* 1	2	3	4	5	Mean Response	S.D.
Financial resources†	1	—	2.38	14.29	45.24	38.10	4.19	0.77
Technical resources	3	—	9.52	16.67	50.00	23.81	3.88	0.88
Relevant skills and core competences	2	—	4.76	21.43	40.48	33.33	4.02	0.86
Time to implementation	4	—	4.76	33.33	40.48	21.43	3.79	0.84
Overall importance of availability of resources criterion		—	2.38	14.29	54.76	28.57	**4.10**	0.73

*1: Irrelevant; 2: Not important; 3: Moderately important; 4: Very important; 5: Vital

†Pairwise comparisons show the mean of 'Financial resources' to be statistically different (more significant) from the other three variables at the 5% level of significance.

The empirical results suggest that two factors are the most important – financial resources (4.19) and relevant skills and core competences (4.02) – although financial resources seem to be relatively more significant. Both factors were rated as very important with over 70 percent of respondents rating them as either 'very important' or 'vital'. Technical resources ranked third with mean importance of 3.88 and time required to implement the opportunity ranked last (3.88) but still above 'moderately important'. The overall criterion was rated as 'very important' (4.10) a little more than it was for bulk (3.88). In general, the results are very similar to those obtained for bulk trades and this is not surprising. Earlier it was argued that regional port managers focus more on neo-bulk market opportunities – the trades which share many similarities with bulk trades and for which they have capabilities and can display some competitive advantage relative to capital city ports. It is not unreasonable to admit to expect that regional port managers perceive these factors as having similar impact in both contexts.

Table A7.9 shows the results of the analysis of business risk factors that are critical for the decision to pursue a market opportunity.

Table 7.9 The relative importance of factors used to evaluate break-bulk market opportunities based on business risk criterion

		Percentage of respondents with particular response*						
Factors used for business risk criterion	Rank	1	2	3	4	5	Mean Response	S.D.
Potential for commercial success	1	—	—	7.14	42.86	50.00	4.43	0.63
Fit with profit and growth organisational objectives	3	—	2.38	14.29	45.24	38.09	4.19	0.77
Management support & commitment	2	—	2.38	16.67	35.71	45.24	4.24	0.82
Competition that the opportunity†† will attract	4	—	9.52	33.33	26.20	30.95	3.79	1.00
Overall importance of business risk criterion		—	—	19.05	50.00	30.95	**4.12**	0.75

*1: Irrelevant; 2: Not important; 3: Moderately important; 4: Very important; 5: Vital

††Pairwise comparisons show the mean of Political risk' to be statistically different (less significant) from the other three variables at the 5% level of significance.

The results indicate that in the case of break-bulk opportunities, regional port managers perceive the potential for commercial success as the most important factor (4.43). On average it was rated as 'very important' but more than 92 percent of the respondents believed that it was either very important or vital. The second most important factor was top management commitment and support (4.24) which did not differ in importance from the fit of the opportunity with the organisational profit and growth objectives (4.19). While more than 50 percent think that the competition that the opportunity will attract is 'very important' or 'vital', 43 percent think that it is moderately important or not important at all. Probably the same reasons as in the bulk case apply. Despite this, however, overall the criterion was rated as 'very important' (4.12) and relatively more important that it was for bulk situations (4.05). One possible explanation is that the degree of competition for break-bulk trades is relatively higher than for bulk trades. Generally, break-trades have attracted both regional and capital city ports and neither of the market participants has absolute advantage (Victorian Sea Freight Industry Council 2001).

Table A7.10 depicts the results of the analysis of political risk factors for break-bulk market opportunities.

Table A7.10 The relative importance of factors used to evaluate break-bulk market opportunities based on political risk criterion

		Percentage of respondents with particular response*						
Factors used for political risk criterion	Rank	1	2	3	4	5	Mean Response	S.D.
Government support	2	2.38	23.81	26.19	26.19	21.43	3.40	1.15
Community support	3	4.76	23.81	28.57	23.81	19.05	3.29	1.18
Regulatory requirements	1	2.38	11.91	35.71	26.19	23.81	3.57	1.06
Overall importance of political risk criterion		2.38	14.29	35.71	28.57	19.05	**3.48**	1.04

*1: Irrelevant; 2: Not important; 3: Moderately important; 4: Very important; 5: Vital
Note: Pairwise comparisons show that the means of political risk factors are not statistically different from one another.

From the results the interpretation is that regulatory requirements play a major role in the evaluation. They are the most important (3.57) ahead of government and community support (3.40 and 3.29 respectively). The results display considerable variation which limits the power of the inferences made but they tend to be skewed toward a positive assessment of the importance of each factor. The overall assessment of the criterion is that it is 'moderately important' (3.48) and relatively less important than it was for bulk trades (3.67). It can be suggested that unlike bulk cargoes break-bulk cargoes are less 'dirty' and therefore less likely to attract opposition from community and environmental groups.

- **Relative importance of criteria used to evaluate market opportunities in the context of container markets**

Table A7.11 shows the results of the analysis of factors that affect access to markets and are critical when regional port managers evaluate market opportunities in container business. All results are significant and suggest that the factors are either 'very important' or 'vital'. The most important factor is the logistic service. It ranked first with a mean score of 4.60 and 64 percent of respondents noted that it was vital. Compared to bulk and break-bulk situations the score is relatively high and it is not difficult to see why. Regional port managers are well aware that if they are to have any chance of succeeding in container operations the provision of a cost-effective and total logistics service through value driven supply chains is critical. Capital city ports seem to enjoy some relative advantage partly because their container freight logistics are better if not superior to those provided by regional ports even where niche markets are concerned.

Table 7.11 The relative importance of factors used to evaluate container market opportunities based on market access criterion

Factors used for market access	Rank	Percentage of respondents with particular response* 1	2	3	4	5	Mean Response	S.D.
Logistics service	1	—	—	4.76	30.95	64.29	4.60	0.58
Labour force/stevedoring	5	—	4.76	4.76	47.62	42.86	4.29	0.77
Cargo handling facilities	2	—	—	2.38	47.62	50.00	4.48	0.55
Storage facilities	4	—	2.38	7.14	50.00	40.48	4.29	0.70
Land transport	2	—	—	2.38	47.62	50.00	4.48	0.55
Shipping service	3	—	—	7.14	45.24	47.62	4.40	0.62
Overall importance of market access criterion		—	—	2.38	42.86	54.76	**4.52**	0.55

*1: Irrelevant; 2: Not important; 3: Moderately important; 4: Very important; 5: Vital
Note: Pairwise comparisons show that the means of political risk factors are not statistically different from one another.

The next most important factors were land transport and cargo handling facilities. Both were rated as very important (4.48) with 50 percent of the respondents considering them 'vital'. It has been said that a major competitive disadvantage and apparently an opportunity for differentiation is the land transport network and the infrastructure that supports it (Hayuth 1987; Valentine and Gray 2002). Both are the key for effective access to markets and the fundamental mechanisms through which the ports can deliver and capture value. Equally, efficient cargo handling facilities are required to ensure a seamless movement of freight. Unless regional ports develop similar or superior cargo handling facilities in terms of efficiency and adequacy to those in capital city ports, their chances of competing are low. Even where political decisions to move some container trades to regional ports are made (Lloyd's DCN 2003), the efficiency and adequacy of cargo handling facilities will be required if the ports are to be perceived as value creating centers.

The availability of a shipping service ranked third with a mean score of 4.40 and more than 95 percent of respondents noted that it was either 'very important' or 'vital'. No port oriented supply chain can be effective without offering an effective blue-water access to markets through the services of a reliable shipping line. The issue is even more important when the freight is containerised and liner services must run on schedule.

Although labour force and storage facilities ranked last they were statistically significant and rated as 'very important' (4.29). They are part of an effective supply chain and when effective they promote superior access to markets. Overall the criterion was rated as 'vital' if we consider that more than half of the respondents said that it was 'vital' and 98 percent of the respondents said that it was either 'very important' or 'vital'. Compared to bulk and break-bulk the access to markets criterion is slightly important, which suggests that to compete in the container business the strategy focus should be on access to markets which can be efficiently and effectively provided through developed and integrated value driven supply chains.

Table A7.12 shows the empirical results of factors used to assess the benefits or value the opportunity is likely to create for the port.

Table 7.12 The relative importance of factors used to evaluate container market opportunities based on perceived benefits criterion

		Percentage of respondents with particular response*						
Factors used for perceived benefits criterion	Rank	1	2	3	4	5	Mean Response	S.D.
Business growth potential	2	—	—	4.76	57.14	38.10	4.33	0.57
Financial returns	1	—	—	7.14	50.00	42.86	4.36	0.61
Potential regional development benefits	3	—	4.76	14.29	57.14	23.81	4.00	0.76
Potential social returns[††]	4	—	19.05	40.48	33.33	7.14	3.29	0.86
Potential environmental returns[††]	5	2.38	19.05	35.71	35.71	4.15	3.26	0.93
Overall importance of perceived benefits criterion		—	—	19.05	59.52	21.43	**4.02**	0.64

*1: Irrelevant; 2: Not important; 3: Moderately important; 4: Very important; 5: Vital

[††]Pairwise comparisons show the mean of 'Potential social returns' and 'Potential environmental returns' to be statistically different (less significant) from the other three variables at the 5% level of significance.

The results indicate that there are three factors that port managers perceive as being very important. These factors are *financial returns* (4.36), *business growth potential* (4.33) and *potential regional development benefits* (4.00). It can be said that the reasons are same as those presented in the discussion for bulk and break-bulk trades. A business that does not earn acceptable returns cannot be sustainable in the long term; and an opportunity that doe not provide the business with the potential to grow is not central to ports whose main strategic motive is the pursuit of growth to sustain long-term survival and prosperity. In addition, an opportunity that does not provide benefits to the region in which the port operates may not help to promote an image of social responsibility nor the port efforts to develop an infrastructure to sustain trade in the region. Social and environmental returns were the least significant but in general they were perceived as 'moderately important' (3.29 and 3.26 respectively). Overall the criterion was rated as 'very important' (4.05) as it was in bulk and break-bulk cases.

Of interest is how the availability of resources affects the decision to pursue an opportunity. Table A7.13 reports the findings and suggests that the most important factor is financial resources (4.45).

Table A7.13 The relative importance of factors used to evaluate container market opportunities based on resources availability criterion

		Percentage of respondents with particular response*						
Factors used for resources availability criterion	Rank	1	2	3	4	5	Mean Response	S.D.
Financial resources†	1	—	2.38	2.38	42.86	52.38	4.45	0.67
Technical resources	3	—	2.38	19.05	42.86	35.71	4.12	0.80
Relevant skills and core competences	2	—	2.38	16.67	45.24	35.71	4.14	0.78
Time to implementation	4	—	2.38	21.43	50.00	26.19	4.00	0.76
Overall importance of availability of resources criterion		—	4.76	19.05	59.52	16.67	**4.29**	0.63

*1: Irrelevant; 2: Not important; 3: Moderately important; 4: Very important; 5: Vital

†Pairwise comparisons show the mean of 'Financial resources' to be statistically different (more significant) from the other three variables at the 5% level of significance.

The majority of the respondents (52 percent) perceive this factor as being 'vital'. The interpretation is that most of the opportunities in the container business require considerable amounts of investment. Regional ports willing to enter the container business must consider its financially feasibility before committing other resources. Technical resources and core competences are also important – indeed they are perceived as 'very important' (4.12 and 4.14 respectively). The results suggest that they are a part of the bundle of resources that regional managers need to consider to make the opportunity come to fruition. Also, the time to implementation was considered as 'very important' (4.0). When the same factor is compared across bulk and break-bulk situations it is relatively more important in the context of container trades which suggests that factors such as the intensity of competition, the change in demand conditions and the difficulties of implementing container projects may have a greater impact in the container business than in the others. The ranking of factors is, however, similar to that in bulk and break-bulk. Overall, the criterion is perceived as 'very important' (4.29) and rates higher than for bulk and break-bulk.

Table A7.14 reports the results of the assessment of business risk factors which regional port managers consider in their evaluation of market opportunities. The results suggest that in the container business, management support and commitment is the most important factor (4.48) to reduce the exposure to business risk.

Most respondents (52 percent) believe it is 'vital' and 43 percent think it is 'very important'. About 5 percent felt that it was 'moderately important'. The results are consistent with the theory which argues that without senior management leadership, organisational strategy is vulnerable and the organisation's sense of direction and focus is diluted (Hamel and Prahalad 1994). The likelihood that the opportunity will succeed commercially is also a 'very important' factor (4.43). Regional ports should assess carefully all market factors that are likely to plunge the opportunity into a failure before committing scarce and expensive corporate resources.

Table A7.14 The relative importance of factors used to evaluate container market opportunities based on business risk criterion

		Percentage of respondents with particular response*						
Factors used for business risk criterion	Rank	1	2	3	4	5	Mean Response	S.D.
Potential for commercial success	2	—	—	—	57.14	42.86	4.43	0.50
Fit with profit and growth organisational objectives	3	—	—	11.90	45.24	42.86	4.31	0.68
Management support & commitment	1	—	—	4.76	42.86	52.38	4.48	0.59
Competition that the opportunity will attract	4	—	2.38	35.72	30.95	30.95	3.90	0.88
Overall importance of business risk		—	—	9.52	50.00	40.48	**4.31**	0.64

*1: Irrelevant; 2: Not important; 3: Moderately important; 4: Very important; 5: Vital
††Pairwise comparisons show the mean of 'Competition that the opportunity will attract' to be statistically different (less significant) from the other three variables at the 5% level of significance.

Determining the fit between the opportunity and the strategic motives of the port is critical. Not all opportunities are attractive although they may contribute to the strategic orientation of the port. It is therefore important that priority be given to those opportunities that are likely to be favoured by the organisation as a whole because they are aligned with the strategic interests of the port and its shareholders and stakeholders in general.

In addition, port managers should not overlook the potential competition that the opportunity is likely to attract. Keen competition is often an external obstacle to growth (Penrose 1959). Regional ports should not involve themselves in a competition they know upfront they cannot win because in doing so they waste resources and effort and help build a negative image of an uncompetitive port. For this reason, the respondents rated the risk of competition as a very important factor (3.90). Overall the criterion was perceived as very important (4.31) as it was for bulk and break-bulk.

Table A7.15 is the last table and shows the empirical results of the analysis of political factors associated with the evaluation of how easy it is to implement a market opportunity in the context of container business.

Table A7.15 The relative importance of factors used to evaluate container market opportunities based on political risk criterion

Factors used for political risk criterion	Rank	Percentage of respondents with particular response* 1	2	3	4	5	Mean Response	S.D.
Government support	1	—	11.90	16.67	30.95	40.48	4.00	1.04
Community support	2	—	11.91	28.57	33.33	26.19	3.74	0.99
Regulatory requirements	3	2.38	9.53	33.33	33.33	21.43	3.62	1.01
Overall importance of political risk criterion		—	7.14	19.05	45.24	28.57	**3.95**	0.88

*1: Irrelevant; 2: Not important; 3: Moderately important; 4: Very important; 5: Vital
Note: Pairwise comparisons show that the means of political risk factors are not statistically different from one another.

The results are very similar to those obtained in bulk and break-bulk contexts. This suggests that port managers' perceptions about the importance of political factors are the same across all trades in which they seek valuable opportunities. More importantly, however, regional port managers perceive government support for container opportunities as critical and more important than in bulk and break-bulk situations. The development of container business in regional ports has been very problematic. Some market players, particularly the capital city ports, argue that regional ports are removed from consumers and such developments are not justified. Others argue that the current port infrastructure and transport linkages in regional ports are inefficient and that the investment required to set in place a competitive infrastructure outstrips the benefits of servicing container trade through regional ports.

In this context, any attempt to develop container trade through regional ports faces considerable external pressures. This makes it almost inevitable for regional ports to have to relay not only on the their ability to provide superior value but also to mobilize significant support from government.

Appendix 8

Rules for Reading the Decision Tree and Class Probability Distribution

Rules for reading the tree and class probability distribution

Note: For each terminal node the interpretation of the decision rule is made easier if read from the bottom to the top (e.g. for terminal node 1 from Trades == container to Economic _Benefits == medium)

Terminal Node 1

```
if
(
  (
     ECONOMIC_BENEFITS$ == medium
  ) &&
  (
     MARKET_ACCESS$ == similar
  ) &&
  (
     BUSINESS_RISK$ == low
  ) &&
  (
     TRADES$ == Container
  )
)
{
   terminalNode = -1;
   class = Pursue Container;
   probClass1 = 0;
   probClass2 = 0;
   probClass3 = 0.0714286;
   probClass4 = 0;
   probClass5 = 0;
   probClass6 = 0.928571;
}
```

Terminal Node 2

```
if
(
  (
     ECONOMIC_BENEFITS$ == low
  ) &&
  (
     MARKET_ACCESS$ == similar
  ) &&
  (
     BUSINESS_RISK$ == low
  ) &&
  (
     TRADES$ == Container
  )
)
{
   terminalNode = -2;
   class = Do not Pursue Container;
   probClass1 = 0;
   probClass2 = 0;
   probClass3 = 0.857143;
   probClass4 = 0;
   probClass5 = 0;
   probClass6 = 0.142857;
}
```

Terminal Node 3

```
if
(
  (
     ECONOMIC_BENEFITS$ == medium
  ) &&
  (
     MARKET_ACCESS$ == superior
  ) &&
  (
     BUSINESS_RISK$ == low
  ) &&
  (
     TRADES$ == Container
  )
)
{
   terminalNode = -3;
   class = Pursue Container;
   probClass1 = 0;
   probClass2 = 0;
   probClass3 = 0.857143;
   probClass4 = 0;
   probClass5 = 0;
   probClass6 = 0.142857;
}
```

Terminal Node 4

```
if
(
  (
     ECONOMIC_BENEFITS$ == low
  ) &&
  (
     MARKET_ACCESS$ == superior
  ) &&
  (
     BUSINESS_RISK$ == low
  ) &&
  (
     TRADES$ == Container
  )
)
{
   terminalNode = -4;
   class = Do not Pursue Container;
   probClass1 = 0;
   probClass2 = 0;
   probClass3 = 0.428571;
   probClass4 = 0;
   probClass5 = 0;
   probClass6 = 0.571429;
}
```

Terminal Node 5

```
if
(
  (
     BUSINESS_RISK$ == high ||
     BUSINESS_RISK$ == medium
  ) &&
  (
     ECONOMIC_BENEFITS$ == low ||
     ECONOMIC_BENEFITS$ == medium
  ) &&
  (
     MARKET_ACCESS$ == similar ||
     MARKET_ACCESS$ == superior
  ) &&
  (
     TRADES$ == Container
  )
)
{
   terminalNode = -5;
   class = Do not Pursue Container;
   probClass1 = 0;
   probClass2 = 0;
   probClass3 = 0.87013;
   probClass4 = 0;
   probClass5 = 0;
   probClass6 = 0.12987;
}
```

Terminal Node 6

```
if
(
  (
     ECONOMIC_BENEFITS$ == high
  ) &&
  (
     MARKET_ACCESS$ == similar ||
     MARKET_ACCESS$ == superior
  ) &&
  (
     TRADES$ == Container
  )
)
{
   terminalNode = -6;
   class = Pursue Container;
   probClass1 = 0;
   probClass2 = 0;
   probClass3 = 0.357143;
   probClass4 = 0;
   probClass5 = 0;
   probClass6 = 0.642857;
}
```

Terminal Node 7

```
if
(
  (
     MARKET_ACCESS$ == inferior
  ) &&
  (
     TRADES$ == Container
  )
)
{
   terminalNode = -7;
```

```
    class = Do not Pursue Container;
    probClass1 = 0;
    probClass2 = 0;
    probClass3 = 0.892857;
    probClass4 = 0;
    probClass5 = 0;
    probClass6 = 0.107143;
}
```

Terminal Node 8

```
if
(
  (
      MARKET_ACCESS$ == similar
  ) &&
  (
      ECONOMIC_BENEFITS$ == high ||
      ECONOMIC_BENEFITS$ == medium
  ) &&
  (
      BUSINESS_RISK$ == low ||
      BUSINESS_RISK$ == medium
  ) &&
  (
      TRADES$ == Bulk
  )
)
{
    terminalNode = -8;
    class = Pursue Bulk;
    probClass1 = 0;
    probClass2 = 0.142857;
    probClass3 = 0;
    probClass4 = 0;
    probClass5 = 0.857143;
    probClass6 = 0;
}
```

Terminal Node 9

```
if
(
  (
      RESOURCE_AVAILABILITY$ == long ||
      RESOURCE_AVAILABILITY$ == medium
  ) &&
  (
      ECONOMIC_BENEFITS$ == medium
  ) &&
  (
      MARKET_ACCESS$ == inferior ||
      MARKET_ACCESS$ == superior
  ) &&
  (
      BUSINESS_RISK$ == low ||
      BUSINESS_RISK$ == medium
  ) &&
  (
      TRADES$ == Bulk
  )
)
{
    terminalNode = -9;
    class = Do not Pursue Bulk;
    probClass1 = 0;
    probClass2 = 0.678571;
    probClass3 = 0;
    probClass4 = 0;
    probClass5 = 0.321429;
    probClass6 = 0;
}
```

Terminal Node 10

```
if
(
  (
      RESOURCE_AVAILABILITY$ == short
  ) &&
  (
      ECONOMIC_BENEFITS$ == medium
  ) &&
  (
      MARKET_ACCESS$ == inferior ||
      MARKET_ACCESS$ == superior
  ) &&
  (
      BUSINESS_RISK$ == low ||
      BUSINESS_RISK$ == medium
  ) &&
  (
      TRADES$ == Bulk
  )
)
{
    terminalNode = -10;
    class = Pursue Bulk;
    probClass1 = 0;
    probClass2 = 0.285714;
    probClass3 = 0;
    probClass4 = 0;
    probClass5 = 0.714286;
    probClass6 = 0;
}
```

Terminal Node 11

```
if
(
  (
      ECONOMIC_BENEFITS$ == high
  ) &&
  (
      MARKET_ACCESS$ == inferior ||
      MARKET_ACCESS$ == superior
  ) &&
  (
      BUSINESS_RISK$ == low ||
      BUSINESS_RISK$ == medium
  ) &&
  (
      TRADES$ == Bulk
  )
)
{
    terminalNode = -11;
    class = Pursue Bulk;
    probClass1 = 0;
    probClass2 = 0.380952;
    probClass3 = 0;
    probClass4 = 0;
    probClass5 = 0.619048;
    probClass6 = 0;
}
```

Terminal Node 12

```
if
(
  (
      POLITICAL_RISK$ == high
  ) &&
  (
      MARKET_ACCESS$ == similar ||
      MARKET_ACCESS$ == superior
  ) &&
  (
      ECONOMIC_BENEFITS$ == low
  ) &&
  (
      BUSINESS_RISK$ == low ||
      BUSINESS_RISK$ == medium
  ) &&
  (
      TRADES$ == Bulk
  )
)
{
    terminalNode = -12;
    class = Do not Pursue Bulk;
    probClass1 = 0;
    probClass2 = 0.928571;
    probClass3 = 0;
    probClass4 = 0;
    probClass5 = 0.0714286;
    probClass6 = 0;
}
```

Terminal Node 13

```
if
(
  (
      RESOURCE_AVAILABILITY$ == long ||
      RESOURCE_AVAILABILITY$ == medium
  ) &&
  (
      POLITICAL_RISK$ == low ||
      POLITICAL_RISK$ == medium
  ) &&
  (
      MARKET_ACCESS$ == similar ||
      MARKET_ACCESS$ == superior
  ) &&
  (
      ECONOMIC_BENEFITS$ == low
  ) &&
  (
      BUSINESS_RISK$ == low ||
      BUSINESS_RISK$ == medium
  ) &&
  (
      TRADES$ == Bulk
  )
)
{
    terminalNode = -13;
```

```
   class = Pursue Bulk;
   probClass1 = 0;
   probClass2 = 0.357143;
   probClass3 = 0;
   probClass4 = 0;
   probClass5 = 0.642857;
   probClass6 = 0;
}
```

Terminal Node 14

```
if
(
  (
     BUSINESS_RISK$ == low
  ) &&
  (
     RESOURCE_AVAILABILITY$ == short
  ) &&
  (
     POLITICAL_RISK$ == low ||
     POLITICAL_RISK$ == medium
  ) &&
  (
     MARKET_ACCESS$ == similar ||
     MARKET_ACCESS$ == superior
  ) &&
  (
     ECONOMIC_BENEFITS$ == low
  ) &&
  (
     TRADES$ == Bulk
  )
)
{
   terminalNode = -14;
   class = Pursue Bulk;
   probClass1 = 0;
   probClass2 = 0.285714;
   probClass3 = 0;
   probClass4 = 0;
   probClass5 = 0.714286;
   probClass6 = 0;
}
```

Terminal Node 15

```
if
(
  (
     BUSINESS_RISK$ == medium
  ) &&
  (
     RESOURCE_AVAILABILITY$ == short
  ) &&
  (
     POLITICAL_RISK$ == low ||
     POLITICAL_RISK$ == medium
  ) &&
  (
     MARKET_ACCESS$ == similar ||
     MARKET_ACCESS$ == superior
  ) &&
  (
     ECONOMIC_BENEFITS$ == low
  ) &&
  (
     TRADES$ == Bulk
  )
)
{
   terminalNode = -15;
   class = Do not Pursue Bulk;
   probClass1 = 0;
   probClass2 = 0.857143;
   probClass3 = 0;
   probClass4 = 0;
   probClass5 = 0.142857;
   probClass6 = 0;
}
```

Terminal Node 16

```
if
(
  (
     MARKET_ACCESS$ == inferior
  ) &&
  (
     ECONOMIC_BENEFITS$ == low
  ) &&
  (
     BUSINESS_RISK$ == low ||
     BUSINESS_RISK$ == medium
  ) &&
  (
     TRADES$ == Bulk
  )
)
{
   terminalNode = -16;
   class = Do not Pursue Bulk;
   probClass1 = 0;
   probClass2 = 0.928571;
   probClass3 = 0;
   probClass4 = 0;
   probClass5 = 0.0714286;
   probClass6 = 0;
}
```

Terminal Node 17

```
if
(
  (
     POLITICAL_RISK$ == high
  ) &&
  (
     BUSINESS_RISK$ == high
  ) &&
  (
     TRADES$ == Bulk
  )
)
{
   terminalNode = -17;
   class = Do not Pursue Bulk;
   probClass1 = 0;
   probClass2 = 1;
   probClass3 = 0;
   probClass4 = 0;
   probClass5 = 0;
   probClass6 = 0;
}
```

Terminal Node 18

```
if
(
  (
     RESOURCE_AVAILABILITY$ == medium
  ) &&
  (
     MARKET_ACCESS$ == similar
  ) &&
  (
     ECONOMIC_BENEFITS$ == high ||
     ECONOMIC_BENEFITS$ == medium
  ) &&
  (
     POLITICAL_RISK$ == low ||
     POLITICAL_RISK$ == medium
  ) &&
  (
     BUSINESS_RISK$ == high
  ) &&
  (
     TRADES$ == Bulk
  )
)
{
   terminalNode = -18;
   class = Pursue Bulk;
   probClass1 = 0;
   probClass2 = 0.285714;
   probClass3 = 0;
   probClass4 = 0;
   probClass5 = 0.714286;
   probClass6 = 0;
}
```

Terminal Node 19

```
if
(
  (
     RESOURCE_AVAILABILITY$ == long
  ) &&
  (
     MARKET_ACCESS$ == similar
  ) &&
  (
     ECONOMIC_BENEFITS$ == high ||
     ECONOMIC_BENEFITS$ == medium
  ) &&
  (
     POLITICAL_RISK$ == low ||
     POLITICAL_RISK$ == medium
  ) &&
  (
     BUSINESS_RISK$ == high
  ) &&
  (
     TRADES$ == Bulk
  )
)
{
   terminalNode = -19;
```

```
  class = Do not Pursue Bulk;
  probClass1 = 0;
  probClass2 = 0.714286;
  probClass3 = 0;
  probClass4 = 0;
  probClass5 = 0.285714;
  probClass6 = 0;
}
```

Terminal Node 20

```
if
(
 (
   MARKET_ACCESS$ == superior
 ) &&
 (
   RESOURCE_AVAILABILITY$ == long ||
   RESOURCE_AVAILABILITY$ == medium
 ) &&
 (
   ECONOMIC_BENEFITS$ == high ||
   ECONOMIC_BENEFITS$ == medium
 ) &&
 (
   POLITICAL_RISK$ == low ||
   POLITICAL_RISK$ == medium
 ) &&
 (
   BUSINESS_RISK$ == high
 ) &&
 (
   TRADES$ == Bulk
 )
)
{
  terminalNode = -20;
  class = Do not Pursue Bulk;
  probClass1 = 0;
  probClass2 = 0.714286;
  probClass3 = 0;
  probClass4 = 0;
  probClass5 = 0.285714;
  probClass6 = 0;
}
```

Terminal Node 21

```
if
(
 (
   RESOURCE_AVAILABILITY$ == short
 ) &&
 (
   ECONOMIC_BENEFITS$ == high ||
   ECONOMIC_BENEFITS$ == medium
 ) &&
 (
   MARKET_ACCESS$ == similar ||
   MARKET_ACCESS$ == superior
 ) &&
 (
   POLITICAL_RISK$ == low ||
   POLITICAL_RISK$ == medium
 ) &&
 (
   BUSINESS_RISK$ == high
 ) &&
 (
   TRADES$ == Bulk
 )
)
{
  terminalNode = -21;
  class = Do not Pursue Bulk;
  probClass1 = 0;
  probClass2 = 1;
  probClass3 = 0;
  probClass4 = 0;
  probClass5 = 0;
  probClass6 = 0;
}
```

Terminal Node 22

```
if
(
 (
   ECONOMIC_BENEFITS$ == low
 ) &&
 (
   MARKET_ACCESS$ == similar ||
   MARKET_ACCESS$ == superior
 ) &&
 (
   POLITICAL_RISK$ == low ||
   POLITICAL_RISK$ == medium
 ) &&
 (
   BUSINESS_RISK$ == high
 ) &&
 (
   TRADES$ == Bulk
 )
)
{
  terminalNode = -22;
  class = Pursue Bulk;
  probClass1 = 0;
  probClass2 = 0.142857;
  probClass3 = 0;
  probClass4 = 0;
  probClass5 = 0.857143;
  probClass6 = 0;
}
```

Terminal Node 23

```
if
(
 (
   MARKET_ACCESS$ == inferior
 ) &&
 (
   POLITICAL_RISK$ == low ||
   POLITICAL_RISK$ == medium
 ) &&
 (
   BUSINESS_RISK$ == high
 ) &&
 (
   TRADES$ == Bulk
 )
)
{
  terminalNode = -23;
  class = Do not Pursue Bulk;
  probClass1 = 0;
  probClass2 = 0.928571;
  probClass3 = 0;
  probClass4 = 0;
  probClass5 = 0.0714286;
  probClass6 = 0;
}
```

Terminal Node 24

```
if
(
 (
   BUSINESS_RISK$ == high ||
   BUSINESS_RISK$ == low
 ) &&
 (
   ECONOMIC_BENEFITS$ == low ||
   ECONOMIC_BENEFITS$ == medium
 ) &&
 (
   TRADES$ == Break-Bulk
 )
)
{
  terminalNode = -24;
  class = Do not Pursue Break-Bulk;
  probClass1 = 0.848214;
  probClass2 = 0;
  probClass3 = 0;
  probClass4 = 0.151786;
  probClass5 = 0;
  probClass6 = 0;
}
```

Terminal Node 25

```
if
(
 (
   POLITICAL_RISK$ == high ||
   POLITICAL_RISK$ == low
 ) &&
 (
   BUSINESS_RISK$ == medium
 ) &&
 (
   ECONOMIC_BENEFITS$ == low ||
   ECONOMIC_BENEFITS$ == medium
 ) &&
 (
   TRADES$ == Break-Bulk
 )
)
{
  terminalNode = -25;
  class = Do not Pursue Break-Bulk;
  probClass1 = 0.771429;
```

```
    probClass2 = 0;
    probClass3 = 0;
    probClass4 = 0.228571;
    probClass5 = 0;
    probClass6 = 0;
}
```

Terminal Node 26

```
if
(
  (
    MARKET_ACCESS$ == similar ||
    MARKET_ACCESS$ == superior
  ) &&
  (
    POLITICAL_RISK$ == medium
  ) &&
  (
    BUSINESS_RISK$ == medium
  ) &&
  (
    ECONOMIC_BENEFITS$ == low ||
    ECONOMIC_BENEFITS$ == medium
  ) &&
  (
    TRADES$ == Break-Bulk
  )
)
{
    terminalNode = -26;
    class = Pursue Break-Bulk;
    probClass1 = 0.785714;
    probClass2 = 0;
    probClass3 = 0;
    probClass4 = 0.214286;
    probClass5 = 0;
    probClass6 = 0;
}
```

Terminal Node 27

```
if
(
  (
    MARKET_ACCESS$ == inferior
  ) &&
  (
    POLITICAL_RISK$ == medium
  ) &&
  (
    BUSINESS_RISK$ == medium
  ) &&
  (
    ECONOMIC_BENEFITS$ == low ||
    ECONOMIC_BENEFITS$ == medium
  ) &&
  (
    TRADES$ == Break-Bulk
  )
)
{
    terminalNode = -27;
    class = Do not Pursue Break-Bulk;
    probClass1 = 0.285714;
    probClass2 = 0;
    probClass3 = 0;
    probClass4 = 0.714286;
    probClass5 = 0;
    probClass6 = 0;
}
```

Terminal Node 28

```
if
(
  (
    MARKET_ACCESS$ == similar
  ) &&
  (
    POLITICAL_RISK$ == high ||
    POLITICAL_RISK$ == medium
  ) &&
  (
    ECONOMIC_BENEFITS$ == high
  ) &&
  (
    TRADES$ == Break-Bulk
  )
)
{
    terminalNode = -28;
    class = Do not Pursue Break-Bulk;
    probClass1 = 1;
    probClass2 = 0;
    probClass3 = 0;
    probClass4 = 0;
    probClass5 = 0;
    probClass6 = 0;
}
```

Terminal Node 29

```
if
(
  (
    BUSINESS_RISK$ == low
  ) &&
  (
    MARKET_ACCESS$ == inferior ||
    MARKET_ACCESS$ == superior
  ) &&
  (
    POLITICAL_RISK$ == high ||
    POLITICAL_RISK$ == medium
  ) &&
  (
    ECONOMIC_BENEFITS$ == high
  ) &&
  (
    TRADES$ == Break-Bulk
  )
)
{
    terminalNode = -29;
    class = Pursue Break-Bulk;
    probClass1 = 1;
    probClass2 = 0;
    probClass3 = 0;
    probClass4 = 0;
    probClass5 = 0;
    probClass6 = 0;
}
```

Terminal Node 30

```
if
(
  (
    BUSINESS_RISK$ == high ||
    BUSINESS_RISK$ == medium
  ) &&
  (
    MARKET_ACCESS$ == inferior ||
    MARKET_ACCESS$ == superior
  ) &&
  (
    POLITICAL_RISK$ == high ||
    POLITICAL_RISK$ == medium
  ) &&
  (
    ECONOMIC_BENEFITS$ == high
  ) &&
  (
    TRADES$ == Break-Bulk
  )
)
{
    terminalNode = -30;
    class = Do not Pursue Break-Bulk;
    probClass1 = 0.285714;
    probClass2 = 0;
    probClass3 = 0;
    probClass4 = 0.714286;
    probClass5 = 0;
    probClass6 = 0;
}
```

Terminal Node 31

```
if
(
  (
    BUSINESS_RISK$ == low ||
    BUSINESS_RISK$ == medium
  ) &&
  (
    POLITICAL_RISK$ == low
  ) &&
  (
    ECONOMIC_BENEFITS$ == high
  ) &&
  (
    TRADES$ == Break-Bulk
  )
)
{
    terminalNode = -31;
    class = Pursue Break-Bulk;
    probClass1 = 0.285714;
    probClass2 = 0;
    probClass3 = 0;
    probClass4 = 0.714286;
    probClass5 = 0;
    probClass6 = 0;
}
```

Terminal Node 32

```
if
(
  (
     BUSINESS_RISK$ == high
  ) &&
  (
     POLITICAL_RISK$ == low
  ) &&
  (
     ECONOMIC_BENEFITS$ == high
  ) &&
  (
     TRADES$ == Break-Bulk
  )
)
{
   terminalNode = -32;
   class = Do not Pursue Break-Bulk;
   probClass1 = 1;
   probClass2 = 0;
   probClass3 = 0;
   probClass4 = 0;
   probClass5 = 0;
   probClass6 = 0;
}
```