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THE FERRY SERVICE OFFER AN ANALYSIS OF FERRY SERVICES OPERATING FROM AND WITHIN THE UNITED KINGDOM

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THE FERRY SERVICE OFFER

AN ANALYSIS OF FERRY SERVICES OPERATING FROM AND WITHIN THE UNITED KINGDOM.

by

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ABSTRACT

THE FERRY SERVICE OFFER

An analysis of ferry services operating from and within the United Kingdom

Harmanus Heijveld

The objective of this study is to investigate the market offer of passenger-car ferry services within and from the United Kingdom. The study is approached from the point of view of the provider of the ferry service offer. Initially, it seeks to analyse the existing ferry services offered within and from the United Kingdom by the various operators, and subsequently undertakes an empirical investigation based on the appropriate marketing and management theory. The role of the consumer is, of course, crucial to an understanding of the marketing of ferry services. However, this particular study focuses on the supply of the ferry offer, and may be seen as complementary to earlier studies of ferry consumers and benefits sought. A comparison of on-board facilities and services on 70 ferries operating in the UK in 1994 resulted in the development of a baseline model explaining differences between services according to a wide range of criteria. This led to the development of a conceptual model of the ferry service offer using concepts from services marketing and corporate culture theory. Using cluster analysis it was concluded that the ferry service offer can be described in terms of core, augmented, and inter-product levels. In addition to these three ferry service offer levels the preferred service provider of each particular ferry service element has been identified. Using multiple discriminant analysis it was concluded that the augmented ferry service offer can be explained by differences among Miles & Snow corporate culture types (prospectors, analysers, and defenders). Combining these results, this study provides an explanation of the ferry service offer in terms of product level, preferred provider, and dominant corporate culture, which should prove of both practical and theoretical value.

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AUTHOR'S DECLARATION

At no time during the registration for the degree of Doctor of Philosophy has the author registered for any other University award. None of the material herein has been used in any other submission for an academic award.

A programme of advanced study was undertaken in partial fulfilment of the requirements, including literature reviews of previous relevant research (under the direction of R. Gray, PhD, MSc, BA), attendance of seminars, workshops and conferences, publication of papers related to this study, participation in and publication of a research report on ferries, lecturing in marketing to students at diploma, degree and post-graduate level at the University of Plymouth, and obtaining further professional qualifications in marketing. The above briefly consisted of:

Published papers relevant to this study (see back of thesis for bound in copies) :

Heijveld, H. , and Gray, R. The competitive environment of a service industry: the example of the UK - Continent passenger sea ferry services, (Maritime Policy and Management, 1996, Vol. 23, No. 2, pp. 157 -166)

Heijveld, H., and Gray, R. An Analysis of Service Elements for Ferry Networks (European Shortsea Shipping, Bergen June 1996, pp. 444 - 455)

Heijveld, H., and R. Gray UK Short Sea Ferry Services: a baseline model approach for policy decision making, in: Wijnolst, N., Peeters, C., and P. Liebman, (Eds.), European Shortsea Shipping, (London: Lloyd's of London, 1993, pp. 211 - 232)

Other published papers:

Heijveld, H., and Vederhus, O.

Market Potential for Fast Ferry Services between Italy and Greece, (London: Cruise & Ferry Publications, 1993, pp. 1 - 20)

Heijveld, H., and Welcome, H.S.

Professional shipmanagement and quality standards: the shipping industry perception, in: Ledger, G. and M. Roe (Eds.) International Studies in Shipping Policy and Management; International Shipping Series No. 1, (Gdansk: Institute of Maritime Transport Economics and Plymouth: Centre for International Shipping and Transport, 1996, pp. 95 - 121)

Heijveld, H., and Babalos, C. Manning in the Hellenic Shipping Industry, in: Ledger, G. and M. Roe (Eds.) International Studies in Shipping Policy and Management; International Shipping Series No. 1, (Gdansk: Institute of Maritime Transport Economics and Plymouth: Centre for International Shipping and Transport, 1996, pp. 3 - 23)

Presented papers:

Marketing of ferry services Chartered Institute of Transport South West Section, October 1994, Plymouth

Marketing strategies for shipping services

Second International Shipping and Intermodal Masterclass for the Baltic States, Central and Eastern Europe, Vilnius, Lithuania, 2 December 1996.

Research Report :

Heijveld, H., Gray, R., and Joint, J.F.

An analysis of existing ferry services and potential developments in the Atlantic Arc, (Plymouth, University of Plymouth, 1995)

Conferences attended as participant:

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Marketing of Services Workshop, Manchester, November 1992

Cruise + Ferry 93 paper presented with O. Vederhus

Shortsea Shipping Delft, Netherlands: June 1993 (paper presented)

Shipping Atlantic Arc Brest, France: November 1994 (interim research report presented

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Date ....25/9/98..................................

Chapter 1

Introduction

1. Introduction

This chapter introduces the reader to the objective of this study, outlines the structure and identifies the location of the research in its theoretical framework. Given the multi-disciplinary nature of the subject area, linking shipping practice with marketing theory in a strategic management context, it also provides the background for readers who are unfamiliar with all these aspects. This chapter also provides a justification for the research topic and concludes with the chapter development and a summary of objectives of the research.

1.1 Objective of the study.

The objective of this study is to investigate the market offer of passenger-car ferry services within and from the United Kingdom. The market offer (or product) is claimed to be the most important element of the marketing mix (Kotler, 1994). The underlying assumption of this research is that a clear understanding of the ferry service offer is central to the marketing and, thus, to the success of the ferry industry.

One of the main decisions for the management of ferry companies to make is what service offer is to be provided and the reasons for doing so. Therefore a more precisely defined description of the ferry service offer, based on marketing theory and practice, is what is needed to make these decisions easier. A universally accepted and precise definition of what is meant by a service offer is not available, and various authors, such as Levitt (1960), Sasser, Olsen & Wyckoff (1978), Grönroos (1980b), Kotler (1984), Eiglier & Langeard (1981), Christopher, et al. (1991), Zeithaml & Bitner (1996) as explained in chapter 3, describe it in different terms that can be applied to a ferry service offer. In essence a ferry service offer consists of different elements, some more central or important than others, varying from one company to the next and with differences in the service offer also existing within one company (see chapter 2). The central elements are sometimes called 'core' elements and the others are known as 'augmented' elements of the service offer.

Members of the ferry industry in Europe, together with national policy makers and those within the European Commission, have shown a keen interest over the last few years in what should be provided by ferry services (Heijveld and Gray, 1993, 1996a, 1996b; Gray et al., 1995). The user of the ferry is also interested in a clear definition of the offer, as that will enable a better choice of the ferry services to be made (see among others: the annual AA guides to Ferries, the monthly Cruise & Ferry Info magazines and the bi-monthly ABC Cruise & Ferry Guides). Governments have also shown an interest in defining what the ferry service offer is and whether legislation or regulations to ensure minimum levels of service provision presently in force are adequate and desirable, in particular with regard to overall safety (Fenton, 1995).

Apart from investigating these practical aspects, the research seeks to make a conceptual contribution to the theory of marketing of services in general, and the marketing of ferry services in particular.

1.2 The theoretical framework

The study concentrates on the ferry service offer and its relationship with services marketing and corporate culture. Services marketing is the part of marketing theory related to the service industries and the study of corporate culture has its roots in management theory, anthropology and sociology. Figure 1-1 shows the components of the theoretical framework of this study. It combines the main practical areas of shipping, land transport and associated infrastructure with concepts from marketing and strategic management. The study is approached from the point of view of the provider of the ferry service offer. Initially, it seeks to analyse the existing ferry services offered within and from the United Kingdom by the various operators, and subsequently undertakes an empirical investigation based on the underlying theory. The role of the consumer is, of course, crucial to an understanding of the marketing of ferry services. However, this particular study focuses on the supply of the ferry offer, and may be seen as complementary to earlier studies of ferry consumers, in particular, Rich (1980), Matear and Rich (1989), Matear (1987, 1991), and Matear, Gray and Cowell (1991). The competitive environment of the UK ferry service market has been covered in detail in a paper (Heijveld & Gray, 1996a) which is included at the end of this thesis.

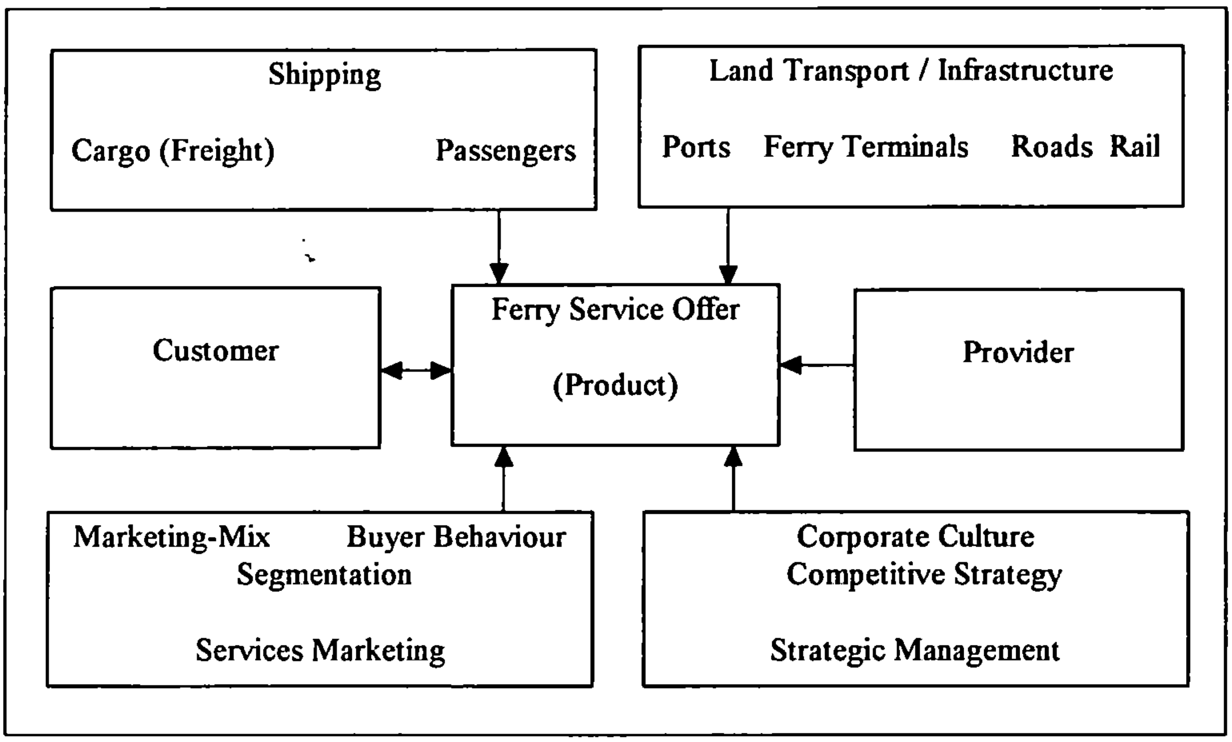


Figure 1-1 Framework of relationship between practice and theory

1.3 Background of ferry services

Ferries form a large and varied segment of the passenger ship market (Alderton, 1995). The roll-on / roll-off (roro) ferry has largely replaced the cargo / passenger ship, which would typically carry up to 200 passengers and several thousand tons of cargo. Over the years the average roro-ferry vessel has increased in size, carrying up to 2,000 passengers with improved facilities, currently at the same level as cruise ships. Such ferries are an integral part of the total transport system, linking road and rail systems where bridges or tunnels are not feasible for either economical or technical reasons. Ferries may also serve as part of the leisure (mini-cruise) industry. Alderton (1995) observes that sometimes ferries are operated as airlines and at other times as buses and trains. Stopford (1997) states that an opinion survey of the ferry market revealed that the commercial trend was strongly towards treating the ship as a 'floating hotel' in order to maximise on-board expenditure by passengers.

The function of the ferry as a 'duty free shop' has been under threat during the period of this study as current European legislation requires the abolition of duty free sales on board of ferries operating between member states by 1999. A late campaign supported by the United Kingdom and some other European countries seeks to avert this from happening. They argue that ferry operators need the income of duty free sales to ensure overall profitability and maintain services. They claim that abolition of duty free sales would result in un-employment, abandonment of certain routes and fare increases (Financial Times, 1998). However the European tax commissioner Mario Monti is determined not to back down on plans to abolish duty free sales and said that there was 'no evidence' that European finance ministers would want to reverse their decision to scrap duty free sales. Any such move would need the backing of all 15 finance ministers (Lloyd's List, 1998).

A further threat to ferry services in the English Channel, with a possible knock-on effect for ferry services in the North, South and South-West of England is the Eurotunnel. Traffic figures for August 1997 show that the Eurotunnel carried 1,019,480 passengers, whereas the ferries carried 2,387,632 passengers between France and the United Kingdom. This means that the Eurotunnel has a market share of 29.9 % of the total passenger flow between

France and the UK and a market share for cars of 38.4 %, for buses of 31.1 %, and 28.6 % for lorries (Cruise & Ferry Info, 1997).

The outcome of these important and topical issues is uncertain at the time of writing. However, it is clear that ferry systems must undertake effective marketing in such a turbulent context if they are to succeed.

1.4 Background of marketing

Marketing is both a business function and an organised set of concepts forming a recognised area of academic study and research. Applied to ferry services the marketing function is 'the management process to identify, anticipate and satisfy ferry customers' needs profitably' (Chartered Institute of Marketing (CIM) definition in: Willsmer, 1987: 9). The total ferry service is made up of a sequence of service encounters (Zeithaml and Bitner, 1996) which should be designed at both strategic and operational levels. For example the strategic design to operate a particular ferry service requires the possible involvement of the ferry operator, the port authority, port operator, government agencies, third party operators, and potential customers. The operational procedure to board the ferry by car involves the ferry operator, the ferry terminal operator and the passenger. The marketing function seeks to identify what the customers want (the market needs) from a ferry service, particularly when direct competition between ferry service providers is allowed or encouraged. The market needs can be divided into core needs, e.g. to travel safely across the sea (car included), and additional needs, e.g. to do so cheaply and in comfort. The market needs may be homogeneous or heterogeneous. In case of the latter, possible market segmentation is to be considered by managers. The market needs, or those of each market segment, are then translated into an appropriate satisfier by means of the marketing mix. The service marketing mix elements (product, price, place, promotion, people, process, and physical evidence) are seen as the 'tool box' of the marketer and determine the exact nature of the satisfier to be offered.

1.4.1 Marketing applied to short sea ferries.

Very little marketing literature has been published on short sea ferries, although one area that has received limited coverage is segmentation. The major segmentation in customers using passenger car ferries, identified by Rich (1980), is between passenger traffic (consumer markets) and freight traffic (industrial markets). Matear (1991) identifies eight market segment criteria in the Irish Sea passenger car ferry market consisting of the requirements of minority groups facilities (facilities for children and disabled persons, public transport connections), on board service (friendly attitude, good service and good food), on board facilities (on-board shops and entertainment), access time (check-in time required, distance to and from origin and destination), price (price and discount fares), travel time (crossing and total travel time), schedule (time and day of departure), and majority group facilities (motorist's lounge and decor). On the basis of these criteria different market segments were established for all routes and customer types. This resulted, for example, in five market segments of Larne-Stranraer car passengers, labelled as 'facilities oriented', 'convenience', 'not price sensitive', 'value for money', and 'shuttle' market segments. For example the 'not price sensitive' market segment considered the 'on board service' and 'travel time' as important components and 'price' and 'access time' as unimportant components, whereas the 'value for money' market segment considered 'on board service' and 'price' as important components and 'travel time' and 'schedule' as unimportant components. Apart from a few segmentation studies there have been no other studies of short sea ferries specifically applying marketing concepts.

A marketing approach was adopted for the study because the UK ferry industry market is undergoing dramatic changes which can be analysed on the basis of existing marketing concepts and methodologies. The reaction to these changes may be determined by the dominant corporate culture.

Specific developments justifying the approach include:

1. Ferries are becoming more competitive, not only among themselves but also in the face of competition from the Eurotunnel and deregulated air services.
2. Transport (and port) liberalisation.
3. EU developments, including the possible abolition of duty-free income.

Specific reasons for adopting a service offer approach are:

1. Previous studies have only looked at the consumer (demand) side.
2. Changing structure of transport in a deregulated environment (e.g. bus companies operating railways).
3. Changing structure of ferry service providers (including a liberalised approach to the functions of ports).

Taken together, these developments raise the question of what exactly should a ferry service offer, and who or which organisation should offer it. It is proposed that the importance of the organisational context requires investigation which is undertaken in this research through the concept of corporate culture.

1.5 Background of corporate culture and strategic management.

All of the firm's activities and its core values and mission statements are affected by the cultural structure of the organisation. An organisation's culture is a complex set of beliefs and ways of doing things that influence the organisation's perspective of itself and the world around it (Bharadwaj, Varadarajan and Fahy, 1993). A key element of the corporate culture is the set of formal rules and structures that governs the way people relate to one another in the workplace. Another is a set of myths and traditions that help to define the ideology of the organisation (Mintzberg, 1983). Most of the literature on organisation culture and performance of a firm suggest that culture can have a significant positive economic value for a firm (Barney, 1986a; Ouchi, 1981; Deal and Kennedy, 1982). The 'strong culture hypothesis' suggests that firms with strong distinctive traits, values and shared belief patterns will outperform organisations that are weak on these dimensions (Dennison, 1984). Strong cultures can help attain a shared vision and goal congruence among employees to meet organisational goals (Wilkins and Ouchi, 1983); empower employees to be flexible and achieve organisational goals (Pascale, 1985); and energise the employees of an organisation. A study conducted by Kotter and Heskett (1992) reports that firms with cultures that emphasise key managerial constituencies (customers, stockholders and employees) and leadership (at all levels) outperformed by a large margin firms that do not have those cultural traits. Another study focusing on corporate culture types as determinants of performance (Deshpande, Farley and Webster, 1993), reports that Japanese companies with corporate cultures stressing competitiveness and entrepreneurship outperformed those dominated by internal cohesiveness or rules. Services being primarily delivered by employees, the 'people' component of service delivery as perceived by customers, plays an important role in service differentiation. Hence, a critical factor that endows a service organisation with the competitive edge is its employees, and the way they are influenced by the culture of the organisation. Or, as stated by Curtis (1994):

> 'To be successful, a firm needs a culture where people have an intuitive ability what is expected of them in a given situation; they know '*where they are coming from*' and hence what they have to do'

To determine specific dominant cultural types is therefore important, and academic research has shown the existence of different cultures. For example four different types have been identified by Miles and Snow (1978), who labelled these organisational cultures as defenders, analysers, prospectors and reactors.

1.5.1 Corporate culture applied to short sea ferry services.

There appears to be no literature relating to corporate culture applied to short sea ferry services. It could therefore be argued, why is it appropriate to include corporate culture in a study of ferry services now? The main reason for doing so now are the important changes in the corporate structure of transport in Europe, and specifically the ferry industry in the United Kingdom. These have been outlined in section 1.4.1 and the specific issue of changes in the ferry industry will be discussed in detail in this work in chapter 2. Chapter 3 will provide a review of the literature on corporate culture and associated strategic management.

1.6 Theoretical contribution of this research

This research seeks to contribute to the body of knowledge on marketing of services in general by confirming the validity of the 'product' classification models based on descriptives such as 'core' and 'augmented' service offer. The contribution to the study of marketing of ferry services, in particular, is through an investigation of the 'product' aspects of the ferry service offer, both in terms of importance and the service provider. A further contribution of this research is to seek to identify, by means of examining the augmented ferry service offer, similarities and differences between ferry service providers in terms of the corporate culture of each provider.

This research will show that the basic or core service offer is practically identical for each ferry operation, and this similarity is also what ferry users in general perceive the ferry service offer to be. The consumer, upon initial examination of ferry services offered, is likely to perceive an image of similarity of ferry operators, route and schedule details, and on board ferry facilities. Customer perception of ferry services based on company brochures reinforces this image. A more detailed examination by the author, however, has revealed differences in augmented service offerings between routes, among competing ferry operators, within the same company, their various ships, and on board facilities (Heijveld and Gray, 1993). From this analysis (discussed in detail in chapter 3), it is clear that different products are offered. As stated in section 1.1, it is an objective of this study to identify the exact nature of the ferry service offer and its minimal requirements. Initially it will concentrate on those aspects of the ferry service offer which are indeed identical, or similar to all companies. This may be considered the *core definition* of the service offer. However, as stated above, the research will show that not everything is identical and that it is necessary to examine the differences and what causes can be identified to explain these differences.

1.7 Chapter development and summary of research objectives

The thesis is divided in three parts. The first part describes the background of the ferry industry in the United Kingdom in chapter 2 and contains a literature review relating to the concept of a service product in chapter 3. These provide the basis for the conceptual model of the ferry service offer developed in chapter 4. The second part of the thesis, covering the methodology, contains the operationalisation of the conceptual model (chapter 5) and the analytical methodology (chapter 6). The third and final part presents the results by means of analysis (chapter 7) and conclusions (chapter 8).

The objectives of this research can be summarised as:

- to investigate the market offer of passenger car ferry services operating from and within the UK in 1994 in order to explain the 'ideal' ferry service offer by means of a general model in terms of operations and ferry service elements or customer benefits offered

- to identify the possible reasons for similarities and differences among the ferry service offers based on different market segmentation criteria, such as
    - area of operation (port, route, country)
    - ship's particulars (size, carrying capacity, age, engine power and make, shipyard of newbuilding, number of cabins, number of beds)
    - operational characteristics (speed, frequency of sailings, crossing time, route distance, country of registry)
    - operator (type, nationality)
    - customer organisation's ratings (AA ferry ratings)
- to undertake a literature review of services marketing and corporate culture in order
    - to develop a conceptual model of the ferry service offer
- to formulate appropriate research hypotheses relating to the ferry service offer
    - to operationalise the conceptual model and
    - to develop a research instrument and
    - to test the research hypotheses
- to conclude whether the research hypotheses can be accepted or must be rejected
- to identify the implications of the results in terms of
    - contribution to knowledge, in both theoretical and practical terms
    - limitations of the research (scope, nonresponse)
    - areas of further research

Chapter 2

The United Kingdom passenger car ferry industry

2. The United Kingdom Passenger Car Ferry Industry

2.1 Introduction

Ferry services are provided all over the world. For practical reasons, however, the study will limit itself to ferry services offered in the United Kingdom. This includes both domestic (see table 2-1) and international routes (table 2-2). Concentrating on the United Kingdom ferry services will not excessively limit the scope of the investigation as it will enable the comparison of a wide variety of routes, ferries, ports and operators while maintaining a common base of potential customers.

Major Domestic Ferry Routes From	To	**Distance** nautical miles	**Operator**	**Passengers**	**Cars**
Clyde Services			Caledonian MacBrayne	3,000,000	534,000
Western Isles Services			Caledonian MacBrayne	3,200,000	771,000
Jersey/Guernsey	Weymouth	71/96	Condor	n/a	n/a
Douglas	Ardrossan	120	Isle of Man Steamship	2,691	307
Douglas	Belfast	78	Isle of Man Steamship	26,682	2,508
Douglas	Fleetwood	55	Isle of Man Steamship	20,180	60
Douglas	Heysham	59	Isle of Man Steamship	257,222	46,531
Douglas	Liverpool	72	Isle of Man Steamship	107,042	17,169
Cairnryan	Larne	26	P&O European Ferries	590,373	150,020
Aberdeen	Lerwick	340	P&O Scottish Ferries	56,389	10,425
Aberdeen	Stromness	235	P&O Scottish Ferries	13,738	1,825
Scrabster	Stromness	46	P&O Scottish Ferries	131,829	35,393
Stromness	Lerwick	210	P&O Scottish Ferries	11,917	1,830
Southampton	East Cowes	9	Red Funnel	1,041,130	241,236
Southampton	West Cowes	9	Red Funnel	798,049	n/a
Stranraer	Belfast	42	Seacat Scotland	414,334	87,821
Stranraer	Larne	34	Stena Sealink	1,286,000	285,800
Dunoon	Gourock	3	Western Ferries	668,157	358,069
Lymington	Yarmouth	3	Wightlink	1,179,000	261,000
Portsmouth	Fishbourne	6	Wightlink	2,363,000	661,000
Portsmouth	Ryde	4	Wightlink	1,327,000	n/a
Total Domestic Routes				**16,494,733**	**3,465,994**

Source: Cruise & Ferry Info, 1995

Table 2-1 Major domestic ferry routes in the UK

Ferry services have been provided since time immemorial. Whenever people wanted to cross a river, lake or sea, a system of ships operating on a stretch of water between places of departure (piers, quays or ports terminals) has satisfied this need of travel across water. Over time the system has become more and more sophisticated. For instance, when in the

1840's railway networks were developed, the ferry service became an integral part of international railway connections. In some cases railway wagons would board the ferry and accompany the passengers across the water, but in most cases the passengers would leave the train and board the ferry by foot and after the crossing would continue by train. The ferry operators in most cases were also the railway operators, and the ferry service was offered under the same terms and conditions as the railway service. As these services were often considered to be of strategic national importance, quite a few ferry companies were either state owned or the state had a large control in the actual operation.

The ferry service offers from the United Kingdom to the Continent did not change significantly for the next 100 years. In the early 1950's demand of motor car owners to accompany their cars on the ferry resulted in the development of the passenger car ferry. Up till then cars had to be transported on cargo ships. The cars would be treated as any other piece of general cargo and lifted on board into the hold at the port of departure and lifted out of the hold onto the pier at the port of arrival. This separation of driver and car each travelling on different ships, the driver on the ferry and the car on the cargoship, became unacceptable to customers and the passenger car ferry was introduced.

An early example of what was to come occurred on 9 June 1936, when a passenger car ferry, the Forde, a former minesweeper and equipped with a stern gate, became the victim of a strike of crane drivers. As they refused to unload the cars on board in the port of Calais the master of the ferry lowered the ramp onto the pier and the vehicles drove off (Cowsill & Hendy, 1989). This idea would have caught on very rapidly, not surprisingly, in view of the savings in both cost and time, if the war had not intervened.

International Routes From	To	Distance nautical miles	Operator	Passengers	Cars
Douglas (IoM)	Dublin	83	Isle of Man Steamship	32,257	2,914
Dover	Calais	21	Hoverspeed	1,276,156	239,662
Dover	Calais	21	P&O European Ferries	10,056,309	1,838,524
Dover	Calais	21	Stena Sealink	6,928,000	1,145,000
Dover	Dunkerque	32	Stena Sealink / SNAT	58,000	64,400
Dover	Zeebrugge	52	P&O European Ferries	248,967	2,102
Felixstowe	Scheveningen	113	Norfolk Line	3,473	n/a
Felixstowe	Zeebrugge	84	P&O European Ferries	489,143	124,043
Fishguard	Rosslare	54	Stena Sealink	844,000	158,700
Folkestone	Boulogne	24	Hoverspeed	898,887	131,514
Folkestone	Boulogne	24	Meridian Ferries	n/a	n/a
Harwich	Esbjerg	335	Scandinavian Seaways	228,647	28,445
Harwich	Gothenburg	526	Scandinavian Seaways	n/a	n/a
Harwich	Hamburg	363	Scandinavian Seaways	200,597	33,914
Harwich	Hoek van Holland	116	Stena Line	1,177,000	220,700
Holyhead	Dublin	61	Irish Ferries	710,764	120,457
Holyhead	Dun Laoghaire	56	Stena Sealink	1,460,000	254,100
Hull	Rotterdam	197	North Sea Ferries	597,472	132,059
Hull	Zeebrugge	202	North Sea Ferries	413,563	60,885
Ipswich	Rotterdam	132	North Sea Ferries	n/a	n/a
Jersey/Guernsey	St Malo	55	Emeraude Lines	114,000	30,000
Lerwick	Bergen	349	P&O Scottish Ferries	n/a	n/a
Middlesborough	Zeebrugge	280	North Sea Ferries	n/a	n/a
Newcastle	Esbjerg	339	Scandinavian Seaways	53,898	9,170
Newcastle	Gothenburg	481	Scandinavian Seaways	18,661	4,274
Newcastle	Hamburg	417	Scandinavian Seaways	55,621	10,880
Newcastle	Bergen	336	Color Line	141,733	15,468
Newhaven	Dieppe	64	Stena Sealink	1,177,000	174,900
Pembroke	Rosslare	67	Irish Ferries	336,026	81,554
Plymouth	Roscoff	96	Brittany Ferries	529,843	138,696
Plymouth	Santander	415	Brittany Ferries	176,062	44,168
Poole	Cherbourg	60	Truckline	451,358	112,253
Portsmouth	Bilbao	555	P&O European Ferries	142,838	20,959
Portsmouth	Caen	95	Brittany Ferries	1,140,093	296,913
Portsmouth	Cherbourg	86	P&O European Ferries	644,092	188,253
Portsmouth	Le Havre	90	P&O European Ferries	820,635	225,819
Portsmouth	St Malo	142	Brittany Ferries	598,380	170,064
Ramsgate	Dunkerque	38	Sally	1,693,984	230,233
Ramsgate	Ostend	61	RMT	1,547,223	232,035
Sheerness	Vlissingen	124	Ferrylink	n/a	n/a
Sheerness	Vlissingen	124	Olau Line	195141	24195
Southampton	Cherbourg	63	Stena Sealink	581,000	140,300
Swansea	Cork	160	Swansea Cork Ferries	191,449	52,644
Total International Routes				**36,232,272**	**6,760,197**

Source: Cruise & Ferry Info, 1995

Table 2-2 International Ferry Routes from the United Kingdom (Traffic 1994)

Eventually, a second-hand bridge bought in 1946 was finally adapted for use as a linkspan in Calais, and on 27 June 1951, the 'Halladale', to commemorate the occasion carried an 8 ton East Kent coach (FFN 453) to off-load via the new linkspan. Whereas from then on Calais became a drive on - drive off port, it was not until 30 June 1953, that the same was possible in Dover, when the port's twin linkspans at Eastern Dock were officially opened by the UK Minister of Transport (Cowsill & Hendy, 1989). This drive on - drive off system is the one that is now mainly used all over the world. Depending on the local port conditions the ship's ramps are either directly lowered onto the pier or onto a linkspan which is a permanent flexible floating construction between the ramp and the pier to enable cargo to roll on and roll off. Passengers embark and disembark using gangways or flexible shoreside links.

In 1994 there were 21 domestic ferry routes with services offered by 9 different operators and 43 international ferry routes operated by 19 different ferry companies. Table 2-2 shows the international routes, distances, ferry operators and the passenger and car traffic.

From these tables it can also be seen that the UK ferry industry is very diverse and the results of further analysis are presented in the next paragraphs.

2.2 The importance of UK ferry travel.

Ferry travel in the UK is of considerable importance, because it has provided the only international surface transport link to Continental Europe (before the opening of the Channel Tunnel) and provides an international link to Eire.

Ferry Traffic in 1994	Passengers	Cars	Buses	Trailers	Trips	Railway Wagons
Total All Routes	52,727,005	10,226,191	246,173	2,712,730	212,872	29,573

Source: Cruise & Ferry Info, 1995 (adapted)

Table 2-3 Total UK Ferry traffic in 1994

It also provides the main, if not the only, domestic link between various parts of the UK, for the transport of cars, buses, trailers and lorries and their drivers and passengers. The total number of traffic on all routes can be seen in table 2.3.

The following statistics give an indication of the large volume of ferry traffic. In 1991 the total population of the UK was 57,801,000 (England 48,208,000; Wales 2,892,000; Scotland 5,107,000; and Northern Ireland 1,594,000). The total number of ferry passengers carried equals 91 % of the total UK population. Furthermore, the total number of licensed private cars and light goods vehicles in Great Britain at the end of 1992 was 22,345,000, and ferry traffic in 1994 represented 46 %. of this total number. In 1988 ownership of buses and coaches in the UK was 132,000 and the number of lorries and vans owned was 2,599,000. In terms of ferry traffic the number of buses carried in 1994 represented 186 % of the total UK number of buses and coaches and the figure for trailers (lorries and vans) equals 104 %.

2.3 Analysis of ferry services in the UK in 1994.

The analysis of ferries services in the UK is based on the development of a specific database for this purpose by the author. The sources of information are the Automobile Association Ferry guide, Lloyd's Register of Shipping, Fairplay World Shipping Encyclopaedia, ABC Cruise & Ferry Guide, Cruise & Ferry Info, Lloyd's List, brochures of ferry companies, newspapers and magazines and other publications specifically dealing with ferries. This database has been created in SPSS - Statistical Package for Social Sciences - for Windows (see appendix J) and raw data has been recoded into appropriate categories to enable more detailed analysis. The initial database comprised all ferry data, but due to incomplete data, missing or otherwise unavailable, the total database for this section of the study has been limited to 70 ferries. The main criterion for exclusion was when missing data for the ferry facilities and services (the ferry service offer) of a particular ferry was considered to be significant. Thus all the ferries included can be described sufficiently on the basis of on-board ferry facilities and services, a central focus of this study, in addition to all other data which was considered relevant. The total number of available categories for analysis of these 70 ferries/routes combinations is 125, which includes recoded categories. The initial categories include entries such as name of port, distance of route, ship name, operator, voyage time, physical dimensions and many more, and the recoded entries are derived from the initial ones. For example voyage times have been recoded into < 2 hours, ≥ 2 and < 4 hours, ≥ 4 and < 8 hours, and ≥ 8 hours.

The purpose of the following analysis is to establish whether the ferry services offered in 1994 can be classified according to specific types which share common features and differ from others. If this can be established, a further objective of this analysis is to establish whether a cause or reason for these differences and similarities can be identified. The database for route traffic figures, also developed in SPSS, comprises all routes where at least one set of traffic figures, passengers, cars, buses, trailers or trips, are known.

2.3.1 Providers of ferry services

In the ferry service system different operators provide the various goods and services, therefore overall control of the total service offering on a specific route is not always easy to achieve. Parties involved are the ferry operators, the ferry terminal operators, the port operators, and governments at local, regional and national level (and increasingly European level). In a situation where the ferry company also operates the ferry terminal and the port they are still dependent on the providers of the port access infrastructure (roads and railways).

2.3.1.1 Competition.

Most international ferry routes are provided on the basis of commercial viability. Some international and domestic routes are provided as a social necessity; these routes are frequently subsidised. The main reason is to ensure reliable transport links for the population usually in remote areas or scarcely populated regions or islands. For example most of the Scottish services are provided with the support of a subsidy from the Scottish Office.

2.3.2 Ferry route

The main international ferry routes involve 18 UK ports. From some of these ports only one ferry service is being offered, others have two or more ferry services (see table 2-4). Ports often compete among each other to attract ferry services, however in some cases competition is not encouraged and only one operator is favoured to maintain the ferry link.

Table 2-4 shows the main ports of departure and the ports of arrival, from the viewpoint of the mainland UK, divided by their area of operation and the country of destination. It can be seen that ports located in the Channel & South West area of operation, Dover, Folkestone, Newhaven, Plymouth, Poole, Portsmouth, Ramsgate and Southampton provide service ferry routes to France, Belgium, the Channel Islands and Spain.

The main ports in the Irish Sea area of operation, Cairnryan, Fishguard, Holyhead, Pembroke and Stranraer, are linked to ports in Eire or Northern Ireland only. The North Sea area of operation comprises the ports of Felixstowe, Harwich, Hull and Newcastle, and links with ferry ports of arrival in Belgium, Denmark, Sweden, Germany, the Netherlands and Norway.

Main ports of departure and arrival (by area of operation and country of destination)			
Area of operation	Port of departure	Port of arrival	Country of destination
Channel & South-West	Dover	Boulogne	France
	Dover	Calais	France
	Dover	Ostend	Belgium
	Folkestone	Boulogne	France
	Newhaven	Dieppe	France
	Plymouth	Roscoff	France
	Plymouth	Santander	Spain
	Poole	Cherbourg	France
	Poole	St Malo	France
	Poole	St Peter Port	Channel Islands
	Portsmouth	Bilbao	Spain
	Portsmouth	Caen	France
	Portsmouth	Cherbourg	France
	Portsmouth	Le Havre	France
	Portsmouth	St Malo	France
	Ramsgate	Dunkerque	France
	Ramsgate	Ostend	Belgium
	Southampton	Cherbourg	France
Irish Sea	Cairnryan	Larne	Northern Ireland
	Fishguard	Rosslare	Eire
	Holyhead	Dublin	Eire
	Holyhead	Dun Laoghaire	Eire
	Pembroke	Rosslare	Eire
	Stranraer	Belfast	Northern Ireland
	Stranraer	Larne	Northern Ireland
	Swansea	Cork	Eire
North Sea	Felixstowe	Zeebrugge	Belgium
	Harwich	Esbjerg	Denmark
	Harwich	Gothenburg	Sweden
	Harwich	Hamburg	Germany
	Harwich	Hook of Holland	The Netherlands
	Hull	Rotterdam	The Netherlands
	Hull	Zeebrugge	Belgium
	Newcastle	Esbjerg	Denmark
	Newcastle	Stavanger / Bergen	Norway
Source: Various (Adapted by author, 1995)			

Table 2-4 Main ports of departure and arrival (by area of operation and country of destination).

2.3.2.1 Route distance

The route distance in nautical miles is fixed, once a ferry terminal has been put into operation in both the port of departure and the port of arrival, unless physical changes in the natural environment are made. For instance, the construction of a channel, or dredging a shallow stretch of water to appropriate draught levels, may enable the ferry operator to take advantage of these possible short cuts. Generally speaking, however, these changes occur very seldom. Another possibility for reducing the route distance is to be allowed to enter certain areas which may provide cost savings. For instance, for a few years (but not any longer) the French government allowed ferry operators to sail closer to the Brittany shore when passing this area, rather than maintaining the earlier required 60 miles' distance, which was introduced as a result of the sinking of the Amoco Cadiz (Laine, 1994).

So, in practice, the route distances are fixed. The shortest distance is 22 nautical miles and the longest distance is 555 nautical miles for ferry routes from and within the UK.

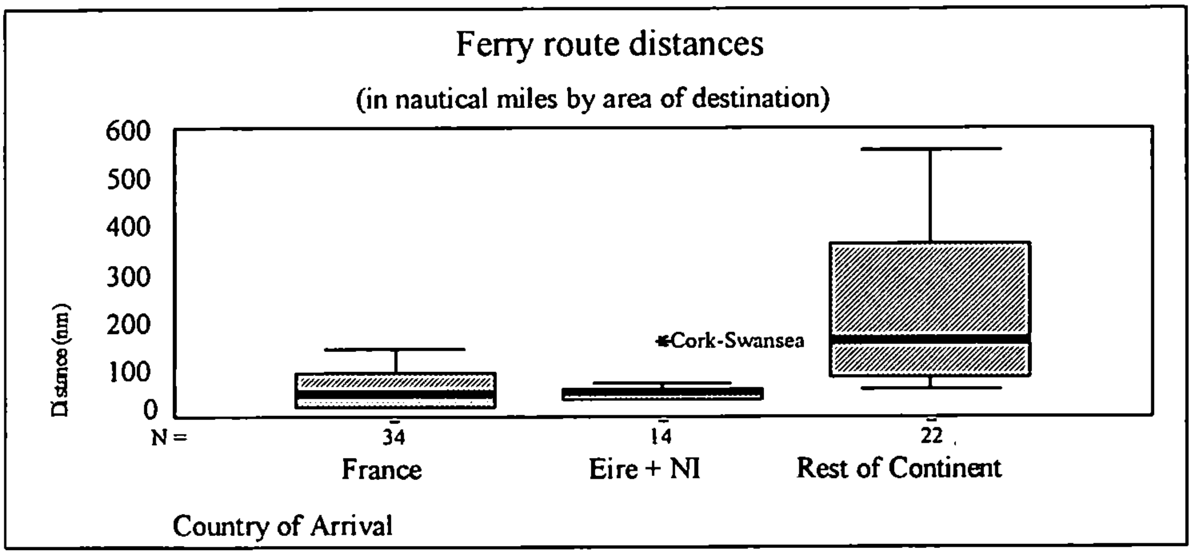


Figure 2-1 Ferry route distances

The mean over the 70 selected routes is 109 nautical miles with a standard deviation of 123. Figure 2-1 shows the boxplot (see appendix H for a detailed explanation of boxplots) of route distance by area of operation.

UK - France has an mean route distance of 56.47 nautical miles (nm), the median is 51 nm, the 25th percentile is 22 nm, the 75th percentile is 93 nm, the shortest distance is 22 nm (for Dover - Calais), and the longest is 142 nm (Portsmouth - St Malo). Routes in the Irish Sea, to Eire and Northern Ireland have a mean distance of 58.14 nm, the median is 54 nm, the 25th percentile is 38 nm, the 75th percentile is 61 nm, the shortest distance is 38 nm (Stranraer - Larne), and the longest is 160 nm (Swansea - Cork). This route is clearly an outlier as shown in the boxplot. Services to the rest of the Continent have a mean route distance of 222.45 nm, the median is 163 nm, 25th percentile is 83, 75th percentile is 362 nm, the shortest distance is 61 nm (Ramsgate - Ostend), and the longest route distance is 555 nm (Portsmouth - Bilbao).

2.3.2.2 Voyage time

The voyage time of ferries on a particular route is determined by the route distance and the operating speed of the ferry. The longer the route distance, the greater the voyage time, and the faster the ferry, the shorter the voyage time. Figure 2-2 shows the route distances with associated voyage times.

The voyage time, which ranges from 35 minutes to 30 hours, is highly correlated (.9415) with the route distance. The dotted line in figure 2-2 shows the mean route distance of 109 nautical miles; the associated mean voyage time is 7 hours and 8 minutes. Figure 2-3 shows the ferry crossing times in four different time periods (under two hours, between two and four hours, between 4 and eight hours, and over eight hours). It can be seen that each time period contains approximately a quarter of all voyages.

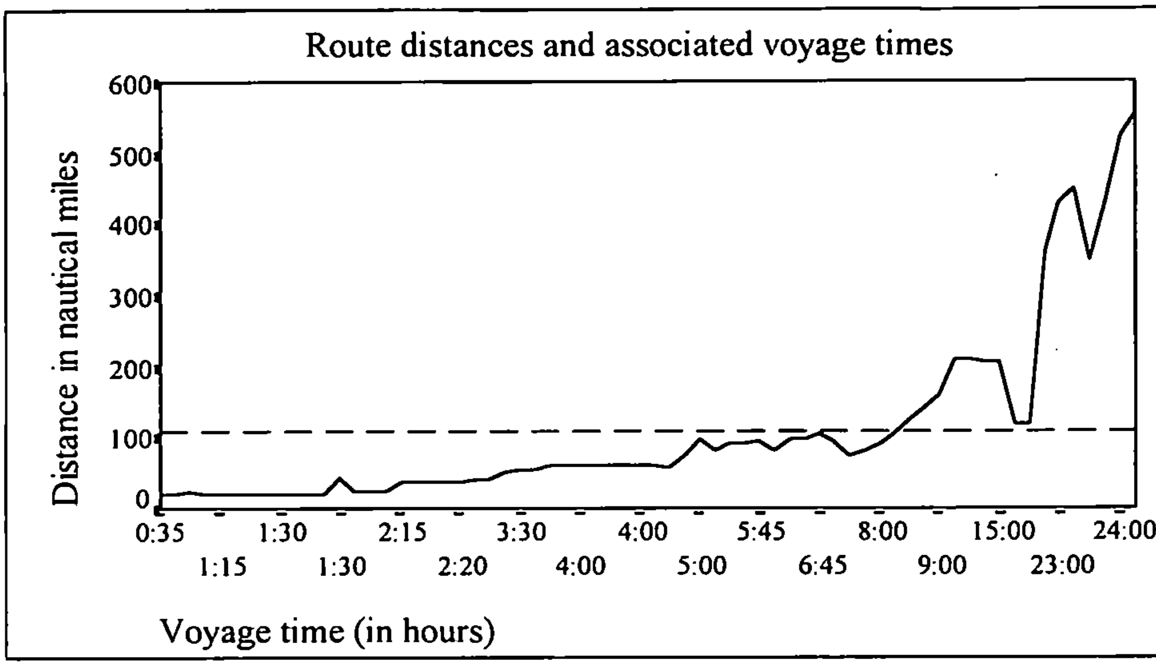


Figure 2-2 Route distances and associated voyage times

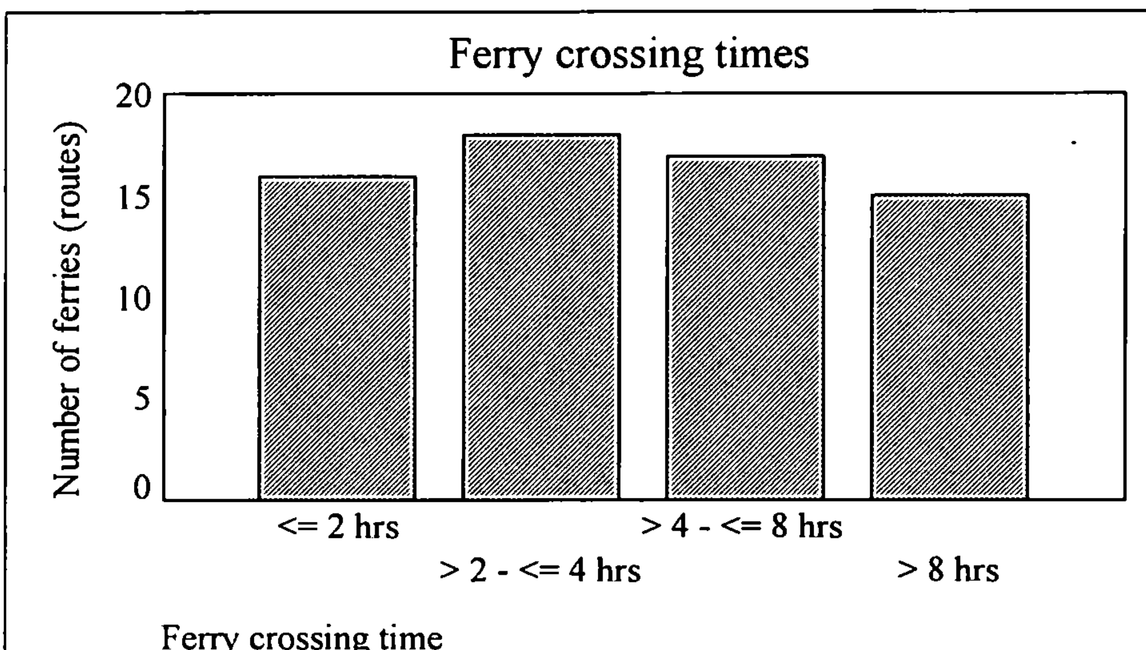


Figure 2-3 Ferry crossing times

A further division of voyage times by area of operation and country of arrival is shown in table 2-5. Of the 66 route/ferry combinations (4 missing values for voyage time) the voyage times in the Irish Sea are on average the lowest, 3 hours and 17 minutes, followed by the Channel & South West area, 5 hours and 25 minutes, and voyage times in the North Sea area of operation are the longest, 15 hours and 22 minutes, on average. Breaking these figures down for country of arrival (lower part of table 2-5), it can be seen that the mean voyage times to Northern Ireland are the shortest, and the voyages to Germany, Denmark, Spain, Sweden and Norway all exceed 20 hours. It is anticipated that voyage time has clear implications for the type of facilities and services to be offered, for example, the provision of beds and restaurants. The elements of the ferry service offer are something that will be investigated in later sections in this chapter.

Voyage times of ferries in hours by area of operation and country of arrival					
Area of operation	Mean	Minimum	Maximum	Number	St.dev.
Channel & South West	5:25	0:35	30:00	40	6:21
Irish Sea	3:17	1:30	9:00	12	1:55
North Sea	15:22	5:30	24:00	14	6:25
Country of arrival (direction from UK mainland)					
France	3:43	0:35	9:00	32	2:39
Eire & Northern Ireland	3:17	1:30	9:00	12	1:55
Eire	4:25	3:30	9:00	6	2:14
Northern Ireland	2:10	1:30	2:20	6	0:19
Rest of Continent	14:14	4:00	30:00	22	8:23
Belgium	7:26	4:00	15:00	8	4:51
Channel Islands	5:00	5:00	5:00	1	
Germany	20:30	20:30	20:30	1	
Denmark	20:30	19:00	23:30	3	2:35
Spain	25:40	23:00	30:00	3	3:47
The Netherlands	10:41	6:45	14:00	4	3:51
Sweden	24:00	24:00	24:00	1	
Norway	23:00	23:00	23:00	1	
All routes	7:08	0:35	30:00	66	7:13

Table 2-5 Voyage times of ferries by area and country

2.3.2.3 Frequency of sailings

The frequency of sailings from a particular port is likely to be associated with the total traffic demand, the size of the ferry in terms of passenger and car carrying capacity and the voyage time. The higher the frequency per day the more convenient the customer will perceive the service, as a missed sailing may not result in having to wait too long for the next one. These highly frequent sailings per day, however, only occur on a limited number of routes.

Frequency of daily sailings				
UK Port	Number of ferries	Daily sailings (according to timetables)		
		Mean	Minimum	Maximum
Cairnryan	2	6	6	6
Dover	16	13	6	18
Felixstowe	2	2	2	2
Fishguard	1	2	2	2
Harwich	6	1	1	2
Holyhead	3	3	2	4
Hull	4	1	1	1
Newcastle	1	1	1	1
Newhaven	2	4	4	4
Plymouth	4	2	1	3
Poole	3	2	1	3
Portsmouth	9	2	1	3
Ramsgate	4	6	5	6
Stranraer	4	9	8	9
Southampton	1	1	1	1
Swansea	1	1	1	1
Folkestone	1	4	4	4
All UK ports	62 *	5	1	18

Table 2-6 Frequency of sailings

(Note: * = 8 ferries excluded for missing values)

Table 2-6 shows the port of departure, the number of ferries on that route, the average number of daily sailings, the minimum and the maximum. The busiest port is Dover with a maximum of 18 daily sailings, for Stena Sealink with 4 ferries, and an average of 13 sailings for all operators. The ferry sailings from Dover are undertaken by Stena Sealink with 4 ferries, by Hoverspeed (1 Hovercraft and 1 Catamaran), by P&O European Ferries (7 ferries), and by Regie voor Maritiem Transport- RMT (2 ferries), operating on the routes Dover to Calais, Dover to Boulogne and Dover to Ostend.

2.3.2.4 Fares

The cost of ferry travel is reflected in fares charged for adults, car, driver and car, and children. Boxplot figure 2-4 shows the fares per adult per nautical mile for three areas of destination. It appears from figure 2-5 and table 2-7 that the highest fares per nautical mile for adults are charged for the shortest routes. Dover has a mean fare for adults of £ 1.05 per nautical mile, the ferry operators P&O European Ferries, Hoverspeed, and Stena Sealink all charging similar mean fares (£ 1.15, £1.12 and £ 1.18 respectively). RMT has a mean fare of £ 0.40, substantially lower than the others, but based on the longer Dover to Ostend route.

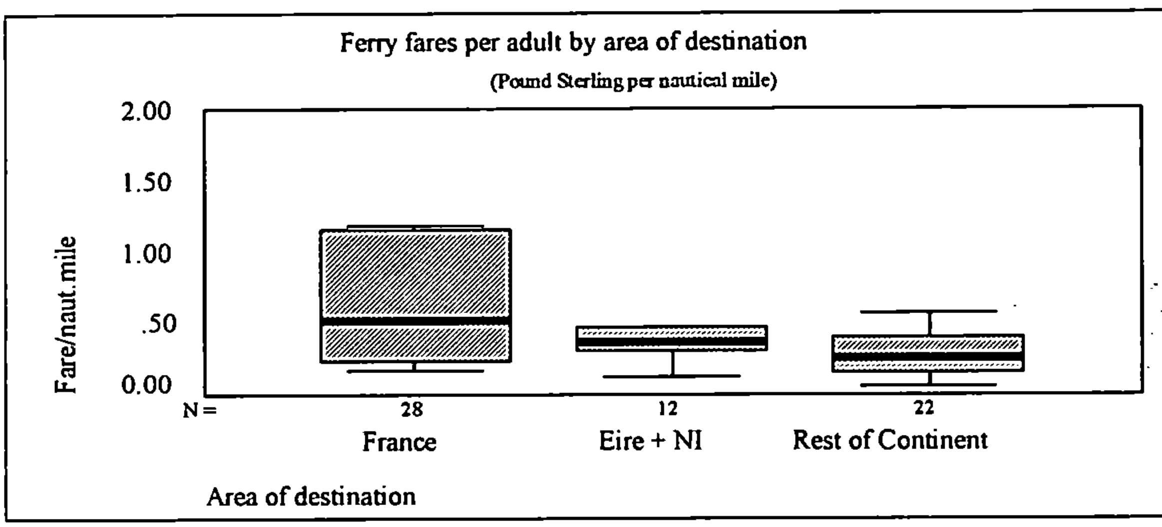


Figure 2-4 Adult fare per nautical mile and area of destination

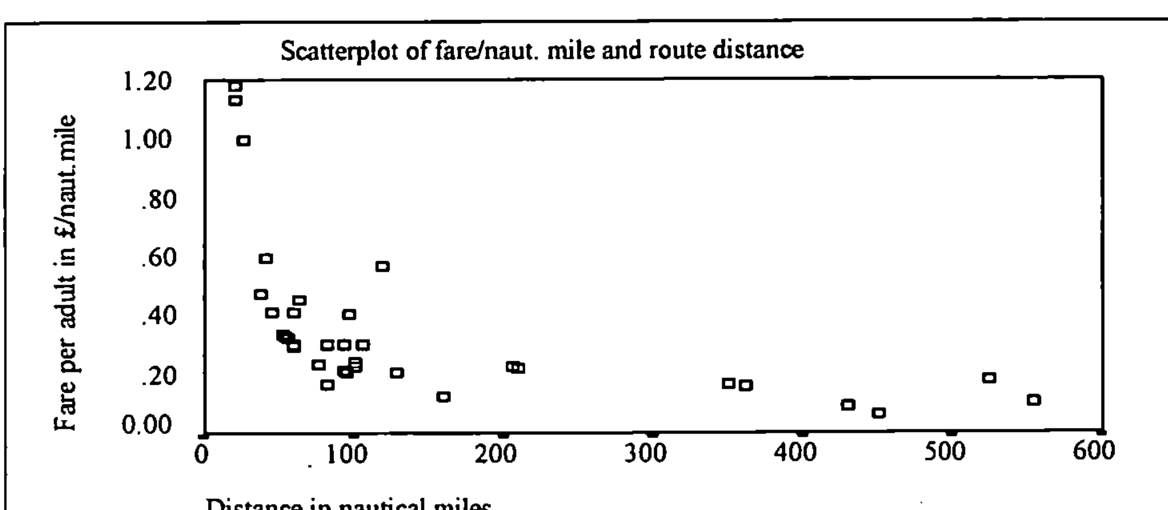


Figure 2-5 Scatterplot of fare per adult per nautical mile and route distance

Mean car fares are the highest in the Irish Sea (£ 2.15 / nm), followed by routes to France (£ 0.85 /nm), and the rest of the Continent £ 0.23 / nm). Routes from Cairnryan (38 nm) and Stranraer (38 nm) charge £ 2.24 and £ 2.11 respectively per nautical mile, and on the route from Dover to Calais (22 nm), P&O European Ferries and Stena Sealink both charge £ 1.91 per nm. The cheapest car fare is from Newcastle, only 11 pence per nautical mile. Fares for car & driver are also the highest in Dover (£2.25/nm) as are fares for children (£ 0.64/nm). The mean route distances give some indication of the relationship between fares and route distance, but do not explain it fully.

Fares in £ per nautical mile by UK port and mean route distance in nm from that port					
Port	Mean route distance in nautical miles	Fare in £ / nm			
		Adult	Car	Car & driver	Child
Dover	28	1.05	1.91	2.25	0.64
Ramsgate	52	0.50	.	0.90	0.30
Cairnryan	38	0.47	2.24	.	0.24
Stranraer	40	0.46	2.11[a]	1.91[b]	0.25
Newhaven	64	0.45	0.47	.	0.23
Harwich	222	0.35	0.27	.	0.05
Fishguard	57	0.33	.	1.69	0.16
Poole	95	0.31	0.57	1.12	0.15
Holyhead	58	0.31	.	1.58	0.15
Felixstowe	83	0.30	.	0.69	0.18
Portsmouth	146	0.23	0.42	.	0.11
Hull	209	0.23	0.27	.	0.11
Southampton	83	0.17	0.45	.	0.07
Plymouth	265	0.16	0.32	.	0.08
Swansea	160	0.13	.	0.55	0.06
Newcastle	400	0.12	0.11	.	0.10
Average	109[c]	0.47	0.78	1.60	0.27
Total cases	68	62	39	23	59
Source: ABC Cruise & Ferry Guide 1994, Company Brochures (adapted by author)					

Table 2-7 Fares per nautical mile by port of departure.

Note: a = Stena Sealink, b = Hoverspeed, c = based on 70 cases, missing values = .

For example route distances from Harwich have a mean value of 222 nm, Hull 209 nm and Plymouth 265 nm, whereas the mean adult fare for Harwich is 35 pence/nm, for Hull 23 pence/nm and for Plymouth the mean value is 16 pence/nm. An investigation of the fares by ferry operator shows that differences exist for every route, even when there is no competing operator on some of the routes, and pricing can be more cost-oriented than competitor oriented. Where competition exists the fares are fairly similar, for example, on the route Dover to Calais, P&O European Ferries charged £ 1.15/ nm, Hoverspeed £ 1.09/ nm and Stena Sealink £ 1.19/nm for adults. In summary, significant fare differences exist among the ferry operators and the UK ports (routes), the reasons for which are not obvious, and require further investigation outside the scope of this study.

2.3.2.5 Traffic figures 1994

Demand for sea travel by ferry can be divided into passengers, coaches and cars (consumer market demand), and trailers and lorries (freight market demand). The consumer market is strongly seasonal, as opposed to the freight market, which is largely constant. In order to meet peak demand, supply of ferry slots during these periods must be available.

Table 2-8 shows the traffic figures in 1994 for all major ports on a daily basis. Demand is the average number of customers per trip and supply is the average available carrying capacity of passengers, cars and lanemetres of the ferries calling at that port. Lanemetres refer to the length of the carrying capacity of ferries in metres of trailers, buses, coaches and lorries allowing for a width of 3 metres for these vehicles. The carriage of buses and lorries varies significantly from route to route. Some routes carry none or few of each category, whereas others carry very large numbers. The lorry (trailer) traffic remains mostly constant throughout the year. Passenger, car and coach traffic is highly seasonal. The peak period is the summer months when most people are taking holidays. The ferry operators are usually able to meet this increased demand by providing extra sailings and frequently exclude lorries to ensure that as many higher fare paying cars are carried as possible. This, of course is not always well received by lorry drivers, who may strongly influence which ferry route and operator their company selects, and who may decide to move their custom to other operators, who do not exclude them. Ferry operators are well aware of this and therefore tend to treat lorry drivers especially well, with separate lounges and other on board facilities, as they rely heavily on the freight traffic in the low capacity period which is the remaining 7-8 months of the year. Some operators only provide services in the peak period and stop them altogether in the remaining months, therefore relying mainly on passenger car customers.

Traffic demand and supply in 1994 by UK port (demand in average customers per trip and supply in mean ferry carrying capacity)						
Port	Passengers		Cars		Lanemetres*	
	demand	supply	demand	supply	demand	supply
Cairnryan	153	1,035	39	330	420	480
Dover	252	1,360	47	385	615	1,121
Felixstowe	164	682	83	220	915	1,167
Fishguard	379	1,225	71	299	285	810
Harwich	604	1,593	95	425	660	889
Holyhead	432	1,475	74	343	270	579
Newcastle	609	950	109	240	255	486
Newhaven	418	1,771	62	378	300	783
Plymouth	812	1,907	207	515	240	1,024
Poole	207	1,021	51	379	600	816
Portsmouth	437	1,420	123	428	315	1,027
Ramsgate	336	1,377	47	391	405	906
Stranraer	201	963	44	248	405	744
Southampton	252	1,800	86	450	165	950
Swansea	491	2,700	135	380	195	890
Folkestone	291	450	43	80	.	.
Pembroke	248	1,500	60	326	240	468
All ports	347	1,366	73	390	330	984
N (trips/ferries)	51	70	48	69	35	63
Source: Cruise & Ferry Info (adapted by author)						

Table 2-8 Traffic 1994 demand and supply by port

Note: * lanemetres are calculated as 15 metres per bus / trailer from demand figures.

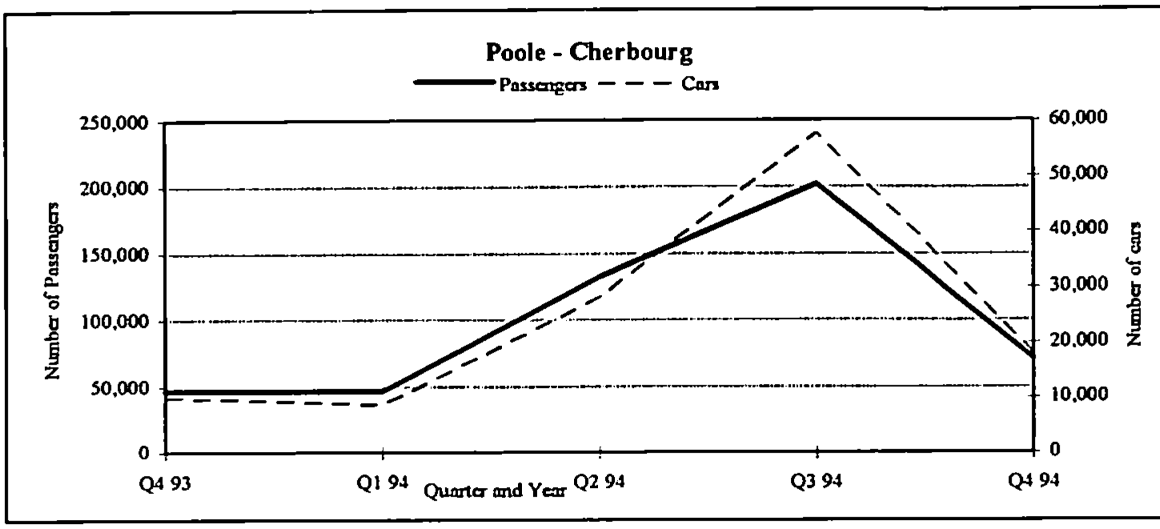


Figure 2-6 Traffic figures Poole - Cherbourg for passengers and cars in 1994

An example of traffic figures for the route Poole - Cherbourg, operated by Truckline, is shown in figure 2-6 for passengers and cars, in figure 2-7 for lorries/trailers and buses, and figure 2-8 shows the load factors for passengers and cars.

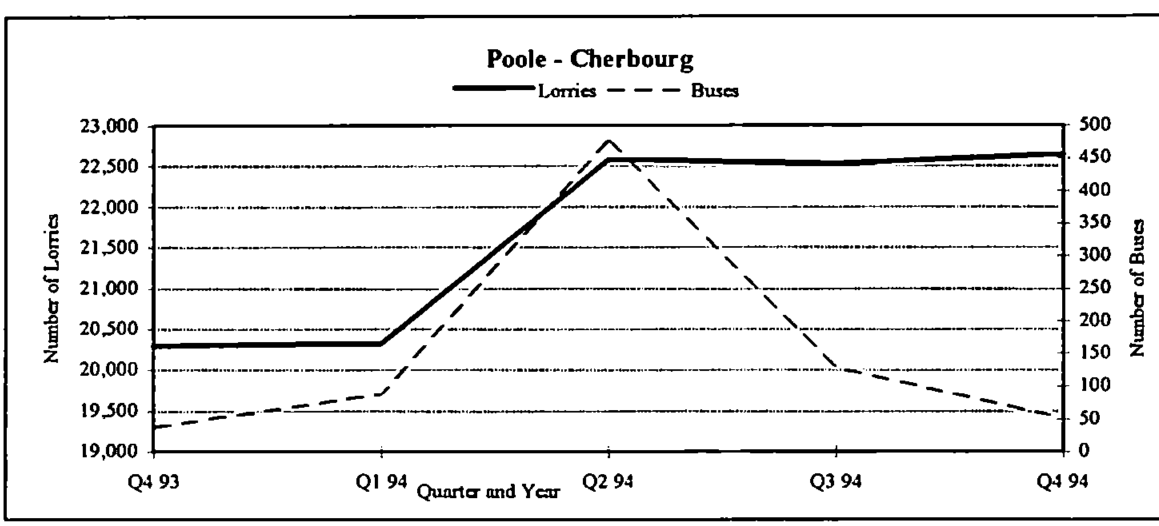


Figure 2-7 Traffic figures for Poole - Cherbourg in 1994, lorries and buses

The number of passengers and cars carried on the route Poole - Cherbourg shows a strong correlation of 0.9879 (see also: figure 2-6). Traffic figures of both rise in the second and third quarter of the year and drop dramatically in the fourth and the first quarter. The demand and supply figures for Poole, table 2-8, show a daily average of 207 passengers with a capacity for 1,021 passengers, which is an average load factor of about 20 %. For cars the load factor is about 13 % daily average for the whole year. Figure 2-8 shows that these load factor values are only exceeded in the peak period of the 3rd quarter.

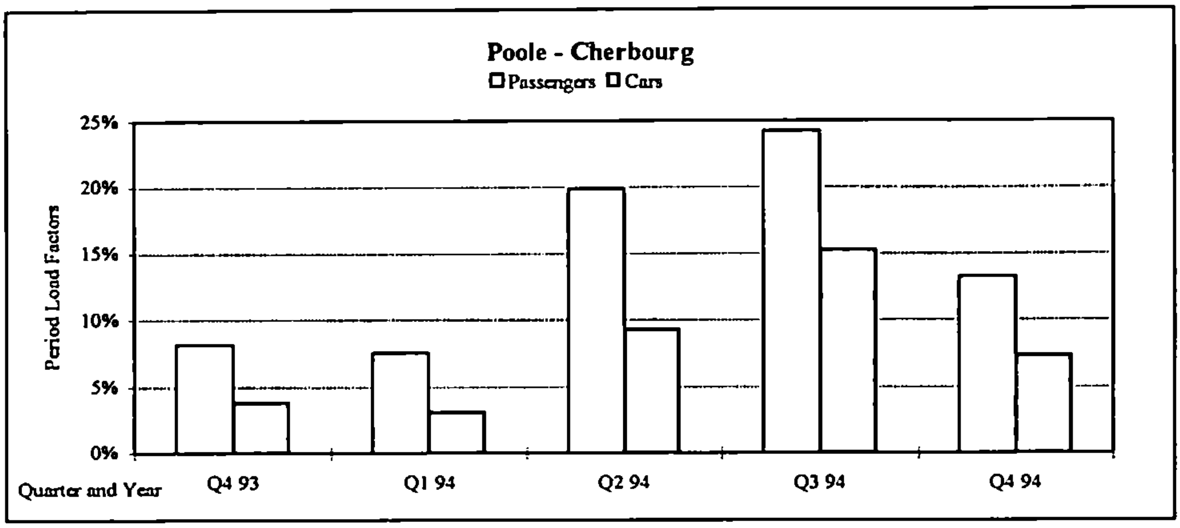


Figure 2-8 Load factors Poole - Cherbourg 1994 passengers and cars

2.3.3 Ferry

The main objective of ferries operating within the UK and between other European countries is to carry passengers and vehicles safely and profitably by sea. Ferries are designed to achieve this objective, based on customer demand and the expectations of the ferry company influenced by the economic, technical, social, cultural, political, and natural environment. The actual ferry in service by a particular operator, whether acquired as a newbuilding or as a second-hand vessel, can be described by a number of different variables, such as: physical dimensions, technical data, construction, capacities, on-board facilities, on-board services, on-board provisions for disabled customers, on-board financial facilities, and consumer organisation rating.

The first analysis is to identify where similarities and differences among these variables exist, and if so, whether these can be explained.

2.3.3.1 Physical dimensions

The main physical dimensions of a ferry are the length, width (beam), and depth (draught). The mean values for the ferries operating within and from the UK are 144.65 metres in length, a beam of 23.63 metres and a draught of 5.5 metres. These physical dimensions of a ferry determine the suitability to operate on routes, which include locks into the port.

An analysis of ferry operators according to the main physical dimensions was undertaken, but no real differences among the operators in terms of length, draught and beam could be established.

2.3.3.1.1 Length

The length of the ferry, expressed as length over all (loa) is a definition used in naval architecture and in shipping in general to describe the longest distance between the bow and the stem of a vessel, varies among the different ferries. Table 2-10 shows the mean, median, mode, standard deviation, variance, range, minimum, and maximum values.

Length of ferries (Loa) (in metres)			
Mean	144.647	Standard deviation	21.563
Median	141.450	Variance	464.960
Mode	129.400	Minimum	74.200
Valid cases	64	Maximum	182.300
Missing cases	6	Range	108.100

Table 2-9 Length (Loa) of UK ferries

To test whether ferries are shorter or longer in specific operating regions it can be seen from figure 2-9 that ferries in the North Sea are, on average, longer (164.4 m) than those operating from ports in the Channel and South West (143.1 m). The shortest ferries, on average, are to be found in the Irish Sea (123.1 m). These differences are statistically significant (F = 14.3477, sig. = .0000; see for details appendix I - analysis of variance, table

I-8), however, the practical impact is likely to be minimal. The catamaran Stena Sea Lynx (see figure 2-9 for Irish Sea) is very small (74.2 m) compared to the majority of conventional single hull ferries, and therefore affects the average length of the ferries operating in the Irish Sea. Exclusion of this fast ferry would have resulted in a mean length of 132 m for the 12 ferries in this region as opposed to 127.5 m for 13 ferries. In general fast ferries, which have different dimensions than conventional ferries, would distort the figures calculated, however, since there is only one fast ferry included in this part of the study and the differences are relatively small it was decided not to exclude the Stena Sea Lynx from the calculations.

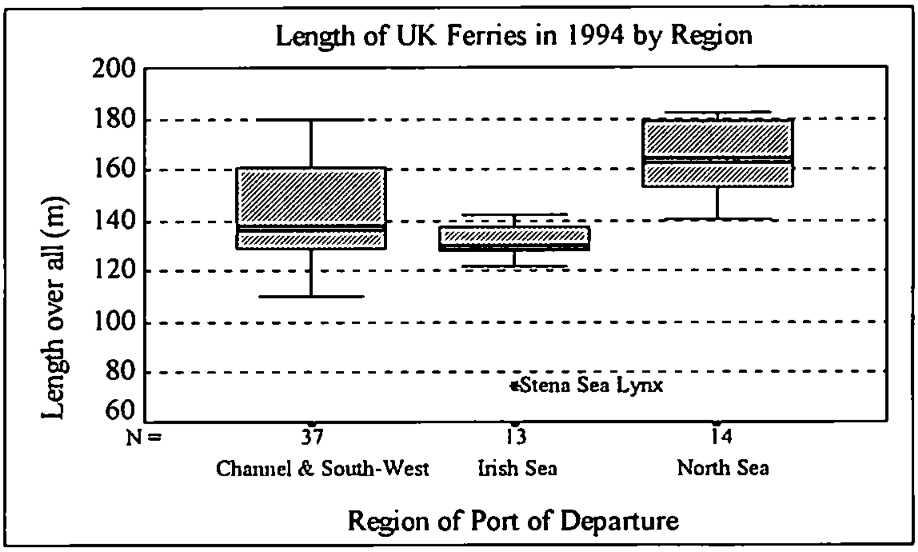


Figure 2-9 Length of UK ferries in 1994 by region of port of departure

2.3.3.1.2 Draught

The draught of a ferry is important for operational reasons. Draught is the depth of the water which a ship draws, which varies with the load carried. Maximum draught, also known as deep load draught occurs when the vessel is fully loaded to her Plimsoll line (Kemp, 1979). The route on which the ferry is operating, the approach to the ports, and the ports' terminal conditions, in addition to the prevailing tides, all determine whether the ferry's draught will cause the vessel to run aground when proceeding. The limitations of several ports in the UK are such that they are not suitable for ferry operations, unless dredging is undertaken to increase the depth of entry channels and sandbanks to acceptable safe levels. Ports with large tidal variations may find their usefulness as a ferry port limited to only a few (varying) hours a day.

Draught of ferries (in metres)			
Mean	5.503	Standard deviation	0.797
Median	5.500	Variance	0.635
Mode	6.500	Minimum	2.400
Valid cases	63	Maximum	6.700
Missing cases	7	Range	4.300

Table 2-10 Draught of UK ferries

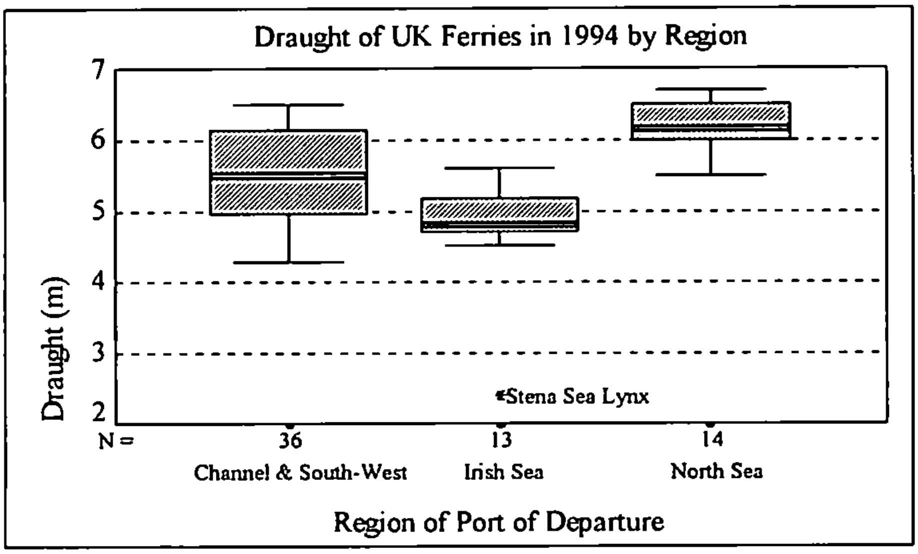


Figure 2-10 Draught of UK ferries by region of port of departure

The mean draught of ferries operating in 1994 in the UK was 5.5 metres. Table 2-10 shows that the minimum value was 2.4 m and the maximum 6.7 m. Figure 2-10 shows the differences in draught by region of port of departure. The outlier, again, is the Stena Sea Lynx, which as a catamaran has a very low draught (2.4 m) compared to the conventional ferries. The results of an analysis of variance (see for a detailed explanation of analysis of variance appendix I) shows that statistically, the differences are significant (F = 14.7229 and sign. = .0000) with ferries operating in the Channel & South West having a mean draught of 5.47 m, ferries operating in the Irish Sea 4.81 m and ferries operating in the North Sea 6.2 m. Exclusion of the Stena Sea Lynx changes the mean draught for the Irish Sea to 5.01 m and the mean for the entire population to 5.55 m. However, the differences between operating areas remains significant (F = 13.9492, sign. = .0000), which means that vessels with the lowest mean draught dimensions are deployed in the Irish Sea, and ferries with the highest mean draught dimensions are operating in the North Sea. The reason for this is the higher mean length for ferries operating in the North Sea region (164.4 m) and the higher mean deadweight (cargo carrying capacity) of 4,017 tonnes, compared to 2,830 tonnes for the Channel & South -West and 1,851 tonnes for the Irish Sea region.

2.3.3.1.3 Beam

The beam, or width, of the ferry also represents a physical limitation of the ferry to operate on certain routes. For instance, (North Sea) ferries can only enter King George Dock in Hull with a beam of 25.5 m. Table 2-11 shows that the average width of ferries in the UK is 23.6 m. The smallest is 16.5 m wide, and the widest is 32 m.

Beam of UK ferries in 1994 (in metres)			
Mean	23.634	Standard deviation	3.157
Median	23.400	Variance	9.970
Mode	26.000	Minimum	16.500
Valid cases	65	Maximum	32.000
Missing cases	5	Range	15.500

Table 2-11 Beam of UK ferries in 1994

Looking at the boxplots in figure 2-11 and table 2- 13 the beam of ferries appears to be more or less the same for each region (about 24 m). The greatest variation is seen the Channel and South West regions with a standard deviation of 3.5 m and a mean of 23.95 m. Statistically the differences are not significant at 1% or 5% level (F=2.5768, sign.= .0841), which confirms that ships have a similar mean width (beam), in whatever the region they operate.

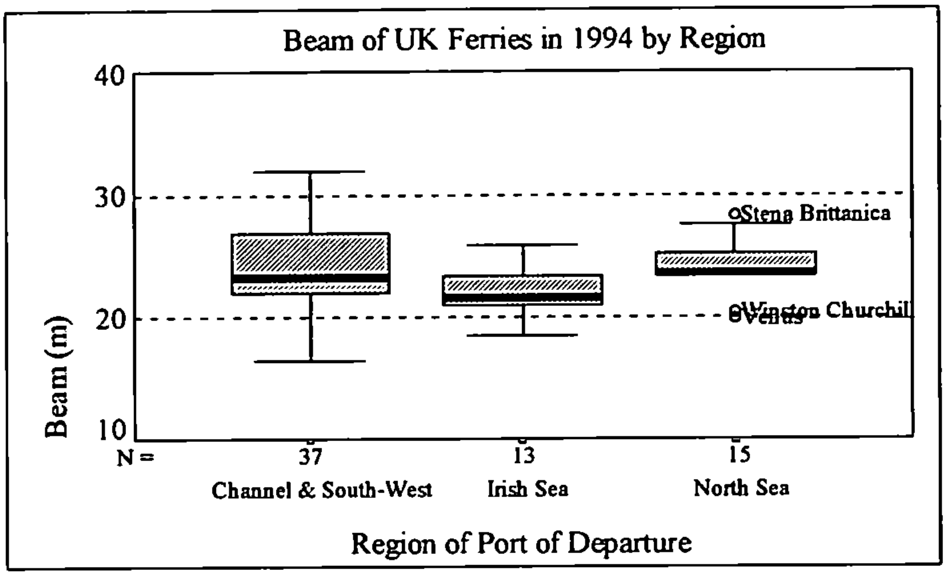


Figure 2-11 Beam of UK ferries by region

The physical dimensions of ferries, length, draught and beam, constrain a vessel in its operating capacity to call at specific ports or at particular times. For instance the size of the King George Dock in Hull determines the length and beam up to which ferries are able to enter the inner basin, and the bar in front of the port of Roscoff limits vessels exceeding a specific draft limit depending on the tide. From this it follows that ferries are usually trading on one route only, and indeed are often designed, acquired or modified for a specific route.

2.3.3.1.4 Tonnage measurements

From the basic dimensions, allowing for the actual use and shape of the ship's areas, tonnage measures are calculated according to international rules. The ship's gross (register) tonnage, and nett tonnage are often used as a basis for port tariffs and canal tolls, and 'dead-weight' is the actual weight in passengers and cargo the ferry is allowed to carry safely. New international regulations, now made compulsory, measure the ships in gross tonnes or GT. These figures have not been used in this study as they were not readily available for all ferries included in the data base and the principle is the same anyway - calculations based on specific formulae and rules applied to an existing ferry. For illustration purposes the tonnage capacities for the UK ferry fleet are shown in table 2-12.

Tonnage capacities of UK ferries in 1994					
Description	Mean	St.dev.	Min.	Max.	Valid N
Deadweight	2,924	1,459	201	6,403	62
Net Register Tonnage (NRT)	7,661	5,133	1,929	23,644	59
Gross Register Tonnage (GRT)	15,129	9,670	325	37,800	66

Table 2-12 Tonnage capacities of UK ferries in 1994

2.3.3.1.5 External access systems and free height

To enable passengers and vehicles to board and disembark the ferry easily the dimensions of the ferry access equipment is important. Passengers use a gangway to enter and leave the ferry, which is sometimes linked to a footbridge system, or directly on to the pier. Vehicles and other rolling stock enter and leave the ferry via a ramp or a port. In order to get and maintain the required height during loading and unloading under varying tidal conditions a linkspan is an essential part of the external access equipment in most ports. In order for tall vehicles to enter the ferry, without hitting the deck above, the ramp or linkspan has to be kept at an acceptable gradient, the ideal position of the ramp being horizontal, and is limited to the free height available on the main deck. In figure 2-12 it can be seen that most of the ferries operating in the UK have a free height on the main deck of 4.5 metres, and the minimal value is 4 metres. The free height available and the tidal variation determine the length of the ramp. The most common length of ramps in operation is around 10 metres. The beam of the ferry determines the width and maximum number of the ramps, when access is over the bow and aft of the ship. In order to carry lorries, a ramp width of about 6 metres is required. Because the ship moves, either because of the state of the water, or as a result of lorries and heavy trailers being loaded and moved around on deck, the ramps must be able to absorb a list of at least a few degrees. Torsional flexibility and strength is affected by the type of material used, usually steel, and the length / width ratio of the ramp.

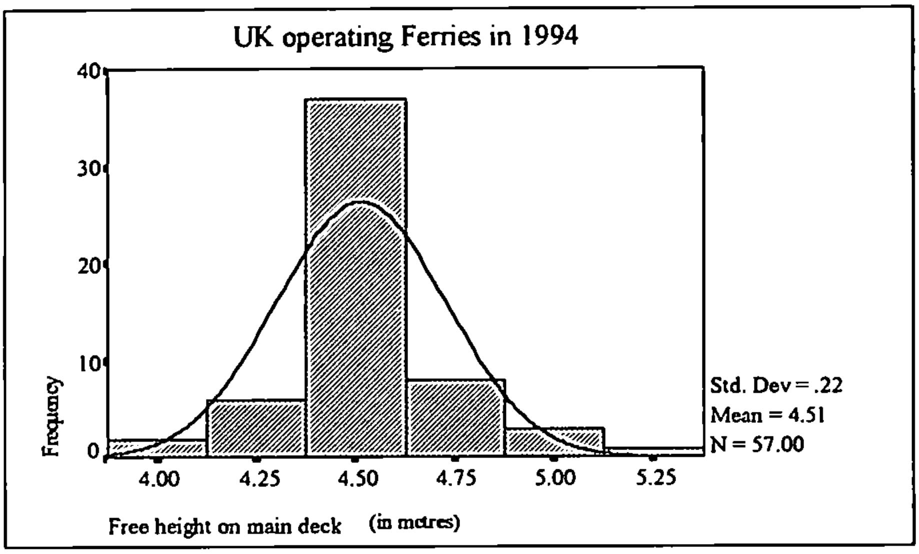


Figure 2-12 Free height on main deck available on UK ferries

2.3.3.2 Construction; year and shipyard of newbuilding

The economic life of a ferry varies with customer demand, but also depends upon the way it is built and maintained during its operation.

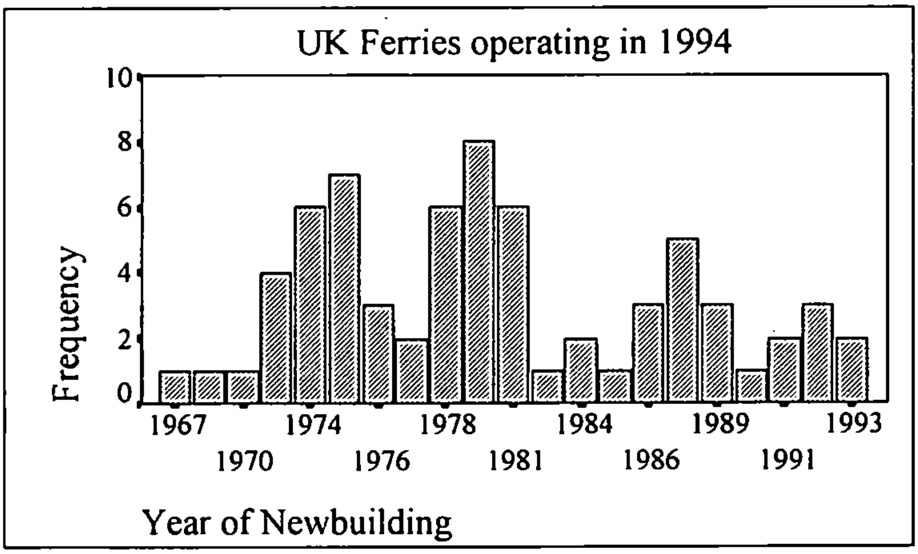


Figure 2-13 Age profile of UK ferries operating in 1994

Generally speaking older vessels are more costly than younger vessels, in terms of fuel cost, insurance premium and in maintenance and repair cost, but as long as revenue exceeds expenditure, it is unlikely that an argument will be made, in economic terms, for replacement. In terms of customer expectations this may of course be completely different.

Age of UK ferries in 1994 by operator and period of newbuilding					
Operator	Period of newbuilding			Ferries	
	<= 1975	1975-85	>= 1986	Number	Percentage
British Channel Island Ferries		1		1	1.4 %
Brittany Ferries	2	2	4	8	11.4 %
Color Line	1			1	1.4 %
Hoverspeed	1		4	5	7.1 %
North Sea Ferries	2		2	4	5.7 %
P&O European Ferries	7	4	6	17	24.3 %
Regie voor Maritiem Transport	1	2	1	4	5.7 %
Sally Line		2		2	2.9 %
Scandinavian Seaways	3	2		5	7.1 %
Stena Sealink	1	13	2	16	22.9 %
Truck Line			1	1	1.4 %
Sealink Newhaven	1	1		2	2.9 %
Irish Ferries		1	1	2	2.9 %
Swansea Cork Ferries	1			1	1.4 %
B&I Line		1		1	1.4 %
Total number of ferries	20	29	21	70	
Percentage of ferries	28.6 %	41.4 %	30.0 %		100
Source: Cruise & Ferry Info, Lloyd's Register of Shipping (adapted by author), 1995					

Table 2-13 Crosstabulation of vessel operator and year of newbuilding

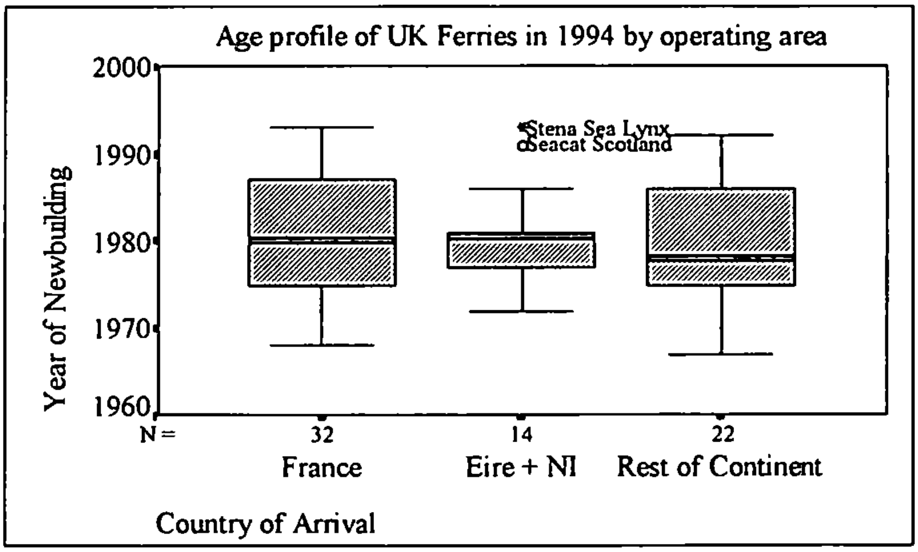


Figure 2-14 Age profile of UK ferries by operating area.

The age profile of the UK ferry fleet is shown in figure 2-14. The oldest operating ferry is almost 30 years, and the youngest almost brand new. The average age of the ferries is about

14 years. In order to establish whether older or newer vessels are employed by specific operators a cross tabulation, see table 2-13, between these two variables shows that most operators employ vessels over the whole range, with P&O European Ferries operating the largest number of over 20 year olds (7) and newest ships (6). Stena Sealink account for the largest number (13) of ferries in the range from 1976 to 1985, and Brittany Ferries and Hoverspeed each operate four vessels built after 1986.

Construction of UK ferries operating in 1994			
Newbuilding Country	Newbuilding Yard	Number	Year
Belgium	Boelwerf	1	1992
	Cockerill	1	1976 - 1978
Germany	Schichau Seebeck	12	1974 - 1993
	Flender Werft	2	1975 - 1976
	W. Nobiskrug	2	1975
Denmark	Nakskov	2	1985 - 1986
	Danyard	5	1974 - 1978
France	AC du Havre	2	1980 - 1984
	Alsthom Atlantique	1	1989
	Dubigeon	1	1984
Norway	Trondheim	1	1977
The Netherlands	Gustowerf	2	1972
	Van der Giessen	1	1986
	Verolme	1	1978
Sweden	Kockums	2	1980
	Gotaverken Arendal	1	1982
United Kingdom	Harland & Wolff	4	1980 - 1981
	Govan	1	1987
Korea	Hyundai	2	1978
Finland	Wartsila Marine	4	1975 - 1986
	MASA Yards	2	1992
Japan	NKK	1	1987
	Hashihama	1	1972
Croatia	Jozo Lozovina	1	1974
	Mosor	1	1974
Eire	Verolme	3	1978 - 1981
Italy	CNR	1	1967
Australia	Int. Catamarans	2	1991 - 1993
Source: Cruise & Ferry Info, Lloyd's Register of Shipping (adapted by author)			

Table 2-14 Number of ferries by country, yard of newbuilding, and year

The operating area of ferries is not determined by the age of the vessels. It could be argued that some older ones would be more suitable in specific areas than others, however figure 2-14 shows that this is not the case and no difference in age profile exists among vessels trading between the UK and France, or the UK and Eire & Northern Ireland, or indeed the UK and the rest of the Continent.

The ship yards which built the ferries, the number they built, and during which period are listed in table 2-15. It can be seen that the most successful yard is Schichau Seebeck Werft with a total of 12 ferries operating in the UK in 1994 (over 17 %). Some of these ship yards are no longer in existence.

2.3.3.3 Carrying capacities of ferries operating in the UK in 1994

The main purpose of a ferry is to carry passengers, cars, coaches and freight vehicles. The passenger and car carrying capacity of ferries operating in the UK is expressed by number, and the freight vehicles by lanemetres. Figure 2-15 shows the carrying capacity of 62 UK ferries operating in 1994.

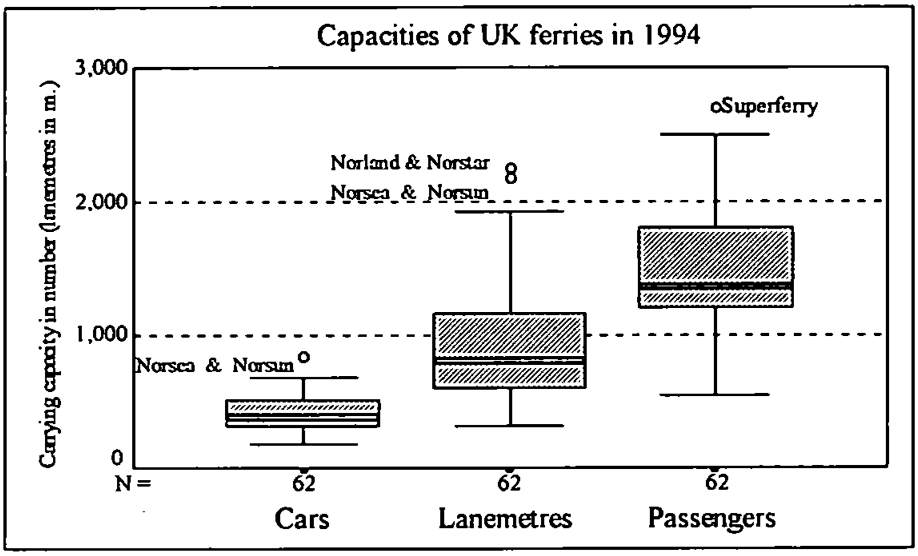


Figure 2-15 Capacities of UK ferries in 1994

The mean passenger carrying capacity is 1,366 (Superferry is an outlier with 2,700 passengers), the mean car carrying capacity is 390 metres (outliers are the Norsea and the Norsun of North Sea Ferries) and the mean lanemetres capacity is 984 metres (outliers are the ferries Norsea, Norsun, Norland, and Norstar). These figures are identical to the mean supply figures by UK port as shown earlier in table 2-8. To establish, however, whether any significant differences exist among the ferry operators each capacity will be analysed in further detail in the next paragraphs.

The number of passengers which can legally be carried is controlled by the Special Trade Passenger Ships (Space Requirements) Rules, 1973. After an inspection and survey of a special trade passenger ship which complies with the applicable requirements of these Rules, a certificate called a Special Trade Passenger Ship Space Certificate is issued for a period of not more than twelve months. This Certificate must be posted up in a prominent and accessible place in the ship (often on the main deck or near the purser's office). Any space intended for the accommodation of passengers must be marked at or near the entrance to that space with the number of passengers for which that space is certified. Table 2-15 shows the minimum space requirements per passenger in square metres.

Table of Space Requirements for Passengers		
Location	Duration of voyage	Minimum space allocation per passenger in m^2
Weather deck (season of fair weather only	Less than 24 hours	0.74
	24 hours and over but less than 72 hours	1.12
Upper deck	Less than 24 hours	0.74
	24 hours and over but less than 72 hours	1.12
Upper between deck	Less than 24 hours	0.88
	24 hours and over but less than 72 hours	1.12
Lower between deck	Less than 24 hours	0.88
	24 hours and over but less than 72 hours	1.40
Source: IMCO, 1973 (International Conference on Space Requirements for Special Trade Passenger Ships)		

Table 2-15 Table of space requirements for passengers

Carrying capacity of UK ferries in 1994 by operator				
Ferry operator	Number of	Mean carrying capacity		
	ferries	Passengers	cars	Lanemetres
Swansea Cork ferries	1	2,700	380	690
Sealink Newhaven Dieppe	2	1,742	377	783
Stena Sealink Line	16	1,607	394	908
Brittany Ferries	8	1,550	448	973
Irish ferries	2	1,550	363	536
Sally Line	2	1,454	395	996
P&O European Ferries	17	1,384	404	971
Scandinavian Seaways	5	1,261	356	725
Regie voor Maritiem Transport	4	1,250	408	1,042
Truck Line	1	1,212	600	1,530
B&I Line	1	1,200	326	468
North Sea Ferries	4	1,069	675	2,215
Color Line	1	1,050	300	648
British Channel Island Ferries	1	550	205	450
Hoverspeed	5	436	75	n/a
Total within ferry operators	70	1,366	390	984
	N	70	69	63
Analysis of variance				
Between ferry operators	F value	3.4861	3.1424	3.4789
	significance	.0004	.0012	.0007
	d.f.	14	14	13
	R squared	.0826	.0003	.0649
Within ferry operators	d.f	55	54	49
	Eta squared	.4702	.4489	.4800
Source: Various (analysed by author)				

Table 2-16 Carrying capacity UK ferries in 1994 by operator

Passenger carrying capacity varies significantly among vessel operators (see table 2-16). The smallest carrying capacity, 436 passengers, is Hoverspeed, and their fleet of five ferries is of about equal size (standard deviation = 29 passengers). The operator with the largest differences among its own ferries is P&O European Ferries (standard deviation = 527 passengers, mean carrying capacity = 1,384 passengers). Similar large variations can also be seen for Brittany Ferries (standard deviation = 524, mean carrying capacity = 1,550 passengers), Stena Sealink Line (448 and 1,607), and Sally Line (423 and 1,454). Carrying capacity for cars and lanemetres also shows statistically significant differences among the ferry operators as can be seen in table 2-17 (F-values are 3.1424 and 3.4789 respectively).

It is reasonable to expect that ferry operators vary their passenger, car and lanemetre carrying capacity according to the route and deploy the appropriate size on a particular route.

Carrying capacity of UK ferries in 1994 by ferry route				
Ferry route	Number of ferries	Mean carrying capacity		
		Passengers	cars	Lanemetres
Swansea - Cork	1	2,700	380	690
Portsmouth - Bilbao	1	2,500	580	1,115
Plymouth - Santander	2	2,155	590	1,410
Harwich - Hook of Holland	2	2,050	475	1,017
Southampton - Cherbourg	1	1,800	450	950
Newhaven - Dieppe	4	1,771	377	783
Plymouth - Roscoff	2	1,658	440	637
Holyhead - Dun Laoghaire	2	1,550	323	622
Dover - Calais	11	1,520	440	1,251
Harwich - Gothenburg	1	1,517	364	840
Pembroke - Rosslare	1	1,500	326	468
Portsmouth - Le Havre	3	1,466	510	1,306
Ramsgate - Dunkerque	2	1,454	395	996
Harwich - Esbjerg	2	1,427	417	825
Holyhead - Dublin	2	1,400	363	536
Portsmouth - Caen	2	1,390	517	1,124
Ramsgate - Ostend	1	1,300	387	816
Poole - St Malo	1	1,300	332	468
Hull - Rotterdam	2	1,250	850	2,250
Fishguard - Rosslare	2	1,225	298	810
Poole - Cherbourg	1	1,212	600	1,530
Dover - Ostend	2	1,200	450	1,268
Portsmouth - Cherbourg	2	1,200	275	468
Stranraer - Larne	3	1,133	304	744
Harwich - Hamburg	1	1,085	404	810
Newcastle - Stavanger	1	1,050	300	648
Cairnryan - Larne	2	1,035	330	480
Hull - Zeebrugge	2	889	500	2,180
Dover - Boulogne	3	878	157	387
Newcastle - Hamburg	1	850	180	324
Portsmouth - St Malo	1	700	160	n/a
Felixstowe - Zeebrugge	2	682	220	1,167
Poole - Jersey / Guernsey	1	550	205	450
Stranraer - Belfast	1	450	80	n/a
Folkestone - Boulogne	1	450	80	n/a
Total within ferry routes	70	1,366	390	984
	N	70	69	63
Analysis of variance				
Between ferry routes	F value	2.0229	1.8829	3.0475
	significance	.0208	.0346	.0013
	d.f.	34	34	31
	R squared	.0034	.0241	.1171
Within ferry routes	d.f	35	34	31
	Eta squared	.6627	.6531	.7529
Source: Various (analysed by author)				

Table 2-17 Carrying capacity by ferry route for UK ferries in 1994

Evidence that this is the case can be seen in table 2-17 as the differences between the ferry routes is statistically significant (F = 2.0229, sign.= .0208 for passenger carrying capacity; F=1.8829, sign.=.0346 for car carrying capacity; and F=3.0475, sign.=.0013 for lane metre capacity). These differences may be expected since 15 out of 35 ferry routes are served by one ferry only.

2.3.3.4 Cabins and beds capacity

A further subdivision for the carrying capacity is the number of cabins and the number of beds (including couchettes) on board. According to the Special Trade Passenger Ships - Space Requirements Rules (1973) every ship making a voyage which extends under normal circumstances to 72 hours or more, must be fitted with a bunk (bed) for every passenger. The size of the bunk shall not be less than 1.90 metres long and 0.70 metres wide and must be fitted with leeboards.

Ferries operating in the UK in 1994 can be divided in those with a range of cabins on board and those without any cabins. Table 2-18 shows that 25 ferries have no cabins at all (35.7%), the rest of the ferries have cabins with varying degrees of luxury. Cabin types labelled mainly as basic cabins (basic facilities only, such as a washbasin), can be found on 11 ferries (15.7 %); cabins with shower (ensuite accommodation with washbasin, wc and shower) are found on 14 ferries (20 %), and luxury cabins can be found on 20 ferries (28.6%).

Cabins on board UK ferries in 1994		
Cabin type	Number	Percentage
No cabins	25	35.7
Basic cabins	11	15.7
Cabins with shower	14	20.0
Luxury cabins	20	28.6
Total	70	100.0
Source: AA Ferry Guide 1994 (adapted by author)		

Table 2-18 Cabins on board of UK ferries in 1994

The number of cabins and beds is influenced by travel time. Not only to comply with the 'Rules' (see page 35), but also to satisfy consumer needs. For instance, if the crossing involves an overnight stay on board, a greater demand for beds and cabins is expected than for trips lasting less than two hours, and depending on the expectations of the customers more or less luxury cabins are to be fitted. This can be seen in figure 2-16 for cabins and figure 2-17 for beds.

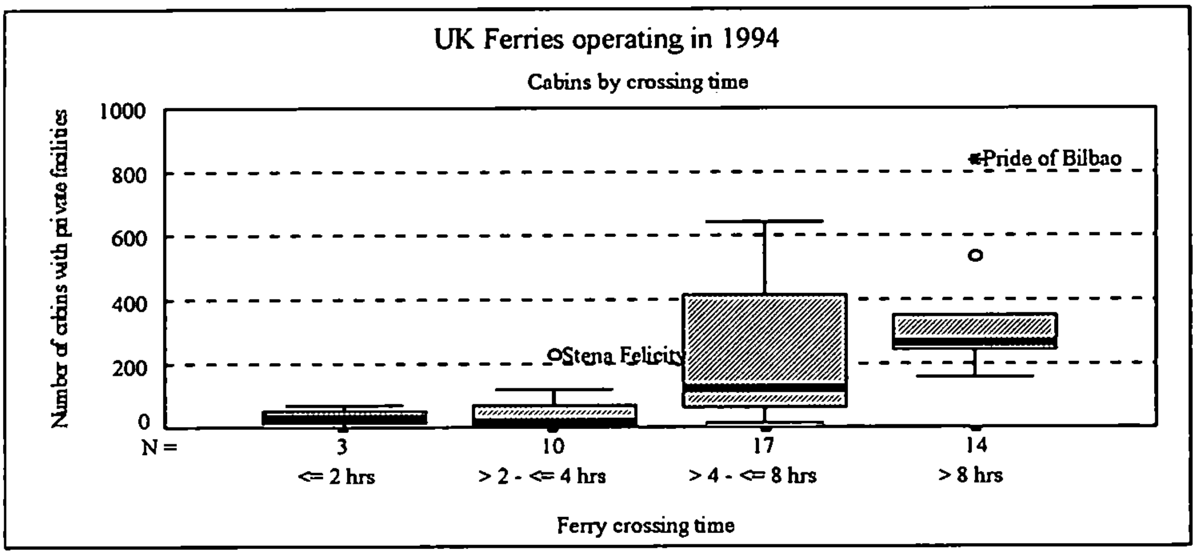


Figure 2-16 Cabins by crossing time

It can be seen (figure 2-16) that the existence of cabins and the category of cabin is strongly influenced by the travel time. For instance, there are no voyages lasting over four hours undertaken by ferries without any cabin. Those without cabins are all on the short (time) routes. The category, basic cabins (offering only basic facilities such as a washbasin) are mostly found on voyages lasting between four and eight hours. Ferries with a range of cabins the majority of which offer ensuite accommodation, which includes a washbasin, shower and wc, are not found on any trip taking less than two hours. Finally most ferries with a range of cabins, the majority of which offer ensuite facilities in addition to a limited amount of luxury cabins, are operating on routes with a crossing time of over eight hours. The level of luxury offered also increases when travel time increases, as can be seen in table

2-19. The difference in cabin type in relation to ferry crossing time is statistically highly significant, Chi-square = 55.17540, sign.= .00000 with 9 degrees of freedom, as can be seen in table K-1, appendix K. In appendix K a detailed explanation of the Chi-square test of independence can be found.

UK ferries crosstabulation of cabin types and ferry crossing time (in number of ferries and in percentages)						
Cabin type	Ferry crossing time (in hours)				Total	
	≤ 2	> 2 - ≤ 4	> 4 - ≤ 8	> 8	No	%
No cabins	15 / 22.7 %	7 / 10.6%			22	33.3
Basic cabins	1 / 1.5 %	2 / 3.0%	7 / 10.6%	1 / 1.5%	11	16.7
Cabins with shower		6 / 9.1%	3 / 4.5%	4 / 6.1%	13	19.7
Luxury cabins		3 / 4.5%	7 / 10.6 %	10 / 15.2%	20	30.3
Total number	16	18	17	15	66	
Total percentage	24.2 %	27.3 %	25.8 %	22.7 %	100.0 %	

Table 2-19 Crosstabulation of cabin types and ferry crossing time

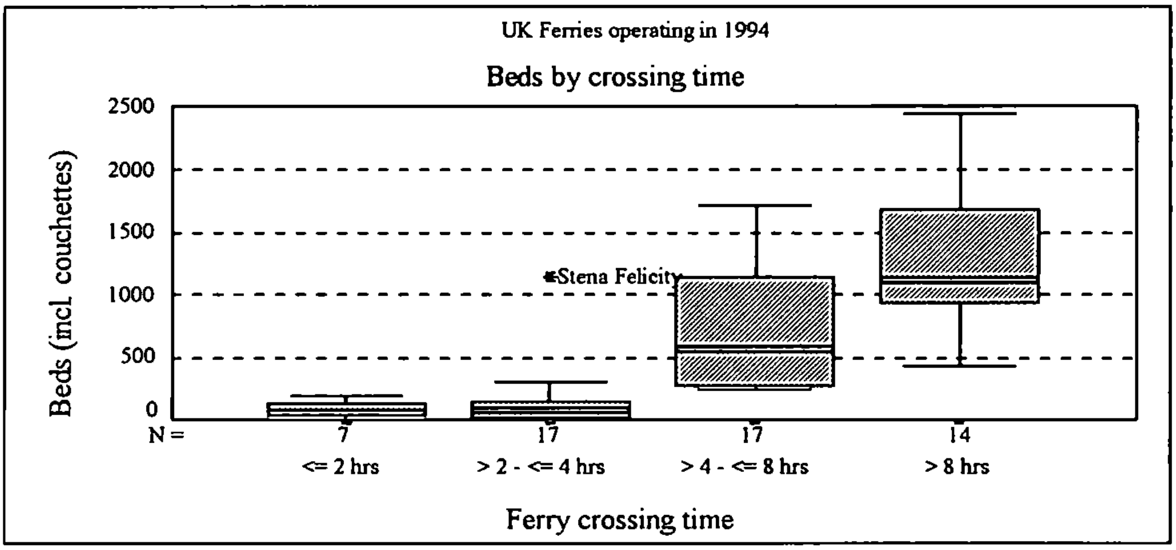


Figure 2-17 Number of beds by ferry crossing time

In figure 2-17 the number of beds (which includes couchettes) is plotted against the ferry crossing time. This shows clearly that a positive relationship exists, which is confirmed by table K-2 (appendix K), where the differences in the average number of beds is statistically significant (F= 20.0170, sig. = .0000).

2.3.3.5 Technical data

Technical data is concerned with the marine engineering aspects of ferries and is therefore different from most of the other ferry data, which relates to space and capacities of the hull or the decks. These are aspects of the ferries generally considered part of the area of naval architecture. For the purpose of this study technical data includes those aspects which affect the provision of service offer such as speed, main engine power, machinery (main engine) manufacturer, and fuel consumption. Table 2-20 shows descriptive statistics for operating speed in knots (mean = 20.7 knots), fuel consumption in metric tons per day (mean = 56.61 t/d), and engine power in kilowatts (mean = 15,747 kW). The number of ferries included in the analysis are listed in the last column.

Technical statistics for UK ferries in 1994					
Description	Mean	Min.	Max.	St.Dev.	Number
Operating speed (in knots)	20.7	17.0	37.0	3.3	64
Fuel consumption (in tons/day)	56.6	29.0	86.0	15.9	18
Engine power (in kW)	15,747	8,240	33,540	5,022	64
Source: Cruise & Ferry Info, Lloyd's Register of Shipping (adapted by author)					

Table 2-20 Descriptive statistics of technical data.

2.3.3.5.1 Operating speed

Ferry crossing time is of course dependent on the speed of the vessel and the actual route distance, as well as the time taken for berthing. Operating speed is the speed in knots (nautical miles per hour) at which the ferry usually operates at sea. In most cases this is the design speed and means that this is as fast as the ferry will travel. This speed is not always maintained. For example, some ferries (e.g. those operating on the route Hook of Holland - Harwich) will slow down during night crossings in order to have a more favourable arrival time (e.g. arriving at six o'clock in the morning at reduced speed rather than four o'clock in the morning at full speed). No real differences in operating speed exist among the conventional ferries; the main exceptions are the fast ferries operated by Hoverspeed at twice the average (conventional) speed, around 40 knots. The introduction of more fast ferries is likely to dramatically change the route patterns in terms of voyage time and the associated required cabins and beds.

2.3.3.5.2 Fuel consumption

The fuel consumption of a ferry is very important in terms of voyage costs. Reductions in fuel cost can only be achieved, when the ferry is in operation, by reducing the operating speed; this, however, is not a practical solution as the sailing schedule may not allow it. The relationship between the fuel consumption, the operating speed and the engine power can be derived from first principles in physics and mechanics, but cannot accurately be predicted in advance.

Fuel consumption of ferries operating in UK in 1994 by engine manufacturer, year built, operating speed and engine power.				
Main Engines	Fuel consumption in ton/day	Built in	Operating Speed in knots	Engine Power in kW
Pielstick	29	1977	18.0	8,240
Wartsila	30	1992	20.5	17,760
MAK	40	1981	20.0	13,240
Pielstick	45	1972	21.8	14,033
Sulzer	48	1980	19.0	13,025
Sulzer	48	1980	18.0	13,025
Sulzer	50	1992	21.0	21,120
B & W	53	1967	22.0	10,300
Wartsila	56	1989	21.0	17,760
MAN	56	1986	21.0	19,360
Pielstick	60	1974	19.5	12,310
Pielstick	60	1974	19.5	12,310
Pielstick	60	1975	21.5	15,890
Sulzer	72	1980	21.0	17,600
Pielstick	72	1986	22.0	23,000
Sulzer	77	1987	18.5	18,390
Sulzer	77	1987	18.5	19,200
Sulzer	86	1980	23.7	17,600

Table 2-21 Daily fuel consumption of UK ferries with associated year of built, engine manufacturer and engine power .

Table 2-21 shows the daily fuel consumption of a number of ferries together with the engine manufacturer, year built and engine power. The shape of the hull (most ferries in this study are monohulls), the condition of the hull (barnacles or other rough surface areas), the sea state, the efficiency of the engine and the auxiliary power requirements (e.g. air conditioning) determine the amount of fuel consumed in practice. For practical, and contractual, purposes the fuel consumption is determined during sea trials immediately after newbuilding or major refits. The values are recorded for a number of operating conditions and speeds, which serve as a guideline for further efficient fuel management during the operating life of the ferry. Over the years improvements in design and operating practice have resulted in more fuel-efficient ships. Figure 2-18 shows the efficiency gains which have been achieved over the years.

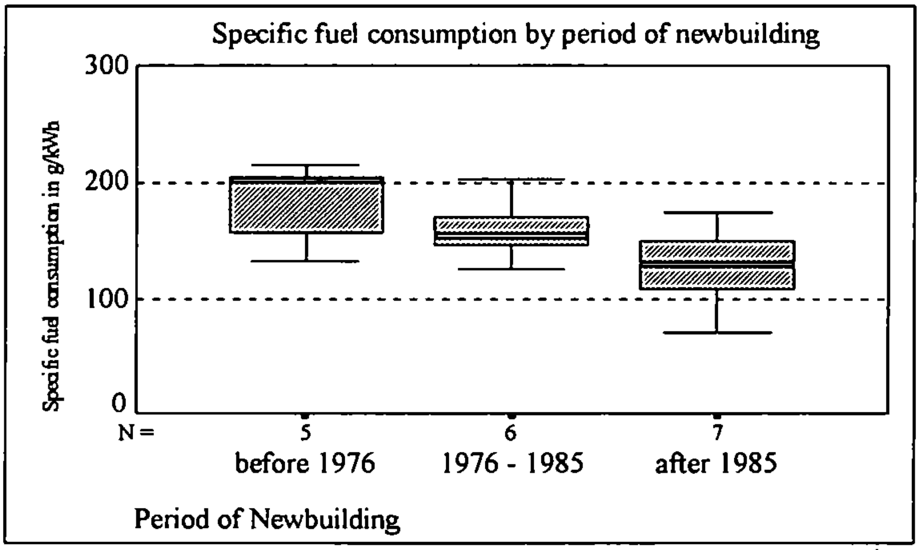


Figure 2-18 Specific fuel consumption of ferries by period of newbuilding

Figure 2-18 shows the specific fuel consumption of ferries operating in the UK in 1994 by period of newbuilding. Before 1976 specific fuel consumption was on average 182 g/kWh and gradually reduced to 159 g/kWh in the period from 1976 until 1985. After 1985 specific fuel consumption has been reduced to 127 g/kWh. These differences are statistically significant (F= 4.1677, sig. = .0364).

2.3.3.5.3 Machinery manufacturer

The manufacturers of the main engines or, more specifically, the make of the main engine on board of ferries operating in the UK in 1994 are all European companies. The French engine Pielstick (30 % of total fleet) has the largest share, followed by the Dutch Stork Werkspoor Diesel (SWD), Sulzer (Switzerland), MAK (Germany), Wartsila (Finland), Burmeister & Wain (Denmark), Ruston (UK) and MAN (Germany). Most of these manufacturers are no longer in business as individual manufacturers, but have merged with each other, for example SWD and Wartsila are now together as SWD (Stork Wartsila Diesel).

2.3.3.5.4 Engine power

The increase in engine power for main propulsion over the years can be seen in figure 2-19 and is statistically significant between the periods of newbuilding (F= 6.22 and sig.= .0035). Up to 1975 the mean engine power was 13,287 kW, between 1976 and 1985 this increased to a mean of 15,330 kW and in the period after 1986 this was 18,741 kW.

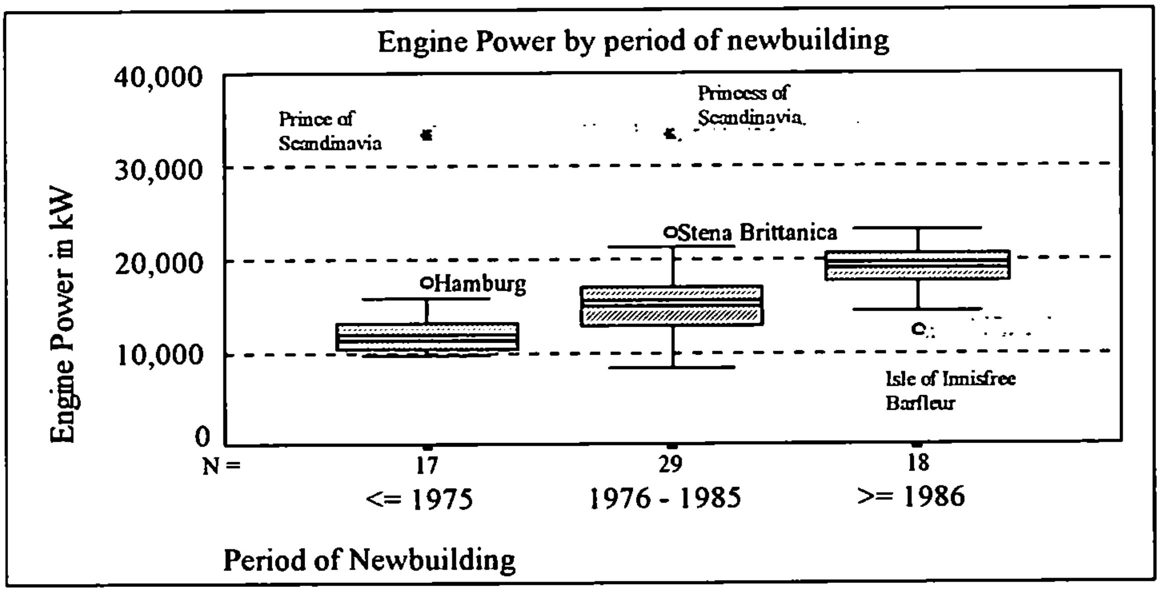


Figure 2-19 Engine power by period of newbuilding

2.3.3.6 On-board facilities and services.

The elements of the ferry service offer which are provided on board of a ferry can be termed on-board facilities and services. The facilities and services identified on ferries operating in and from the UK in 1994 are duty / tax free shop, bar, lounge, cafeteria restaurant (includes buffets and free flow restaurants), television / video room, telephone, children's play area, cabins, full service restaurant, cinema, reclining seats, disco / dancing, club class, casino, medical services, conference room and business facilities, mother and baby room, photographic services, sauna, swimmingpool, hairdresser / beauty salon, and health club / spa. Special facilities and services for disabled passengers are lift, toilets, special parking, access to all seating areas, and cabins. Payment facilities include a bureau de change, and acceptance of VISA, Access, American Express, and Diners Club credit cards or Eurocheques.

2.3.3.6.1 A baseline for ferry service elements.

The main purpose of the analysis in this chapter, as stated before, is to find the reason for similarities and differences in the offering of ferry service elements on the basis of other variables such as area of operation, type of operator, ferry route, year of newbuilding, country of registration and voyage time. The results of this analysis is in the following paragraphs and for ease of comparison a 'baseline' model approach has be used. The baseline shows the number of ferry service elements (and their respective percentages) for a selected independent variable. The overall baseline includes the facilities and services of all the 70 ferries operating in 1994 in the UK selected for this part of the study. The overall baseline of on-board facilities and services on ferries operating from and within the UK in 1994 are listed in figure 2-20. The baseline ranges from 98.6 % , representing 69 ferries, for the on-board facilities of bar and duty / tax free shop, to 1.4 %, representing just one ferry, which is equipped with a healthclub / spa facility. The number of facilities and services relates to a particular ferry only, hence one, two or more bars on board of a particular ferry counts as one for the on-board facility 'bar'.

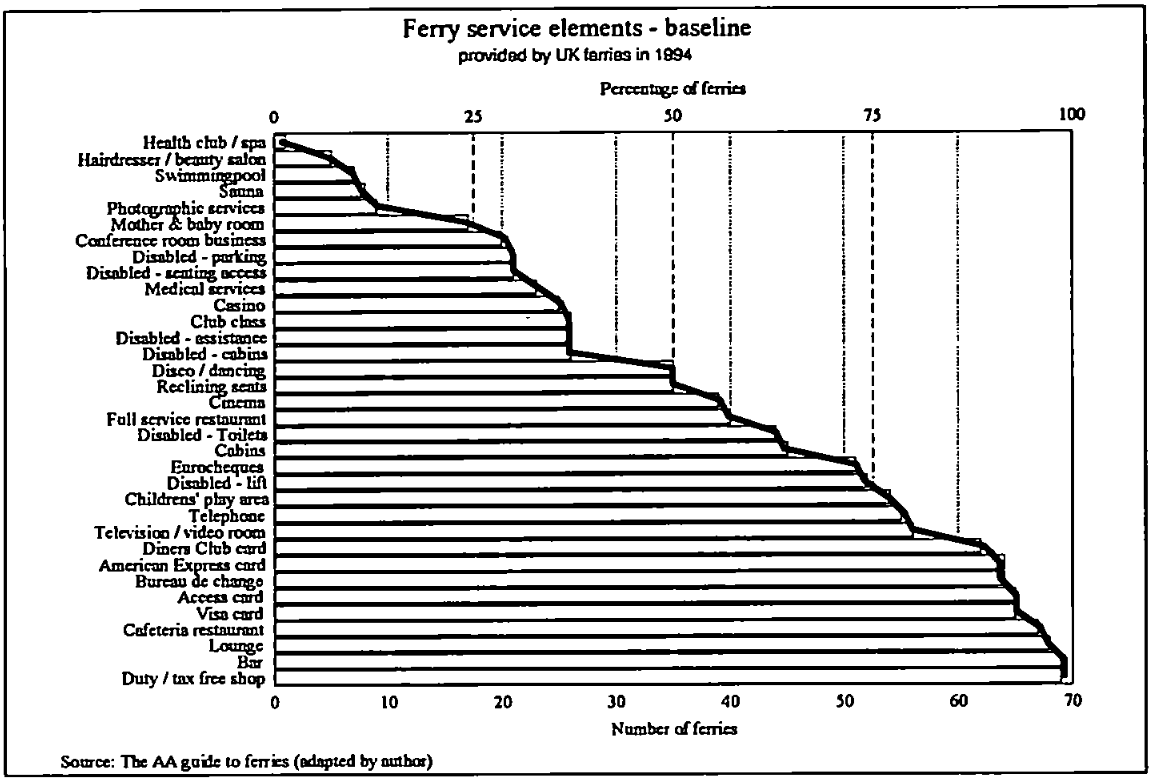


Figure 2-20 Ferry service elements - overall baseline

2.3.3.6.2 Ferry service elements by ferry routes in specific areas of operation.

The ferry routes have been aggregated by areas of operation, based on all routes to France, Eire and Northern Ireland, and the rest of the Continent. In figure 2-21 the ferry service elements provided by ferries on routes to France are compared to the overall baseline. This group matches the overall baseline fairly well and no major differences can be identified. Figure P-1 (appendix P) shows the ferry service elements provided by ferries destined for Eire and Northern Ireland compared to the overall baseline. The differences are slightly larger; such as all ferries have a bar, lounge, a television / video room, and a cafeteria restaurant. No health club / spa, hairdresser / beauty salon or photographic services can be found on any of the ferries operating on ferry routes in the Irish Sea.

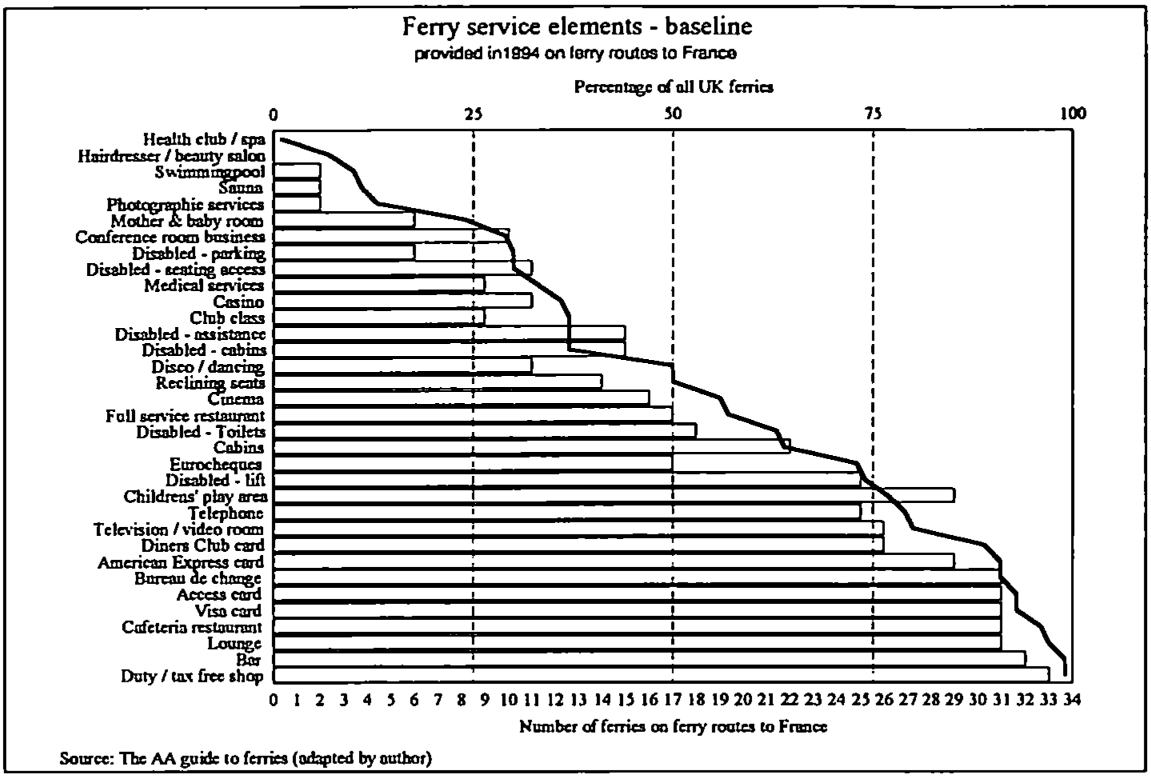


Figure 2-21 Ferry routes to France compared to overall baseline

The ferry service elements provided on ferries operating on routes to the rest of the Continent compared to the overall baseline can be seen in figure P-2 (appendix P). It shows that all ferries have a duty / tax free shop, a bar, lounge, cafeteria restaurant and cabins. Only two ferries have a mother and baby room, whereas twelve ferries (more than half) have a casino.

The baseline principle of ferry service elements can be used for any underlying variable. Figure 2-22 shows the baseline for ferry routes to France - these are the same number of ferry service elements as shown (as a barchart) in figure 2-21 presented in ascending order as a line diagram (and as a barchart). This baseline for ferries operating on routes to France serves as a comparison to the other areas of operation (Eire and Northern Ireland, and the rest of the Continent). Figure 2-23 shows the comparison of the Eire and Northern Ireland routes to the France baseline and figure P-3 (appendix P) shows the ferries to the rest of the Continent compared to the France baseline. The baseline of ferries to France is fairly similar to the overall baseline (see figure 2-21 previously) therefore more or less the same differences can be identified.

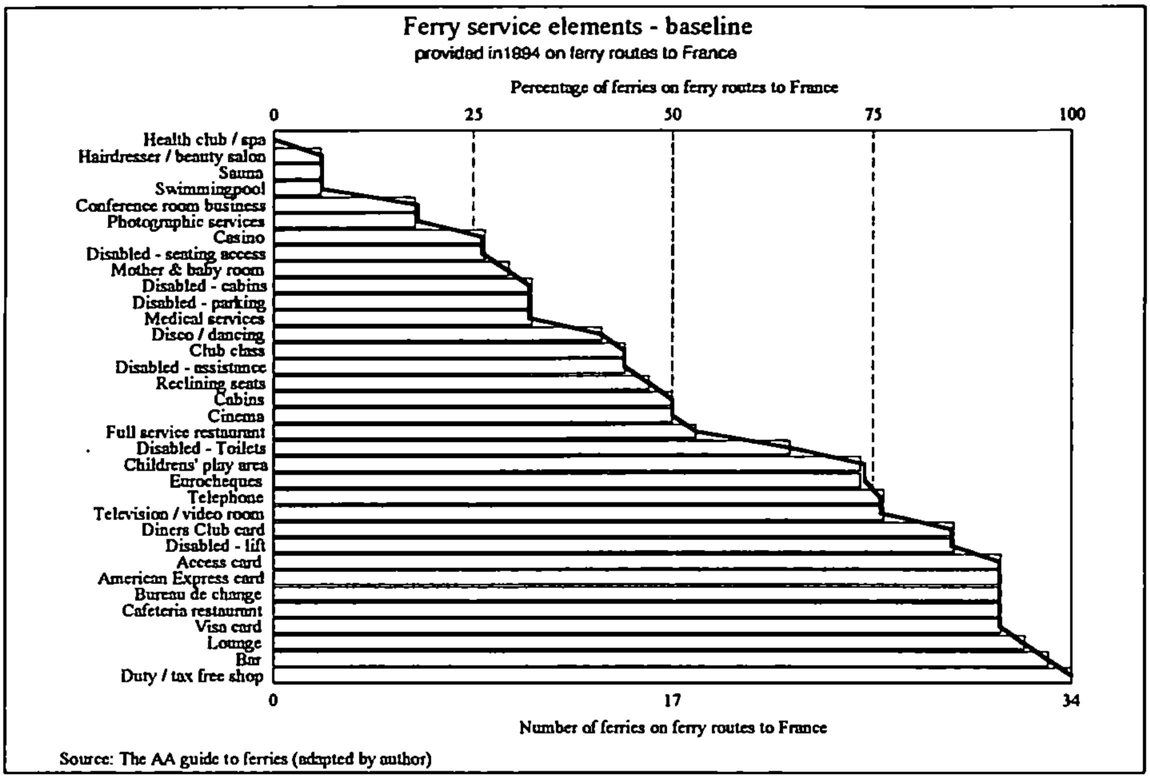


Figure 2-22 Baseline ferry routes to France

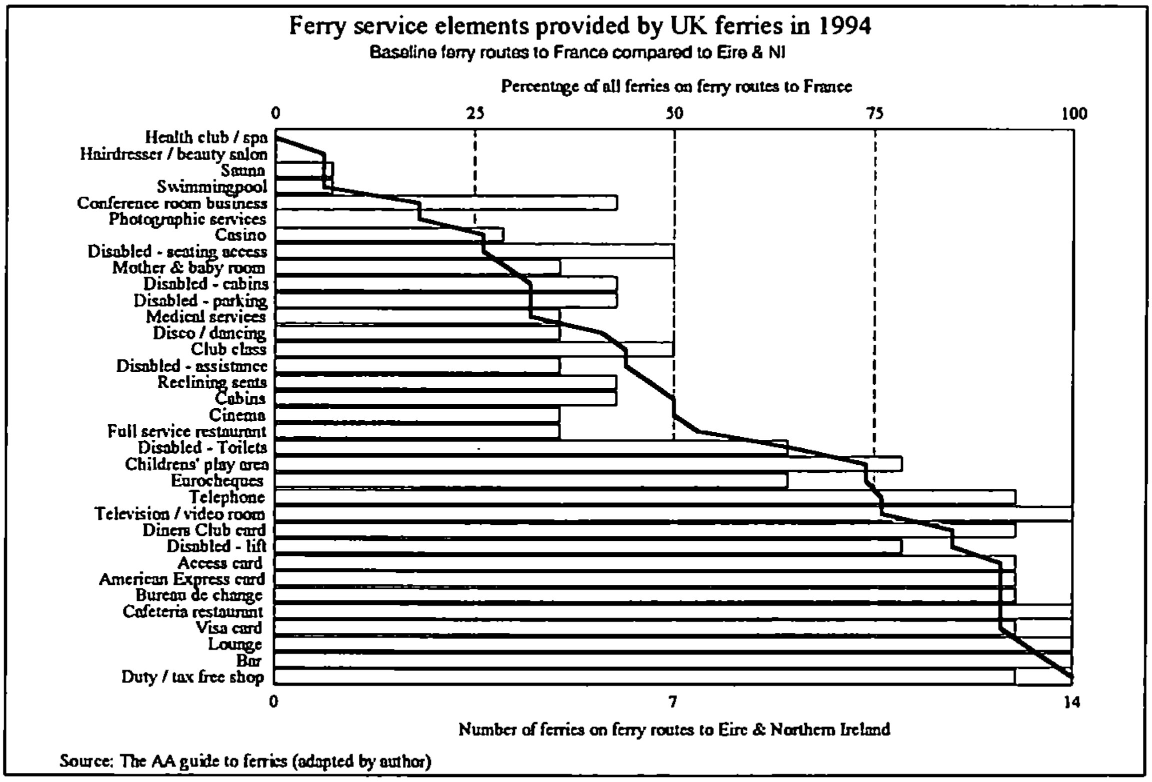


Figure 2-23 Ferry routes to Eire & Northern Ireland compared to baseline France

2.3.3.6.3 Ferry service elements provided by different ferry operators

The ferry operators of interest are those who operate a fleet of ferries; single vessel operators are useful, but not for the purpose of this analysis. The ferry operators selected are P&O European Ferries (17 ferries in 1994), Stena Sealink Line (16 ferries), Brittany Ferries (9 ferries in total; 8 under brand name Brittany Ferries and 1 under brand name Truckline), Scandinavian Seaways (5), Regie voor Maritiem Transport (4), North Sea Ferries (4), and Hoverspeed (5) and the ferry service elements each provides compared to the overall baseline are shown from figure P-4 to figure P-10 in appendix P.

P&O European Ferries (see figure P-4, appendix P) provides a duty / tax free shop, bar, television / video room, toilets for disabled passengers and lounge and accepts payment with Visa card on all ferries in 1994. None, however, is equipped with mother and baby room or a health club / spa.

Stena Sealink Line, figure P-5 (appendix P), provides a duty/tax free shop, bar, lounge, cafeteria restaurant, bureau de change and toilets for disabled passengers on all of its UK ferries in operation in 1994, and all accept Visa, Access, American Express and Diners Club cards as methods of payment. No health club / spa, hairdresser / beauty salon, or conference room / business facilities are on any of its ferries. Stena Sealink also offers access to all seating areas for disabled passengers on 14 (almost 90 %) of its ferries.

Ferry service elements provided by Brittany Ferries (which includes here also Truckline) compared to the overall baseline are shown in figure P-6 (appendix P). It can be seen that Brittany Ferries offers all of the ferry service elements identified, but not on all ships. Overall, Brittany Ferries exceeds the baseline on most ferry service elements, in particular, for photographic services, medical services, and cabins for disabled passengers, but falls short on toilets for the disabled, a casino and telephone. On all ferries operated by Brittany Ferries (and Truckline) a duty/ tax free shop, bar, lounge, cafeteria restaurant, full service restaurant, cinema, bureau de change, reclining seats, and cabins can be found. Payment can be made by means of Visa, Access, American Express and Diners Club card on all ferries.

The ferry service elements provided by ferry operators Scandinavian Seaways (figure P-7), Regie voor Maritiem Transport (figure P-8), North Sea Ferries (figure P-9) and Hoverspeed (figure P-10) appear to be slightly more consistent, in terms of on-board facilities and services offered, within their fleet of ferries. The most consistent is North Sea Ferries where the ferry service elements offered are identical for all but two; telephone (two ferries or 50 %) and television / video room (one ferry or 25%). Whereas Scandinavian Seaways, Regie voor Maritiem Transport and North Sea Ferries, when compared to the overall UK baseline, either exceed it or do not offer the facilities and services at all, Hoverspeed falls short of the overall baseline on all but three occasions (mother and baby room, medical services and Club Class).

Comparing the ferry service elements offered by a particular ferry operator to the overall UK baseline gives a good indication how the ferry operator measures up to the average on offer. Equally important, if not more so, is to compare one ferry operator to another competitor. Many permutations are possible, but comparing the three larger operators, selecting one as the baseline, enables direct assessment of similarities and differences. For example, in figure 2-24, Stena Sealink Line is compared to the baseline of P&O European Ferries. It shows that Stena Sealink Line falls short on television / video room, lift and parking and assistance for disabled passengers, and Club Class, among others, compared to P&O European Ferries. However, it exceeds them with access to seating areas for disabled passengers, conference room and business facilities, disco dancing, and casino. Figure P-11 (appendix P) shows Brittany Ferries (includes Truckline) compared to P&O European Ferries, where it can be seen that Brittany Ferries exceeds P&O EF on most ferry service elements, in particular with full service restaurant, cinema, cabins, and reclining seats.

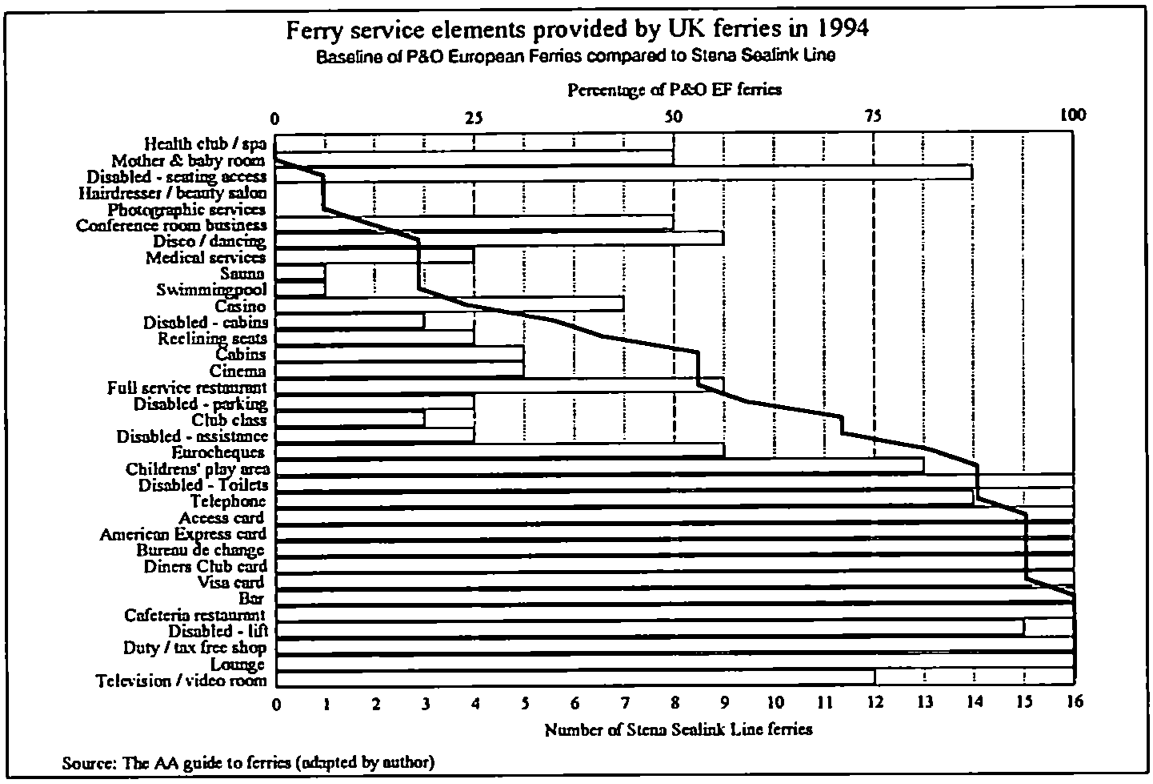


Figure 2-24 Ferry operator Stena Sealink Line compared to baseline P&O European Ferries

2.3.3.6.4 Ferry service elements provided by ferries departing from different UK ports.

Operators may face direct competition from other operators leaving that port. Therefore to establish whether ferries departing from the same port are offering similar on-board facilities and services, some of the larger ports, in terms of departing ferries, have been compared to the overall UK baseline. Figure 2-25 shows the ferry service elements offered by ferries departing from Dover compared to the overall UK baseline. It can be seen that only a few ferry service elements, such as, Club Class, mother and baby room, and facilities and services for disabled passengers (parking, toilets, lift and assistance) exceed the average slightly. Figure P-12 (appendix P) shows the port of Harwich compared to the overall baseline, where the differences include conference room/ business facilities, disco dancing, cinema, full service restaurant, cabins, children's' play area, (all 100 % on offer) among others. Figure P-13 shows that Portsmouth more or less matches the baseline and where differences exist exceeds the ferry service elements offered. This contrasts strongly with Stranraer (figure P-14) where substantial differences compared to the overall baseline can be identified.

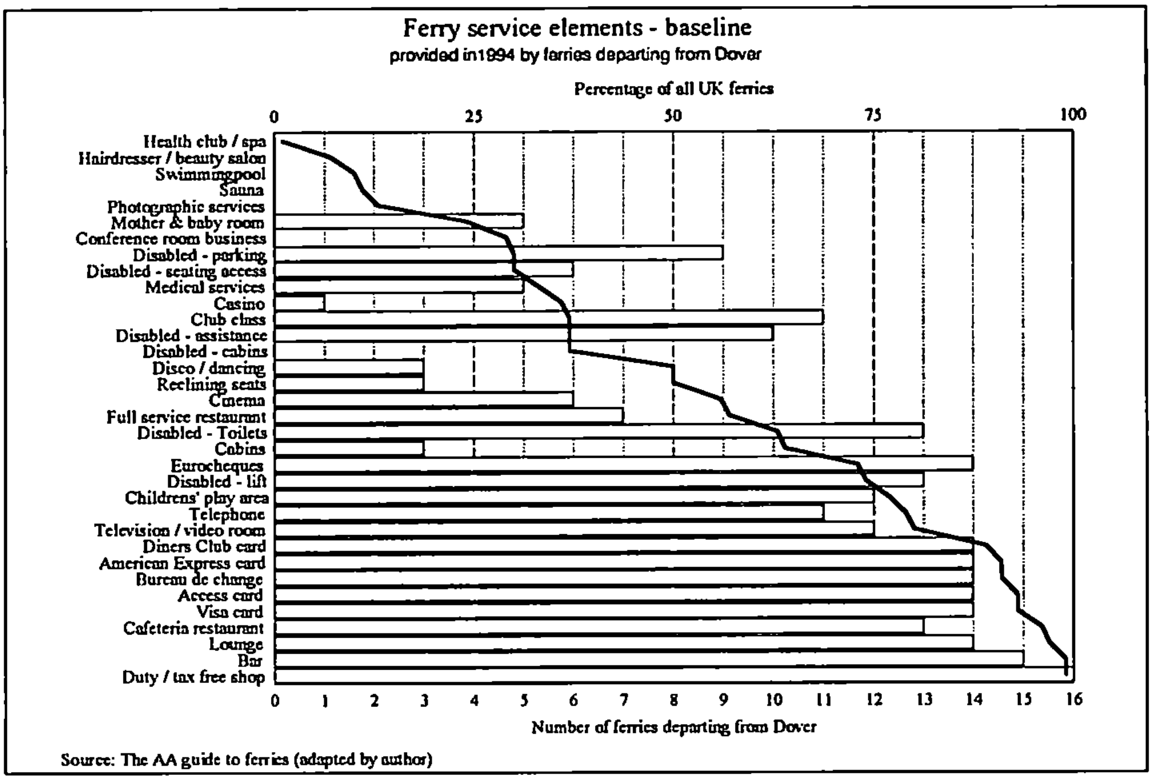


Figure 2-25 Ferry service elements provided by ferries departing from Dover

Of interest is also how ports compare directly to each other. This is achieved by selecting the ferry service elements offered by one of the ports as the baseline. Figure 2-26 compares the on-board facilities and services offered by ferries departing from Harwich to the baseline of Dover. It can be seen that great differences exist both in terms of exceeding the baseline substantially or not offering a particular service element at all. Less dramatic are the differences between Portsmouth and Dover as can be seen in figure P-15 (appendix P), where, overall, the ferry service elements offered exceed the Dover baseline. Figure P-16 compares the ferry service elements of ferries departing from Stranraer to the baseline of ferries departing from Dover. The main differences are identifiable as conference room and business facilities, access to all seating areas, lift and toilets for disabled passengers, telephone, television / video room, cafeteria restaurant, lounge, and bar which exceed the Dover baseline. In contrast, casino, cabins, disco dancing, medical services, cinema, full service restaurant, and special parking for disabled are not on offer from Stranraer.

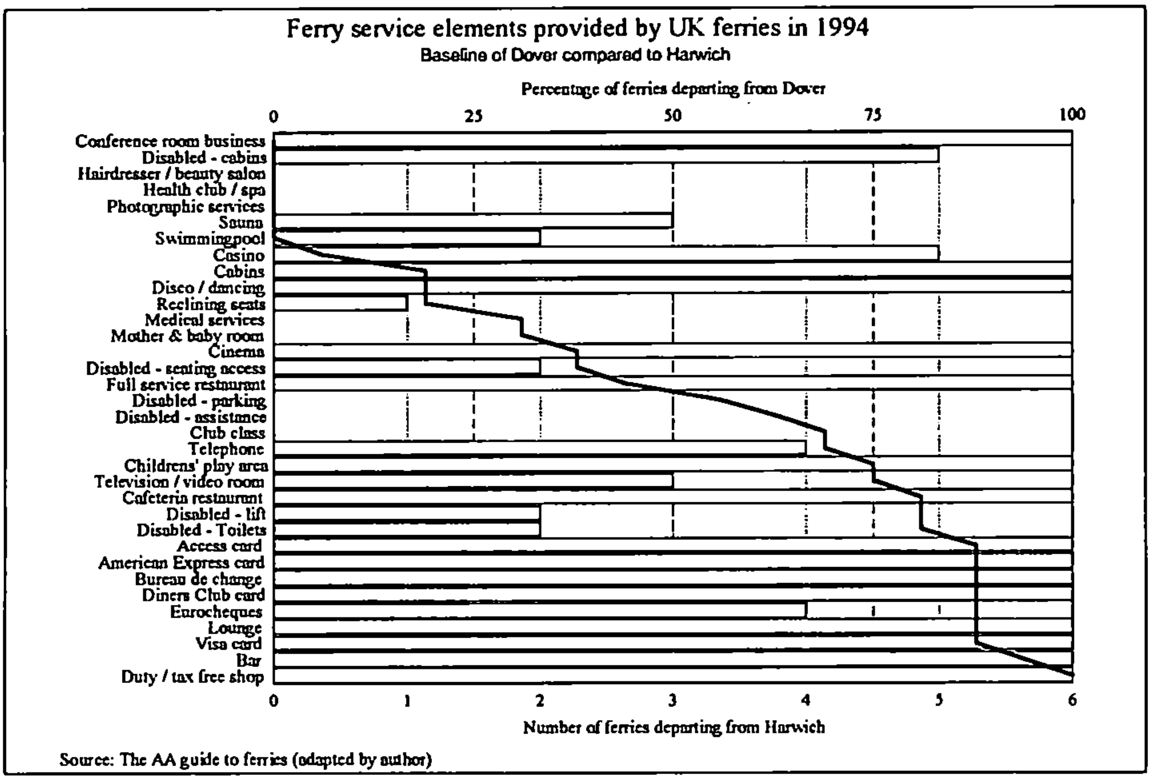


Figure 2-26 Port of departure Harwich compared to baseline of Dover

A further comparison has been made with the ferry service elements offered by ferries departing from Dover as a baseline and all the specific ferry routes departing from Dover, which are Dover to Boulogne, Dover to Calais and Dover to Ostend.

In figure 2-27 ferries on the route Dover - Boulogne are compared to the baseline of ferries departing from Dover. Some differences, such as casino, cabins, disco dancing, medical services, mother and baby room, cinema and full service restaurant are not at all on offer, whereas all ferries have Club Class facilities. In figure P-17 (appendix P) the ferries operating on the route Dover to Calais in 1994 are almost identical to the Dover baseline. In figure P-18 the ferry route Dover to Ostend is compared to the Dover baseline. Differences with the baseline are identified as disco dancing and mother and baby room, which are not on offer, and fall short of the baseline, and the rest of on-board facilities and services, which either match or exceed the Dover baseline.

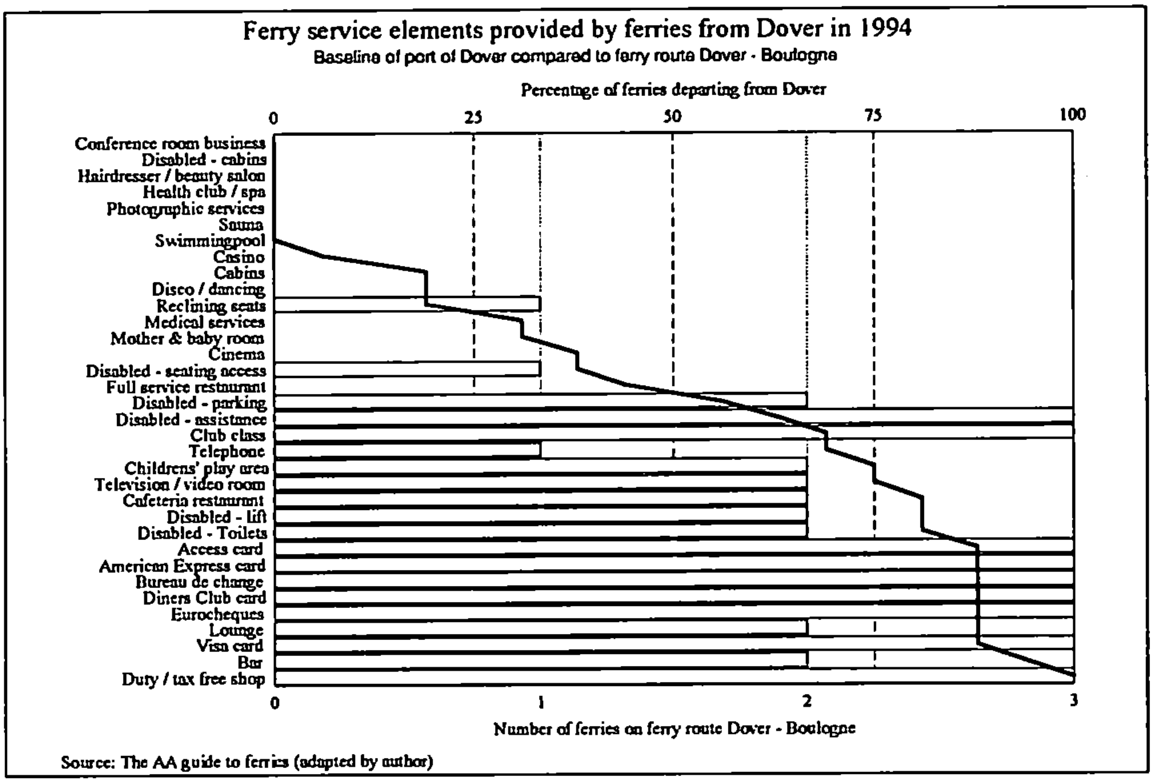


Figure 2-27 Ferries on ferry route Dover - Boulogne compared to baseline of ferries departing from Dover.

2.3.3.6.5 Ferry service elements provided on ferries with different AA Star rating

For a number of years ferries operating from the UK have been rated by AA inspectors who assess the quality of service and facilities found on each ship. In general the stars have been awarded according to the criteria listed in table 2-22.

AA Star awarding criteria for ferries	
Stars	Criterion
One	Provides basic facilities which will include toilet facilities, food provision and lounge/bar area.
Two	Offers separate bar and lounge areas, possibly a choice of catering operations, limited shopping facilities and bureau de change.
Three	A good range of facilities and services. Generally these will include a choice of catering operations, a range of public areas including television/video, children's play area, mother and baby room, bureau de change and shopping facilities.
Four	Often larger ships, which in addition to facilities and services offered by a 3-star ship, will provide a variety of entertainment which can include a casino, games room, cinema, dancing and live music, plus good shopping facilities.
Five	Strongly recommended for providing a high level of service and facilities with excellent standards in most areas of their operation.
Source: AA Guide to Ferries, 1994	

Table 2-22 AA Star awarding criteria for ferries.

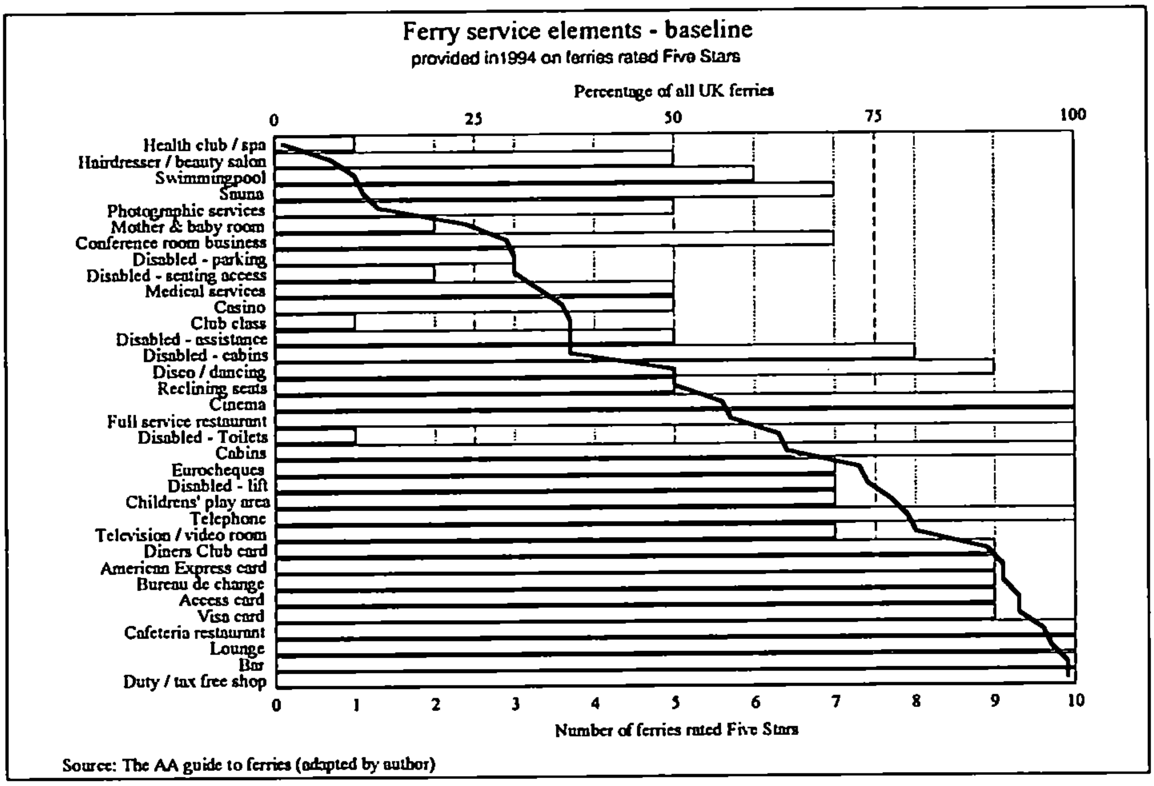


Figure 2-28 Ferry service elements provided by ferries rated Five Stars compared to overall baseline

Figure 2-28 shows the ferries which are rated Five Stars compared to the overall baseline of UK ferries. It can be seen that differences exist both ways. In general it matches the baseline fairly well, and if anything exceeds it, but falls short for Club Class and for access to all seating areas and toilets for disabled passengers. The ferry service elements offered by ferries rated Five Stars are used as a baseline for comparison of the other star rated ships.

Figure P-19 (appendix P) shows the comparison between two and five stars. Large differences, perhaps as expected, can be identified, the logic however fails to indicate specific reasons based on the existence of facilities and services offered. A similar conclusion can be drawn from the comparison between three and five stars (figure P-20) and between four and five stars (figure P-21). Figure P-22 is a comparison of all star ratings in percentages of ferries equipped with the identified on-board facilities and services. The baseline is the Five Star rating and it can be seen that the general trend is confusing and no distinct pattern can be established as Two Star ratings (circles) exceed the Five Stars, and all of the Three and Four Stars as well, for Club Class, disabled toilets, disabled seating access, disabled parking, children's play area, disabled lift, and television / video room. The Four Stars score low on health club / spa, hairdresser / beauty salon, medical services, photographic services, swimming pool and sauna.

2.3.3.6.6 Ferry service elements provided by ferries on ferry routes with different voyage times.

Most ferry routes differ in voyage time. For ease of comparison four groups have been identified. These are for voyages taking up to two hours, voyages between two and up to four hours, voyages between four and eight hours, and voyages lasting longer than eight hours. Figure 2-29 shows the ferry service elements provided by ferries on routes lasting up to two hours compared to the overall UK baseline. As expected, the number of ferries equipped with cabins on these routes is very low, just one ferry, and no cabins for disabled passengers. Also lacking are the on-board facilities of health club / spa, hairdresser / beauty salon, swimmingpool, sauna, and conference room / business facilities. When the voyage time increases to between two and four hours, see figure P-23 (appendix P) for comparison to baseline, more on-board facilities on more ferries are offered. A similar pattern can also be seen in figure P-24, where voyages between four and eight hours are compared to the overall UK baseline. Figure P-25 which has the of voyages over eight hours compared to the baseline shows that all ferries are equipped with cabins, and closely match or exceed the baseline.

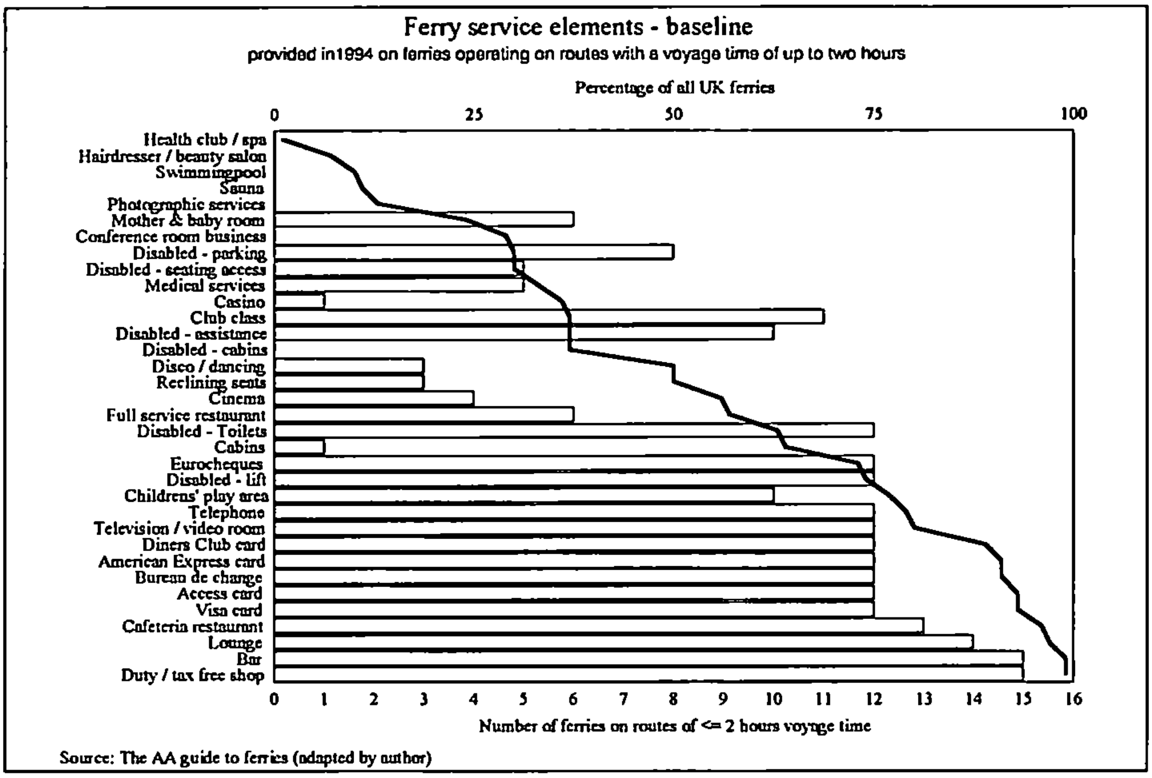


Figure 2-29 Ferry service elements provided on ferry routes with a voyage time of up to two hours compared to overall baseline.

The ferry service elements offered by ferries operating on routes lasting up to two hours are used as the baseline in figure P-26 (appendix P) to compare the difference between voyage times of two to four hours. The two hour baseline is exceeded or matched for all service elements, except for Eurocheques, club class, assistance and parking for disabled passengers, full service restaurant, and mother and baby room. A similar pattern, with the exception of full service restaurant, can be identified for ferry service elements in appendix

P, figure P-27 (two hours voyage time baseline compared to the barchart of ferries on routes of between four and eight hours). Figure P-28 shows the comparison of ferry crossing time over eight hours compared to the two hours baseline. There is a large difference, either side of the baseline, in the number of ferries offering a particular ferry service element. However, a pattern, which might explain these differences logically, cannot be observed.

2.3.3.6.7 Ferry service elements provided by ferries of different country of registry.

The UK ferry fleet can also be divided into country of registry. Registered in the United Kingdom are twenty ferries operated by North Sea Ferries, P&O European Ferries and Stena Sealink Lines. The thirteen ferries registered under the French flag are all ferries operated by Brittany Ferries, Truckline, Sealink Newhaven Dieppe, and three operated by Stena Sealink Line and one by P&O European Ferries. The flags combined under 'other traditional European flag' (20 ferries) are Denmark, Belgium, the Netherlands, Norway, Sweden, Germany, Eire and Greece. The operators of 'other European flags' are Hoverspeed, P&O European Ferries, Regie voor Maritiem Transport, Scandinavian Seaways, Color Line, Swansea Cork Ferries, Stena Sealink Line, B&I Line, and Irish Ferries. The 'flag of convenience' registrations (11 ferries) are from the Bahamas and Bermuda. Figure P-29 (appendix P) shows the percentages of ferries (baselines) providing ferry service of the different countries of registry. Compared to the United Kingdom no evident difference can be established .

2.3.3.6.8 Ferry service elements provided by ferries of different year of newbuilding

The provision of on-board facilities, is initially determined during the newbuilding period, although less so for some services. Ideally the specification for a new ferry takes account of the intended route, or area, of operation and the required facilities such as cabins, restaurants, and lounges. When a ferry enters operation only a limited flexibility exists to designate areas for other uses. For example, to provide a mother and baby room may require knocking down some cabins to create the space required, but this in turn affects revenue, as cabin capacity which no longer exists cannot be sold. This problem also exists when buying second-hand ferries, or when moving ferries from one route to another, where possible different market segments require different use of the ferry facilities. Figure P-30 (appendix P) is a comparison of the ferry service elements provided based on different periods of newbuilding. It can be seen that no distinctive differences among the periods can be observed, and any difference in the on-board facilities and services provided is not easily explained on the basis of period of newbuilding.

2.4 Summary

The ferry service offer as provided to UK customers is very diverse in practice. This is shown by the existence of 64 different routes (international and domestic) operated by 26 different ferry companies carrying annually almost 50 million passengers, 10 million cars, 2.7 million trailers/lorries, and a quarter of a million buses to and from 23 different UK ports on 127 different ferries.

Table 2-23 shows a summary of the average UK passenger car ferry operating in 1994. In this chapter an attempt to identify similarities and differences among these ferries was made. Table 2-23 shows the results and also indicates which criteria have been found statistically significant in explaining these differences. Some of these findings were, of course, expected, such as cabins and ferry crossing time, but others in particular where differences are observed by operator, such as age and capacity, are not easily explained on the basis of the data collected. It would appear that further investigation of corporate decision making is required to explain differences in the ferry service offer.

Average UK passenger car ferry operating in 1994		
Criterion	Mean value	Differences observed by
Route distance	109 n.miles	port / route
Voyage time	7 hrs 8 minutes	port / route / operator
Frequency of sailings	5.1 / day	port / route / operator
Fare	£ 0.47 / n.mile	port / route / operator
Length (loa)	144.647 m	area of port of departure
Draught	5.503 m	area of port of departure
Beam	23.634 m	none
Deadweight	2,924 tonne	none
Nett register tonnage	7,661 NRT	none
Gross register tonnage	15,129 GRT	none
Access - free height	4.51 m	none
Age	14 years	operator
Passenger capacity	1,366	operator / route
Car capacity	390	operator / route
Lanemetres capacity	984	operator / route
Cabins	193	ferry crossing time
Beds	585	ferry crossing time
Operating speed	20.7 knots	none
Fuel consumption	56.61 tonne/day	period of newbuilding
Engine power	15,747 kW	period of newbuilding
Engine manufacturer	Pielstick = 30 %	none
On-board facilities	see baseline diagrams	area of departure / port / route / operator / AA star rating / voyage time

Table 2-23 Summary of average UK passenger car ferry in 1994 and observed differences

This chapter (2) showed that it was not possible to identify the 'ideal' ferry, and therefore identify the exact nature of the ferry service offer, given certain criteria. However, this chapter was able to show that in 'practical' terms the definition of the ferry service offer can be defined by its appropriate 'baseline' model.

The baseline model enables (marketing) managers to establish whether the ferry service offer compares favourably or not with the competition and allows decision making on the number and type of ferry service elements to be offered. However, the analysis in this chapter provides insufficient understanding of the reasons for a ferry service offer. Furthermore, this part of the analysis only concentrated on the 'ferry' element of the ferry service offer, mainly because the 'ferry' is what is communicated to customers as the 'service offer', but did not include the other, perhaps equally important, elements of the ferry experience, such as infrastructure, port and terminal.

The next chapter (3) allows for these aspects to be taken into consideration and is intended to provide a theoretical basis for further analysis by means of a review of relevant literature associated with services marketing and management theory.

Chapter 3

Literature review

3. Literature Review

3.1 Introduction

Chapter 2 has shown that the UK ferry service offer can only partially be explained by looking at route characteristics, ships' particulars, technical ferry data, and on-board facilities and services (see table 2-23). It became apparent, however, that it in order to investigate the concept of the ferry service offer further, an appropriate theoretical basis is needed. As this study concentrates on the ferry service offer, and the companies which provide the service, it is appropriate to identify the underlying theory relating to services marketing, and to review the theory which may explain the corporate culture of the service providers in relation to the service offer (see also figure 1-1).

The concept of the service offer or product in service marketing has the attracted attention of academics since the late 1960's. This chapter will review the literature and comment on the publications that provide either theoretical or empirical material relevant to the current research. There are many texts on this topic that have attempted to extend the theoretical marketing concepts developed for tangible (pure) products to intangible (service) products including Judd (1964, 1968), Rathmell (1966), Wittreich (1966), Bateson (1977, 1983, 1992, 1995), Sasser, Olsen and Wyckoff (1978), Grönroos (1978a, 1978b, 1979, 1980a, 1980b, 1982a, 1982b, 1983a, 1983b, 1984, 1987, 1989, 1990, 1992a, 1992b, 1992c), Shostack (1979, 1982, 1984, 1985, 1987), Lovelock (1979, 1981, 1983, 1992, 1996), Gummesson (1983, 1987, 1991a, 1991b), Eiglier and Langeard (1981, 1987), Berry, Shostack and Upah, (1983); Cowell, 1984; Grönroos and Gummesson (1985), Parasuraman, Zeithaml and Berry (1985, 1988, 1991a, 1991b, 1993, 1994a, 1994b), Lehtinen (1986), Nyquist, Bitner and Booms (1985), Nyquist and Booms (1987), Gummesson and Grönroos (1987), Surprenant and Solomon (1987), Kingman-Brundage (1989), Webster (1989, 1991), Quinn, Doorley and Paquette (1990), Gummesson and

Kingman-Brundage (1992), Fisk, Brown and Bitner, 1993), Zeithaml, Parasuraman and Berry (1994), and Zeithaml and Bitner (1996). It is important to have a proper definition of the service offer, because the right 'product' is a key requisite to satisfy customer needs. Equally important is to investigate the reasons for any similarities and differences in the actual offering. In chapter 2 an analysis of these similarities and differences was based on the actual ferry services provided. A summary of the average UK passenger car ferry in 1994 and observed differences is shown in table 2-23 and it can be seen that some of differences can be explained on the basis of logical criteria, such as the existence of cabins depending on ferry crossing time, but also that quite a few of the differences observed are explained on the basis of operator. Similarities in the product offer, it could be argued, are the essential elements required by the customer and therefore must be included by the providers, but differences on the basis of 'operator' are likely to be the result of different strategic corporate decisions made by the operators and the way they perceive the operating environment. Academics with an interest in corporate strategy have identified types of organisational strategies, market orientation, or corporate culture which explain the reaction of companies to the environment in which they operate (see: Ansoff (1965, 1968, 1987), Miles & Snow (1978, 1984, 1986), Porter (1979, 1980, 1985, 1987, 1990), Barney (1986b), McGee and Thomas (1986), Deshpande and Parasuraman (1986), Bartlett and Ghoshal (1987a, 1987b, 1988), Dess and Davis (1988), Egelhoff (1988), Douglas and Rhee (1989), Deshpande and Webster (1989), Feeser and Willard (1990), and Deshpande, Farley and Webster (1993). A review of these studies and the underlying principles associated with the concept of corporate culture will also be part of this chapter. The chapter is therefore in two parts, consisting of a review of the literature relating to service offer (see: section 3.2), and a review of the corporate culture literature (see: section 3.3).

3.2 The service offer.

The service offer as described by Eiglier and Langeard (1981) and Grönroos (1987), is essentially the 'product' (consisting of goods and services) on offer. In marketing theory 'product' is part of the marketing mix. The elements of the marketing mix (Borden, 1964 and 1965) have been identified as the four P's - product, price, place and promotion (McCarthy, 1960 and 1981). Initially, the concept of the marketing mix referred to goods in particular, but, the realisation that pure services or goods-services combinations were playing an increasingly important role in developed economies led to the development of the concept of a marketing mix for services (Booms and Bitner, 1981), consisting of seven elements (the seven P's). However, the three P's (process, physical evidence and people) additional to the traditional marketing mix elements can arguably be seen as a subdivision of the product element.

Marketing mix classifications by author and year						
McCarthy	Judd	Kotler	Booms & Bitner	Cowell	Kotler	Baumgartner
1960	1987	1984	1981	1984	1991	1991
4Ps	5Ps	6Ps	7Ps	8Ps	11Cs	15 Ps
Product	Product	Product	Product	Product	Co-benefits	Product
Price	Price	Price	Price	Price	Cost	Price
Place	Place	Place	Place	Place	Convenience	Place
Promotion	Promotion	Promotion	Promotion	Promotion	Communication	Promotion
	People	Political power		People	Care	People
					Commitment	Politics
		Public opinion formation		Process	Creative cycle	Public relations
				Physical evidence	Concreteness	Probe
					Consistency	Partition
				Phenomena	Circumstances	Prioritise
					Context	Position
						Profit
						Plan
						Performance
						Positive implementation

Table 3-1 Marketing mix classifications

Source: Gummesson (1994, 1995) Adapted by author.

However, some marketers believed that an extension of the traditional marketing mix was necessary (see: Shostack, 1979 and Lovelock, 1979). It can be argued, that this addition is very useful as it enables the allocation of a specific heading to analyse important service elements. Another P for (natural) phenomena - such as climate and geographical setting, has also been identified (Cowell, 1984). This refers to service elements which may be essential for providing the service and which affect the satisfaction of the customer, but over which the service provider has no control. For example, the sea state in ferry operations can vary from a calm smooth surface to storm and gales. Other combinations of P's, all of which contain the P of 'product' (see: table 3-1) were the five Ps identified by Judd (1987), the six Ps of Kotler (1984), eight Ps of Kotler (1992) and the 15 Ps of Baumgartner (1991). Gummesson (1994 and 1995) argues that the four Ps should be replaced by the 30 Rs (including 'Relationship Marketing'; see also Grönroos, 1994; Grönroos and Ravald, 1997), because he feels that the reduction to the basic four Ps of the marketing mix was a gain in simplicity and elegance, but a loss in substance and validity.

Kotler (1991) developed a model which compares the provider of the service with the customer. An adaptation of this model matches the different (eight) P's of the provider with the associated eleven C's of the customer. The product (service offer) to be provided tries to match the customer with co-benefits (attributes) at the *core level, critical level,* and the *complementary level* (customer value). A summary of classifications is given in table 3-1.

Cowell (1984) comments on decisions to be made by the producers of services as follows:

> 'The shape of the service offer stems from managerial decisions concerned with what services will be provided, when they will be provided, how they will be provided, where they will be provided, who will provide them. Decisions on the service offer are intertwined and indissoluble from decisions on the service delivery system and are derived from the service concept. Management of the service offer is concerned with making decisions and thinking through the implications of actions affecting at least three components: service elements, service forms, and service levels.' (Cowell, 1984: 103)

The 'translation' by the author of this quotation of Cowell (1984) into a model of the 'service offer' produced a framework consisting of the service concept, the service offer affecting the service elements, the service form, service level (which includes quality and quantity), and the service delivery system, with its key elements of people, process, and physical evidence. In addition, the element of phenomena has been incorporated in the model. A diagram of this model is shown in figure 3-1 and all elements included in this model are now described in further detail as they form the key to the theoretical analysis of the service offer.

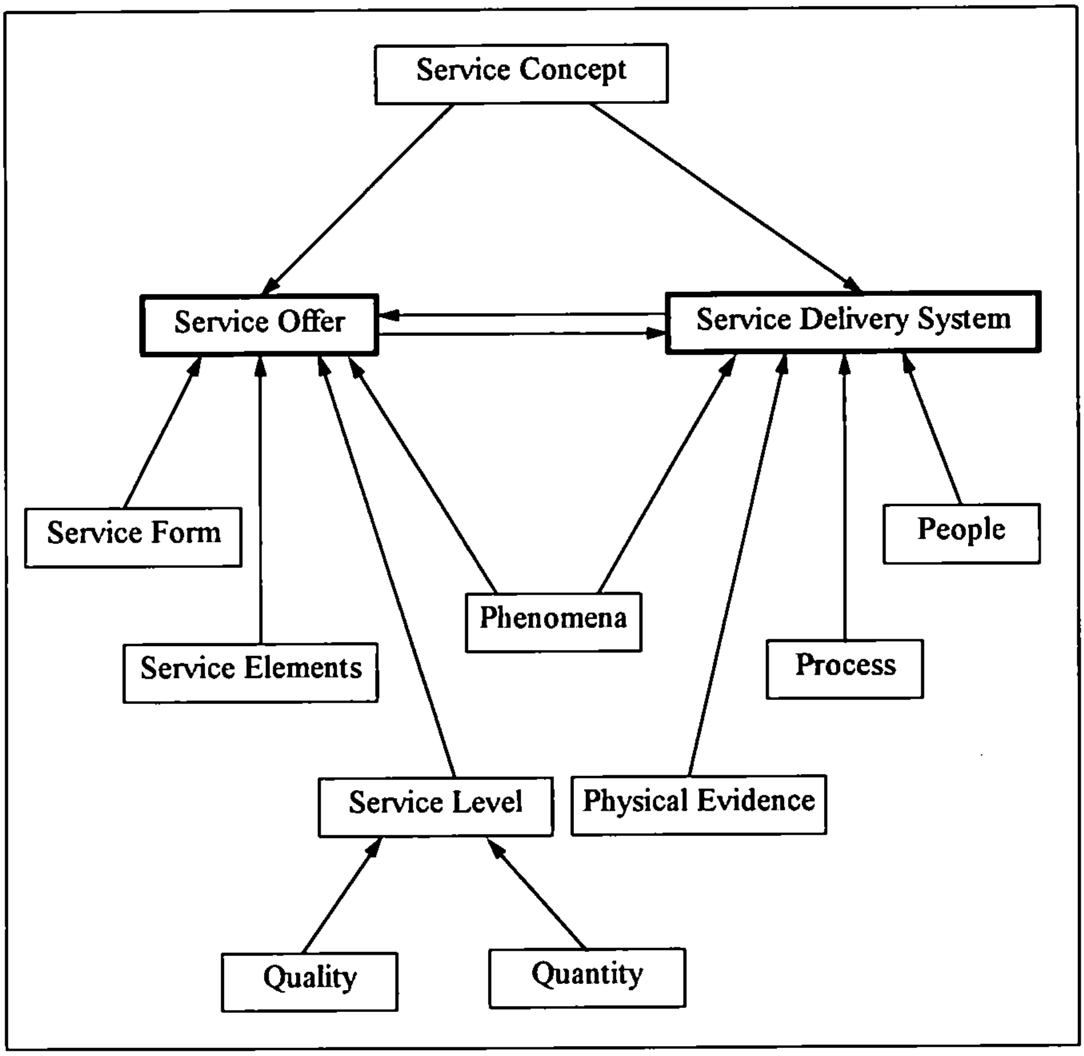


Figure 3-1 The service offer model

Source: Author (based on literature review)

3.2.1 The service concept.

In providing the ferry service the operators must put into practice their service concept. Grönroos (1980b) suggests that the service concept is the core of the service offering and that at least two levels are possible, the general and the specific level. The general service concept is the essential product being offered, for example the ferry for transportation over water. The specific service product is a particular facility on board of a ferry, such as a French style bistro or an English pub. Eiglier and Langeard (1981) suggest that the service concept is translated into a 'service formula'. This service formula implies a definition of the service concept - the consumer benefits the service firm is aiming to serve, and which service attributes best express the consumer benefit (for a more detailed explanation of consumer benefits see Haley, 1968; Kluyver and Whitlock, 1986; Moriarty and Reibstein, 1986, Matear, Gray and Cowell, 1991; Curtis, 1994; and Matear and Gray, 1995). However, it also takes into account the service process - the ways and means by which the service is produced, distributed, and consumed, identification of the market segment, organising the consumer-provider interface, and facilitation of clear communications between the organisation and potential clients. Sasser et al. (1978) suggest that the service concept is the definition of the offer in terms of the bundle of goods and services sold plus the relative importance of this bundle to the consumer. They stress the importance of the process in creating the 'product', and that the delivery system must be designed with the presence of the customer in mind.

The service concept has been defined by Cowell (1984: 101) as:

> 'the general benefits the service organisation offers based on customer benefits sought'

and concludes that, therefore, at a general level it helps to answer the questions:

> 'what business are we in and what needs and wants do we attempt to meet' ?
>
> (Cowell, 1984: 101).

A want can be viewed as 'a disposition towards using, consuming or possessing a product' (Knox, 1968; Gosling, 1969) and as 'a desire for specific satisfiers of a need - a state of felt deprivation of some basic satisfaction' (Kotler, 1994). A 'latent want' is a situation where a customer may want a product without being aware of it (a non-conscious want). A 'passive want' is a conscious want unaccompanied by any intention to buy. A passive want implies that a purchase is inhibited by barriers such as inertia, doubts about the benefits promised, misapprehension, or price.

Further problems arise with the clarification, elaboration and translation of customer wants in terms of what the service provider should offer. These problems are that

1. consumers may be unclear about what they require - out of ignorance, or inexperience, or by being inarticulate in the expression of these requirements;
2. product attributes change over time, as a result of experience, expectations, and increased sophistication; and
3. there are measurement problems in product attributes, their importance, preferences, changes, and trade-offs.

3.2.2 The service elements.

The service elements are the ingredients of a total service offer; they are the particular bundle of tangibles and intangibles which compose the service product (see: Brandt, 1987 and 1988; Heijveld and Gray, 1996b). It is in describing the elements of the service product that the terminology *core, additional* (or *peripheral, augmented and global*) is most widely used (see also: service levels in table 3-1).

Three problems can be identified in defining the elements of the service offer. The first one is the difficulty of articulating all the elements that could make up the service offer. It is usually easier to articulate the tangible elements than the intangible. The second problem is the difficulty of deciding upon the particular set of elements the service organisation will actually use in its service offer. The third problem, which may be uncontrollable, unanticipated, and even undesirable is that in practice some of the elements of the service offer are in fact not provided by the ferry service provider, e.g. a package holiday consisting not only of the ferry crossing which is partly determined by the (un)pleasantness of fellow travellers, but also the service and comfort of the holiday hotel.

Sasser, Olsen, and Wyckoff (1978) describe the service elements as the bundle of goods and services offered and can be seen to consist of the physical items or facilitating goods, the sensual benefits or explicit services, and the psychological benefits or implicit services.

3.2.3 Service forms

Service form is concerned with examining in detail the various options relating to each service element. The particular decision taken on the precise form of each service element will depend upon market requirements, competitors' policies and the need to obtain balance within, and between the various elements that make up the service product offer, and cohesiveness and coherence of the set of services offered (Eiglier and Langeard, 1981). An additional consideration is trying to achieve the lowest level of complexity from a customer and organisational point of view (see also: Nyquist, Bitner and Booms, 1985). A high degree of complexity makes the service product difficult to manage, e.g. in terms of quality control, staff knowledge of options, and difficult to understand by the customer, e.g. the array of fare options presented by ferry companies.

3.2.4 Service levels

Service levels, according to Cowell (1984), refer to the judgements made by customers on the quality and quantity of benefits they expect to receive. From the ferry operator's point of view, this means management decisions on what service quality and service quantity the organisation is willing, able, or intends to provide.

Service quality is an overall measure (of a service product) composed of a number of dimensions like reliability, grade and accuracy of service (Garvin, 1988). Quality is an elusive concept to define; some dimensions may be capable of objective measurement, e.g. turnaround time of ferries, while others depend on more subjective evaluations (Bearden, Nethemeyer, and Mobley, 1993). For the provider, 'unbundling' all the elements is difficult. For the consumer, making conscious evaluations and comparisons between service product elements is also difficult (see: Frank and Massey, 1965; Foxall, 1992b). Both are likely to use other measures for quality (e.g. price). Problems occur when designing, building into, standardising, and maintaining quality in service product offers (especially at a high degree of contact between buyer and seller , and at multiple sites which is the case with ferry operators especially if they operate a large number of vessels). It is difficult to inspect quality, and systems have to be developed to ensure it.

Quality in services has attracted the interest of many academics; see for example Babakus and Boller (1992), Barnes (1993), Berry and Parasuraman (1991), Bitner and Hubbert (1993), Bolton and Drew (1991b), Boulding, Kalra, Stealin and Zeithaml (1993), Brandt and Reffett (1989), Brown and Swartz (1989), Carman (1990), Cronin and Taylor (1992, 1994), Edvardsson (1988, 1992), Edvardsson, Thomasson, and Øvretveit (1994), Garvin (1988), Grönroos (1984, 1992), Gummesson and Grönroos (1987), Gummesson (1991b, 1993), Gummesson and Kingman-Brundage (1992), Iacobucci, Grayson and Ostrom (1994), Lehtinen (1986), Lengnick-Hall (1996), Lewis (1989, 1991), Lewis and Mitchell (1990), Lewis and

Booms (1983), Liljander and Strandvik (1995a, 1995b), Olshavsky and Millar (1972), Roest and Pieters (1997), Rust and Oliver (1994), Stauss and Hentschel (1992), Stauss (1993b), Stauss and Weinlich (1997), Storbacka, et al., (1994), Teas (1993), Parasuraman, et al., (1985, 1988, 1991b, 1994a, 1994b), Webster (1989), and Zeithaml (1988), Zeithaml, et al., (1988), and Zeithaml, et al., (1990).

However, important as this is for the marketing of services, no further analysis of service quality will be presented in this study. The reason of this is best illustrated by table 3-2 describing 'what customers expect' (Zeithaml and Bitner, 1996) and the position in terms of the requirements and possible diagnostics at the four levels described in relation to this study. This study concentrates in particular at levels one (general concepts), two (dimensions) and three (attributes). The ability to set concrete quality levels does not start until level four (behaviour and action) has been reached. There is of course, the scope for future research in ferry service quality systems and standards, and the path chosen for this research does not imply that this topic is unimportant.

Expectations of customers			
Level	Description	Requirements	Diagnostics
1	General concept	Abstract	Low
2	Dimensions	↕	↕
3	Attributes		
4	Behaviour / action	Concrete (able to set standards)	High

Table 3-2 Expectations of customers
Source: Zeithaml and Bitner, 1996: 219

Apart from certain areas traditionally covered by regulations (e.g. safety), quality standards are ultimately defined by the customer. It is customer perception which matters most, not provider perception. This demands an understanding of what attributes a customer takes into account in judging quality and how such attributes will change according to circumstances. Additional difficulties of quality design and control stem from the fact that service is defined differently by individual customer organisations and according to the role position of the respondent, for example, whether the consumer of the service is also the one who is ultimately paying (Christopher et al., 1970).

Grönroos (1980b) identifies three components of service quality; corporate image, technical quality and functional quality. Eiglier and Langeard (1981) observe that the performance of each service element can influence the quality of other elements. A client may evaluate the whole service on the basis of one element (core or peripheral) only. Some services are indispensable for the execution of the core service ('must have') while others are there to improve the quality of the core service ('like to have'). Even those services and products peripheral to the core service can influence its quality. Of main concern is how customers view the service and what distinctions they perceive to be central in their choice and evaluation of service offerings. Berry and Parasuraman (1991, 1993) suggest the five general dimensions influencing customers' assessment of service quality to be reliability, tangibles, responsiveness, assurance, and empathy. Reliability is described as the ability to perform the promised service dependably and accurately. Tangibles include the appearance of physical facilities, equipment, personnel, and communication materials. Responsiveness is the willingness to help the customers and to provide prompt service. Assurance comprises the knowledge and courtesy of employees and their ability to convey trust and confidence. Empathy is the provision of caring, individualised attention to customers (see also: Babakus and Boller, 1992; Bitner and Hubbert, 1994; Bolton and Drew, 1991b).

Decisions to be made on quality are therefore, firstly, the basic level of quality to be provided to match the level of quality desired by customers and the variations within a service product range to match identified market segments (e.g. as in various on board restaurants), and secondly, decisions on changes in quality over time (maintain, lower, or increase).

Service quantity is the amount of service provided. It is difficult to set and manage, and to disentangle the elements of service from the consumer and provider viewpoints. Decisions required concern the volume, such as number and size of the ferries on a particular route; the timing, such as the frequency of sailings; and the flow, for example the loading and unloading procedure of vehicles.

3.2.5 The service delivery system

A service product cannot exist without a service delivery system (Cowell, 1984), the design and operation of which is an essential element in the definition of the service product (Wilson, 1997; Zeithaml et al., 1988; Bitner et al., 1997; Danaher and Mattson, 1994; Kelly et al., 1990). The two key elements of the service delivery system are people and physical evidence.

3.2.5.1 People

People or the 'people' element is used to describe such features as personnel, visible and invisible to the client, and other customers past, existing and potential. Other consumers' knowledge, skills, attitudes, behaviour, appearance, and the role they play have an influence on the service product.

3.2.5.2 Physical evidence

Physical evidence is used to describe physical objects consisting of buildings, plant, equipment, tools, the layout of facilities, and tangible elements from ferries, and terminals, to labels, documents and forms (Bitner, 1990 and 1993). Grönroos (1980b) calls these the 'physical / technical resources', whereas Rathmell (1966) uses the terms 'facilitating goods' and 'support goods'. Support goods vary in their degree of essentiality to the performance of particular services and they may be owned, leased, hired, borrowed or rented. Such support goods and facilitating goods are tangible elements of service provision and may be used during the process of service production and consumption and may need maintenance, repair, and possibly replacement.

The context in which such physical objects are set will also influence service product performance and delivery. Intangible qualities such as 'atmosphere' and 'image' may derive from physical objects, the people providing the service and the economic, geographic, or cultural setting. The 'total experience' which customers may derive from the service product usage may be due to a host of influences, e.g. a package tour's success may depend on the exotic location or the climate as much as upon the other participants or the hotel complex, or even the ferry crossing. Berry and Parasuraman (1991) propose three categories of evidence; the physical environment, comprising ambient factors, design factors, and social factors; communications; and price (see also Baker, 1987).

3.2.6 Product classification

The product (good or service) can be classified as a combination of physical, sensual and psychological attributes, all of which represent different levels of perceived benefit or value to the customer and the provider of the service. The provider has to satisfy the various customer needs with a number of different service attributes while at the same time keeping in mind overall profitability. There are a number of attributes which must be provided and those that could be provided, while a trade-off exists in terms of profitability (or cost of providing these attributes).

One way of describing a service is to identify which functions it must perform and the accuracy with which this performance is measured. For instance a security service for guarding prisoners, such as Group 4, can be measured by the number of prisoners who have escaped (and been recaptured). Let us now consider the functional classification of a ferry service. In general, it could be argued, that the ferry service is a flexible link in the road or railway network and hence has both a passenger and a freight transport function, but sometimes it has a purely leisure function, as part of a holiday or minicruise (Stopford, 1997). On other occasions it serves as both a transport mode and as a location for a period of rest for car, coach and lorry drivers. At a more specific level other functions could be identified such as the safe arrival, timely departures and arrivals, safe voyages, and functions based on other criteria.

To find out these functional requirements past performance records have been collected for this research. Published material in the form of timetables and other company literature in addition to journal and newspaper articles have been analysed. In addition to the collection of secondary data, it should be noted, that before the period of this research the author, as a ship manager for a ship repair and dry-docking company, was in charge of several ferry refits and during the period of the research travelled on a number of ferries as foot passenger and car driver, all of which contributed to the overall understanding of the ferry service from both the provider's and the users' point of view. Also during the period of this research the author attended of several conferences and exhibitions on ferries and co-authored a consultancy report for the European Union (Atlantic Arc), which required detailed discussions and presentations with ferry industry experts, providers and politicians. All such contact was of considerable help in assessing the functional roles associated with ferry operations.

A product may also be seen as the total utility that a buyer receives as a result of a purchase. Various authors have identified different levels of products or services. These levels correspond to the needs, benefits sought, or wants which they are to satisfy. Each product or service has its essential features (the core product or service) which are then augmented or enhanced to provide marketing appeal. Different authors have proposed different 'levels' of product or service as shown in table 3-3.

Description of Products / Services				
Author	Levels			
	1	2	3	4
Levitt, 1960	Core	Expected	Augmented	Potential
Kotler, 1994	Core	Tangible	Augmented	
Eiglier & Langeard, 1981	Core	Peripheral	Global	
Sasser et al., 1978	Substantive	Peripheral		
Christopher et al., 1991	Core	Surround		
Grönroos, 1980b	Core	Auxiliary		

Table 3-3 Description of services levels

Source: the author

Core Product / Service	
Author	Definition
Levitt, 1960	Basic physical product or utility
Kotler, 1994	What is the buyer buying ?
Eiglier & Langeard, 1981	1. Main reason why customer buys 2. Main output that the company provides
Sasser et al., 1978	The essential function of the service
Christopher et al., 1991	Essential elemental attributes
Grönroos, 1980b	General and specific service concepts

Table 3-4 Definitions of the core product or service.

Source: the author

There is some variation among writers in the definition of the core level (see table 3-4), and in those levels in addition to the core level (see table 3-5).

Product or service levels beyond the core level		
Author	Definition	
Levitt, 1960	Level 2. Level 3. Level 4.	Expected Service Minimal purchase conditions to be met Tangible Service Added value Potential Service Potential added features and benefits that are or may be of utility to some buyers
Kotler, 1994	Level 2. Level 3.	Tangible Service Added tangibility through quality level, features, styling, brand name, packaging Augmented Service Additional benefits and services
Eiglier & Langeard, 1981	Level 2. Level 3.	Peripheral Service Some Added value Global Service Set of core and peripheral services which constitute the service offering
Sasser et al., 1978	Level 2.	Peripheral Service Service that surrounds the substantive service
Christopher et al., 1991	Level 2.	Service Surround Added values, e.g. image, service, styling, support
Grönroos, 1980b	Level 2.	Auxiliary Service Extras, not essential but can become an integral part of the offer

Table 3-5 Definitions of product or service levels beyond core level by author. Source: the author

Another way of describing a service is to identify the process of interactions between the customers and the service provider, sometimes referred to as the 'process' component of the marketing mix. These interactions can be both of a human nature and by means of machinery and equipment. By charting out the total ferry service process, critical and non-critical events can be identified. The critical events (without which the service could not be provided) can be labelled 'core' service attributes; those which are non-critical can be labelled 'augmented' product attributes (or respectively 'must have' and 'should have' attributes).

In table 3-5, although the approaches of the various authors differ, they are essentially similar in identifying a value added service beyond the basic core service, often associated with the concept of tangibility. However, the core service is the main reason for the service to exist.

3.2.7 Product factors.

Another way of defining the ferry service is to establish whether one all encompassing word or image describes it sufficiently as a basis for managerial decision making. Sasser et al. (1978) suggest that there are three models of how consumers make judgements about services, which are: one over-powering attribute; one single attribute with accompanying threshold minimum levels on other attributes; and a (weighted average) combination of different attributes thought to be important. It would be expected that product evaluations are at least in part based on consumers' attempts to directly evaluate physical product attributes, such as size, shape, and grade of ingredients. However evidence suggests, that for many goods, buyers can have difficulty in distinguishing between different offerings on the basis of such direct product attributes. For example, during product testing of Coca Cola and Pepsi Cola, where the identity of the drinks were concealed, 65 % of the people surveyed stated that they preferred Coca Cola before the test, but only 44 % selected it when tasting it blind, and of the 23 % of the people who stated in advance to prefer Pepsi Cola, 51 % selected it in the blind test (see: Christopher, Payne and Ballantyne, 1991). As ferry services consist of both tangible and intangible elements an evaluation on the basis of physical product attributes (physical evidence from the marketing mix) would, in theory, be possible although difficult.

Because of these difficulties, communications (promotion in the marketing mix) are used by customers, in addition to the physical evidence, to evaluate the ferry service offer. These communications consist of advertising by ferry operators and mouth-to-mouth information from friends and relatives, personal selling by travel agents and publicity, such as newspaper/journal articles and television programmes,

The word 'ferry' is likely to evoke an image or a perceived image of the ferry service. This image depends on the past experience and expectations of each individual. If these are identical, then it is likely that the same image will result. It is, however, more likely that different images are perceived, since no two people are identical. These differences are caused by either different past experiences or by the different expectations of the individual. Expectations in turn are conditioned by past experiences and personal preferences. See further Howard and Sheth (1969), Webster and Wind (1972), Williams (1990), Bennet and Kassarjian (1972), Bliss (1970), Boulding, Kalra, Stealin, and Zeithaml (1993), Chisnall (1985), Fishbein (1966, 1975), Fishbein and Azjen (1972, 1975), Foxall (1990, 1992b), Kotler (1965), Loudon and Della Bitta (1993), Peter and Olson (1993), Sheth (1974), Assael (1987), and Engel and Blackwell (1990).

3.2.8 Ferry service offer.

The ferry service may also be seen as a combination of different attributes all of which make up together the 'ferry service offer'. Evaluative criteria may vary from one customer to another. No matter how many criteria are evaluated by the consumer, they are likely to differ in their importance, usually with one or two criteria being more important than others. Thus, when several evaluative criteria are salient (important) to the consumer, some are determinant. This means that they are most important and determine the selection of one alternative over the others. Some refer to a determinant attribute, which is both most important and determinant to a consumer, as a critical attribute. For instance in the purchase of running shoes, brand name, quality, price, and comfort may all be important to the buyer, but comfort is likely to be the most determinant for most runners. In this case a subjective factor is considered to be most important, however, one must be careful in assuming that a certain feature ranked as most important is actually determinant (O'Shaughnessy, 1984 and Chisnall, 1985).

The number and type of evaluative criteria may vary by product. Consumers generally use few evaluative criteria when purchasing most grocery items. However, when one is purchasing a home, car, or other major durable item, more evaluative criteria would typically be used in the evaluation process (Loudon and Della Bitta, 1993). This also means that consumers would tend to use more evaluative criteria for high involvement products than for low involvement ones. Generally, however, the number of determinant evaluative criteria used in a consumer decision is six or fewer, although there is some evidence that the number may be as high as nine (Engel, et al., 1982).

Evaluative criteria may also change over time (Loudon and Della Bitta, 1993). As consumers gain experiences and information, their evaluative criteria may shift. When innovations appear with previous unknown features, consumers may incorporate these features into their evaluative criteria. As they learn from ferry brochures and friends what features they should look for in a particular ferry crossing, there may be changes in their evaluative criteria. For instance the existence of swimming pool or casino on board of the ferry may become more important to ferry users. Of course this has important implications for the ferry service providers who seek to influence the evaluative criteria favourably towards their own services. It is often difficult to change such ingrained decision factors (O'Shaugnessy, 1984).

3.2.8.1 Empirical research into the ferry service offer

Empirical research to establish which ferry attributes are to be considered has been conducted by both ferry operators and users (Stena Sealink, 1990; Laine, 1994; and Fenton, 1995) and academics, such as Rich (1980), Matear (1987, 1991), Matear, Gray and Cowell (1991), d'Este and Meyrick (1992), Heijveld and Gray (1993), Gray, Heijveld and Joint (1995), Matear and Gray (1995), and Heijveld and Gray (1996b). Most of these studies, however, have not concentrated on the service offer explicitly, but have focused on market segmentation, service quality, and product development.

Practical attempts to establish an acceptable classification of a ferry service have been made by the Automobile Association. Since 1992 inspectors have paid annual visits to all ferries operating from the United Kingdom and have assessed each vessel (AA Guide, 1992). They publish their findings and base them on a number of 'ferry service' attributes. The result is the rating of each ferry in both percentages and by awarding 'stars' which enable customers to judge the standard of the ferry service offered. Another practical attempt was when the Irish Ferry Users' Forum put out invitations for proposals from the public on the publication of a consumer code of standards for ferries in 1996 (Fenton, 1995).

Research into product attributes (benefits sought), in relation to transport in general (mainly air travel), and in relation to shipping in particular (passengers and freight), has identified a number of specific service attributes. One of the most recent and thorough studies (Matear, 1991) identifies the service attributes, or consumer benefits sought from ferry services in the Irish Sea as: convenience, safety aspects, ease of booking, friendly attitude, discount fare, bus connections, road connections, baggage handling, motorist lounge, on board service, facilities for children, facilities for disabled persons, cabin accommodation, price, decor, travel time and schedule.

Ritchie et al. (1980), Good et al. (1985), and Bruning et al. (1985) have identified in the air passenger market the important service product attributes of price, convenience, restrictions with respect to length of stay, booking requirements, timing and frequency of departure, factors related to inflight service, and safety aspects. Shaw (1985) includes seat availability and length of journey, ease of booking, friendly attitude, good on board service, and travel time, and Toh and Hu (1988) include discount fares as attributes to consider.

As ferries also serve the industrial market, product attributes relevant to the carriage of freight by sea (on a lorry or trailer) should be included in the review. In the freight market benefits sought or service attributes identified as relevant are: frequency, reliability, transit time, schedule, trading partner, freight rate, special offers, relationship with carrier, response to problems, special requirements, and urgent deliveries (Brooks, 1984, 1985). D'Este and Meyrick (1990) identified delays, damage avoidance, loss and theft, and documentation and tracing ability as attributes. Route attributes identified by d'Este and Meyrick (1990) are frequency, capacity, convenience, directness, and flexibility. McGinnins (1980) provides a review of eleven studies of freight attributes.

A more recent study by d'Este and Meyrick (1992) shows factors influencing carrier choice to be: route factors such as frequency and transit time; directness and capacity; cost factors such as freight rate, other costs; service factors, such as delays and reliability, avoidance of damage, loss and theft, fast response to problems, documentation and tracing capability; shipping decision factors, such as commitment, long contracts, technology, damage, door-to-door, frequency, price, flexible contracts, on time, extra space, transit time, promotion, and problems; and port decision factors such as proximity of port to point of production, port charges, strikes, ports record for industrial disputes, facilities, special loading facilities, tradition of company shipping through the port, marketing initiatives of port management, turnaround, ports' record for speed of ship turn around time, and rail access to the port.

3.3 Corporate culture.

Corporate decision making and the firm's activities are assumed to be influenced by the cultural structure of the organisation identified as the corporate culture (Deal and Kennedy, 1982; Deshpande and Webster, 1989; Kotter and Heskett, 1992; Wilson, 1997). Chapter 2 investigated the nature of ferry services, and although some aspects can be explained by physical phenomena such as journey time, others cannot. In some cases the same operator will even have different standards applied to different ferries in its fleet. It is therefore assumed that the approaches of different institutions in the ferry system may need to be explained in some cases by the prevailing corporate culture, rather than physical phenomena. There is an extensive literature on corporate culture, see for example Alvesson and Berg (1992), Barney (1996a), Deal and Kennedy (1982), Dennison (1984, 1990), Deshpande and Parasuraman (1986), Deshpande and Webster (1989), Deshpande, Farley and Webster (1993), Drennan (1992), Frost, Moore, Louis, Lundberg and Martin (1985, 1991), Hatch (1993), Hatch and Schultz (1997), Keesing (1974), Kotter and Heskett (1992), Martin (1994), Pascale (1985), Schein (1992), Smircich (1983), Turner and Spencer (1997), Wilkins and Ouchi (1983), and Wilson (1997).

However, before looking at corporate culture - the main focus of part of this study, it is necessary to discuss strategic management of organisations. Strategy is strongly affected by corporate culture (Schwartz and Davis, 1981; Smircich, 1983; Deshpande and Parasuraman, 1986; Schein, 1992) a brief literature review is therefore included in appendix Q. Strategies are means to an end. The ends concern the purpose and objectives of organisations. As stated in section 1.5, all of the firm's activities and its core values are affected by the cultural structure of the organisation, therefore a detailed discussion of corporate culture and its associated literature is needed.

3.3.1 Concepts of corporate culture

All organisations, and by definition all social systems, possess a culture. Culture is a set of beliefs, norms and values which forms the basis of collaborative human behaviour and makes human actions to some extent predictable and directed towards a set of commonly held purposes or the maintenance of some commonly accepted state. The persuasiveness and uniformity of culture may vary, but is always there whether we want it or not (Normann, 1984, 1991). Culture is generally fairly stable. Beliefs and values do change over time, but cultural revolutions in a larger social system are fairly rare. Culture is embedded in language, institutions, habit, social relations. Changing a culture requires a formidable effort, far beyond what is needed for relabelling certain phenomena or issuing official 'credos' (Crozier, 1964; Kets de Vries, 1980; Deal and Kennedy, 1982).

Howard and Sheth (1969) view culture as '*a selective, man-made way of responding to experience, a set of behaviour patterns*' and postulate that cultural influences affect motives, brand comprehension, attitude, and intention to purchase. Linton (1945) defines culture as '*the configuration of learned behaviour and results of behaviour whose component elements are shared and transmitted by the members of a particular society*'. He emphasises the learning process in the acquisition of cultural behaviour; although some form of instinctive behaviour was apparent, it could not be regarded as part of the culture, in spite of the obvious influence on culture. For example, although eating fulfils a basic need, the way an individual eats, and the types of food he consumes, will depend on how he has learned to eat. Linton (1945) uses the term '*behaviour*' to include all the activities of an individual, '*whether overt or covert, physical or psychological*'. The phrase '*shared and transmitted*' underlines the essential quality of culture: that it refers to certain types of behaviour which are common to two or more persons. Individual idiosyncracies are not part of the culture of a society, until such time as they may become diffused to other people and affect their patterns of behaviour.

The concept of culture, although difficult to define precisely, according to Bliss (1970) '*serves to point to the fact that despite borderline cases, there are large numbers of people who are alike in customs, language and rituals, yet clearly different from their neighbours who, in turn, are similar to each other*'.

Bennett and Kassarjian (1972) state that '*culture derives therefore from a group of people sharing and transmitting beliefs, values, attitudes, and forms of behaviour which are held in common and regarded as important to that society*'

Greenley (1986) comments that throughout the organisation it is likely that executives will have different values and expectations. However some are likely to be similar and such groups of executives represent a coalition of common values and expectations. Chang and Campo-Flores (1980) state that '*executives are unable to separate their feelings, emotions and personal preferences from logical analysis when making decisions, with the major consideration being the executives' personal values*'

Keesing (1974) states that culture can be understood '*not just as beliefs and assumptions, but also as the behaviour patterns, language, and social devices such as rituals and control systems*' , a view generally known as '*cultural adaptionist*'. Deal and Kennedy (1982) have coined the phrase '*the way we do things around here*'.

Johnson and Scholes (1997) describe corporate culture as '*the deeper level of basic assumptions and beliefs that are shared by members of an organisation*'. They suggest that the corporate culture can be established with the analysis of the '*cultural web*' of factors within an organisation which preserve and sustain commonly held core beliefs. These core beliefs are based on stories and myths, rituals and symbols, leadership and management style, and structure and systems.

Detailed analysis of these aspects should give a clearer understanding of the core beliefs. These range from whether the stories and myths are predominantly concerned with success or failure, change or stability, to the type of language used within the organisation. For example, when Hovercraft services started Channel crossings in the late 1960's the companies deliberately mimicked airlines rather than ships and this was sustained throughout the rituals and symbols used - they had a 'pilot', dressed their 'cabin staff' as did airlines, and had 'flights' not sailings.

Schein (1992) suggests that culture has a number of levels which are essentially manifestations of underlying beliefs. They are called '*artefacts*' at the most visible level, which represent the physical and social environment and the outputs of the organisation. This includes written communications, advertisements and the reception that visitors receive. The next level is called '*values*' and these represent a sense of 'what ought to be' based on convictions held by certain key people. The final level is called '*underlying* *assumptions'* which is that people in the organisation have *'taken for granted ways of doing things or solutions to problems'.*

Schwartz and Davis (1981) see culture as a *'pattern of beliefs and expectations shared by the organisation's members, and which produce norms that powerfully shape the behaviour of individuals and groups in the organisation'.* They argue that the beliefs held by the company are seen as major aspects of corporate policy as they evolve from interactions with, and in turn form policy towards, the market place. Linked to this is communication, an essential aspect of culture. Hampden-Turner (1990) argues that culture is based on communication and learning.

Deal and Kennedy (1982) isolated five key elements or determinants of culture. They are the environment and key success factors, the values of strategic leadership, heroes, rites and rituals, and the cultural network (communications system).

Pümpin (1987) states that seven aspects comprise culture. They are market orientation, relationship between management and staff (communications), the target orientation of the people, attitudes towards innovation, attitudes towards cost and cost reduction, commitment and loyalty of staff to the organisation, and impact and reaction to technological change.

Press (1990) suggest that the culture of an organisation is based upon one or more philosophies. Thompson (1995, 1997) identifies four discrete philosophies. They are resources focus, shareholder focus, people focus, and market focus.

Culture as a competitive advantage can be sustained when the culture is valuable, the culture is rare, and when the culture cannot be copied easily by competitors (Barney, 1986a).

3.3.2 Typologies of corporate culture.

Different typologies of corporate cultures have been identified in the literature by Miles and Snow (1978), Porter (1980), Handy (1976), and Miller (1986).

3.3.2.1 Miles and Snow typologies

The first strategic typology based on corporate culture was developed by Miles and Snow (1978) and continues to provide a useful theoretical framework for analysing the ways in which organisations interact with their environment and the subsequent strategies they adopt. The Miles and Snow typology differs from others (such as Etzioni, 1961; Chandler, 1962; Blau and Scott, 1962; Ansoff, 1965; Segal, 1974; and Anderson and Paine, 1975) as it characterises the organisation as a complete system, especially its strategic orientation. No typology can specify every form of strategic behaviour of a complex and changing organisation, but empirical evidence supports the selection of the four types identified by Miles and Snow as a useful indicator of a corporate culture and as a predictor of different corporate reactions to a similar set of environmental factors facing a particular industry (Miles and Snow, 1978; Snow and Hambrick, 1980; Snow and Hrebeniak, 1980; Hambrick, 1983; McDaniel and Kolari, 1987; and McKee, Varadarajan and Pride, 1989).

McDaniel and Kolari (1987), commenting on the Miles and Snow typology, state:

> 'The key dimensions underlying this typology - Miles & Snow - is the organisation's response to changing environmental conditions: that is the rate at which the organisation changes its products or markets to maintain alignment with its environment'

Walker and Ruekert (1987), Hooley et al. (1993), and Slater and Narver (1993) have taken these typologies and used them for further empirical studies in which the validity of these types of corporate cultures was tested.

Miles and Snow (1978) have studied the strategy - structure relationship and classified business organisations into four strategic types or cultures, based on the rate of change of their products or markets. The key element of their theory is management's assessment of the environment as stable, changing, or dynamic. This perception of the environment, which is not considered objective, may result in management's selection of one strategy they feel will be appropriate, or develops as one strategy as a result of management decisions made.

3.3.2.1.1 Defenders

Defenders seek stability by producing only a limited set of products directed at a narrow segment of the market. They defend their domain through competitive pricing or high quality products, and ignore any developments and trends outside their limited niche market. Emphasis is on intensive planning oriented towards cost and efficiency. The result is a highly centralised organisational structure with tight control, extensive division of labour, and high degree of formalisation (Miles and Snow, 1978). Defenders are organisations with a strategy that protects their current position and which engage in little or no new product/market development (Harrison and St.John, 1998)

3.3.2.1.2 Prospectors

A second strategic type of organisation, the opposite of the defenders, are the prospectors. Prospectors derive their strength from finding and exploiting new product and market opportunities. Innovation is considered more important than profitability. This means according to Miles, Snow, Meyer, and Coleman (1978) that '*in short, the prospector is effective - it can respond to the demands of tomorrow's world. To the extent that the world of tomorrow is similar to that of today, the prospector cannot maximise profitability because of its inherent inefficiency*'. As the prospector's success depends on developing and maintaining the capacity to identify these opportunities early and quickly. This requires a flexible structure with a low degree of routine work in decentralised units. Communications are lateral as well as vertical. Prospectors are organisations that aggressively seek new market opportunities and are willing to take risks (Harrison and St.John, 1998).

3.3.2.1.3 Analysers

A third strategic type of organisation is identified as that of analysers. They seek the best of both previous strategies. They seek to minimise risk and maximise profit and achieve this by imitation. They follow innovative companies into new products and new markets, but only if these have proven to be viable and profitable. In order to respond quickly to the new opportunities created by the prospectors, the structure must be flexible. But to maintain operating efficiency at the same time requires part of the organisation to consist of high standardisation, routine, and mechanisation. These dual components of the organisational structure accommodate both stability and flexibility. This type of organisation has been characterised by a moderately centralised control with a tight control over current activities and a looser control over new undertakings. Analysers are organisations that attempt to maintain existing market positions while still locating conservative growth opportunities (Harrison and St John, 1998).

3.3.2.1.4 Reactors

The fourth residual strategic type of organisational culture is called reactors. The reactors are those who have failed to commit themselves to one of the other three strategies, or do so very poorly and inconsistently. Reasons for this may include management's failure to make clear which strategy to pursue, an inappropriate organisational structure, or management's failure to adapt to dramatic changes in its operating environment. Reactors are organisations with no distinct strategy except to respond to environmental situations (Harrison and St John, 1998)

The strategies identified by Miles and Snow (1978) were called defender (type 1), prospector (type 2), analyser (type 3), and reactor (type 4), and the organisations investigated were in such diverse industries as textbook publishers, electronics, food-processing, plastics, semiconductors, automotive, banks, and air transport. The last two are service organisations as is the ferry industry. The study on air transport was conducted in the USA before deregulation. It was found that the 'reactor' was not a stable type, unlike the other three, but that it merely reflected a company in a state of change or temporary confusion, hopefully before settling into one of the other types. Therefore prospectors, analysers and defenders are the types of interest in the longer run. At a general level the three types react differently to changes in the environment to achieve growth.

The Miles and Snow classification illustrates two fundamentally different positions with respect to, among other things, growth (Harrison and St.John, 1998). Of the two extremes prospectors aggressively pursue growth, while defenders tend to pursue stability. Organisations labelled analysers and reactors are somewhere between these two extremes. Attitude toward growth is critical in guiding the allocating of the organisation's resources and also affects any change in mission or scope of the organisation over time.

Growth can be achieved through internal options or through external options. Internal options are market penetration, market development and product development. External options (or diversification) are horizontal integration, vertical integration (forward or backward), joint ventures or strategic alliances, and related or unrelated mergers and acquisitions. The combination of corporate culture type and preferred growth strategy can best be illustrated by their position on Ansoff's product/market growth matrix (see figure 3-2).

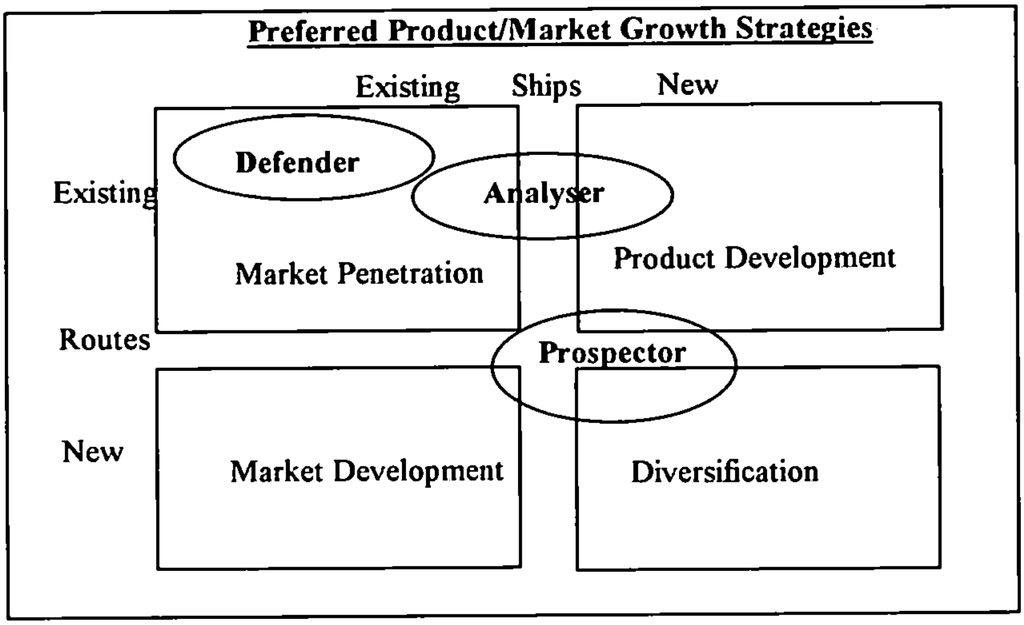


Figure 3-2 Preferred product /market growth strategies
Source: Ansoff, 1968 and McDaniel & Kolari, 1987 (Diagram by author)

Figure 3-2, which for the purpose of this study modifies Ansoff's matrix for ferry shipping (substituting markets for routes and products for ships), shows that defenders concentrate on market penetration, that analysers employ a combination of market penetration and product development, and that prospectors have as their main strategies a combination of market development, product development, and diversification. A reactor has no clearly defined corporate culture and therefore the resulting strategies are not consistent or are at best one of retrenchment. A reactor is unlikely to remain in that position for long and as such is not interesting as a type for further investigation in this study.

3.3.2.2 Porter's classification

Porter (1980) based another classification of a strategy on competitive advantage. He identified three strategies: cost leadership, differentiation, and focus.

3.3.2.2.1 Cost leadership

When a company sets out to be the low cost producer in its industry it must produce a good or service that is comparable to that of its rivals. Typical means to achieve and maintain cost leadership are economies of scale, efficiency of operations, technological innovation, low cost labour, and preferential access to raw materials. To achieve cost leadership the organisation requires a highly complex, highly formalised, tightly controlled and centralised structure.

3.3.2.2.2 Differentiation

A differentiation strategy, where a firm seeks to be unique in its industry, could be based on a high quality, extraordinary service, innovative design, technological capability, or an unusual, positive brand image. The key attribute must be significantly different from comparable competitors to justify a higher price to allow for the cost of differentiation. This strategy is best served with a highly flexible, low complexity, informal decentralised organisational structure.

These two strategies, cost leadership and differentiation, seek to achieve a competitive advantage in a broad range of industry segments.

3.3.2.2.3 Focus

The third strategy of Porter, focus strategy, aims a cost advantage (cost focus) or differentiation advantage (differentiation focus) in a narrow segment of the market. A segment or group of segments will be selected, based on e.g. product variety, distribution channel, geographical area, or customer type, and the strategy will concentrate on serving these segments to the exclusion of others. The organisational structure required depends on the focus selected. The strategy based on cost focus demands the same structure as cost leadership, and that based on differentiation focus requires an identical structure as a differentiation strategy. Organisations that are unable to gain advantage by one of these strategies have been described as '*stuck in the middle*' and no specific organisational structure has been identified (see for example: Govindarajan, 1986; Dess and Davis, 1988; Miller, 1988).

3.3.2.3 Handy's types of culture

Handy (1976) building on earlier work (Harrison, 1972) developed an alternative classification of organisations based on cultural differences.

Handy's four types of culture		
Culture type	Structure	Work division
Power or club	Web	Function or product
Role	Greek temple	Function
Task	Net	Function and product
Person or existential	Cluster	Individual(s)

Table 3-6 Handy's four types of culture
Source: Handy (1976)

3.3.2.4 Miller's framework

Miller (1986, 1987) introduced a strategic framework composed of four dimensions - innovation, marketing differentiation, breadth, and cost control - that integrates the work of Chandler (1962), Miles and Snow (1978) and Porter (1980). An innovation strategy seeks to understand and manage more products, customer types, technologies and markets. A strategy of market differentiation seeks to understand and cater to customer preferences. Breadth may be divided in breadth-innovation and breadth-stability, but both strategies seek to select the right range of products (goods and services), customer and territory each with their respective emphasis. A strategy based on cost control seeks to produce standardised goods and services efficiently. Table 3-7 shows the predicted structural characteristics of an organisation in relation to Miller's dimensions.

Miller's Integrative Framework					
Strategy	Structure				
	Formalisation	Centralisation	Complexity	Co-ordination	Flexibility
Market differentiation	High	Low	High	*	*
Breadth-innovation	Low	Low	High	*	*
Breadth-stability	High	High	High	*	*
Innovation	Low	Low	*	High	High
Cost control	High	High	*	*	*
Note: * indicates that no structural characteristic has been described by Miller (1987) under this heading					

Table 3-7 Miller's Integrative Framework

Source: Miller (1987)

3.3.3 Changing corporate culture, strategy and structure.

The culture of an organisation may be in need of change for any one of a number of reasons. The potential of changing the culture is affected by the strength and history of the existing culture, how well the culture is understood, the personality and the beliefs of the strategic leader, the current organisational structure, and the extent of the strategic need. Lewin (1947) contends that there are three important stages in the process of change: unfreezing existing behaviour, changing attitudes and behaviour and refreezing the new behaviour as accepted common practice. The classic work on the relationship between an organisation's strategy and its structure was undertaken by Chandler (1962). He concluded, after having studied the organisational development of almost a hundred firms from 1909 to 1959, that changes in the corporate strategy preceded and led to changes in the structure of that organisation. Drucker (1974) and Tosi (1984) both confirm these findings by stating respectively that '*any work on structure must start with objectives and strategy*' and '*once the goals of the organisation have been determined, then the development of structure clearly follows in a logical fashion*'. Other elements that play a role in the organisational structure are the age of the company, the capital / labour ratio and the lag factor (Miller, 1987). A starting venture has a better opportunity to tailor its structure to the strategic requirements than a mature business organisation with a settled culture with firmly embedded rules and policies. If the capital / labour ratio is low (labour intensive) changes can be introduced and implemented more rapidly. The level of competition influences the time lapse (lag) allowed by management before structural changes are introduced after a strategy change requires them to do so (see also: Segal, 1974; Miles et al., 1978; Miles and Snow, 1978; Mintzberg, 1979; Booms and Bitner, 1981; Grönroos, 1983b; Egelhoff, 1988).

3.3.4 Corporate culture and strategy creation

The essential cultural characteristics will dictate the preferred model of strategy creation in an organisation. Evidence of all the models is likely to be present to some degree. Miles and Snow (1978) developed a typology of organisations based on values and objectives and in table 3-8 it has been linked by Thompson (1997) to the visionary, planning and adaptive/incremental modes of strategy creation identified by Mintzberg (1973). Defenders, prospectors and analysers are all seen as positive organisations; reactors must adopt one of the other dominant styles or they will suffer long-term decline. Strategy formulation (creation) can result from planning (formal planning which examines a range of options for achieving strategic objectives) and vision (visionary leadership which focuses the organisation's resources on seizing opportunities).

Miles and Snow typologies and preferred mode of strategy creation			
Type	Characteristic	Mode of Strategy Creation	Example
Defender	Conservative beliefs Low-risk strategies Secure markets Concentration on narrow segments Considerable expertise in narrow areas of specialism Preference for well tried resolutions to problems Little search for anything really 'new' Attention given to improving efficiency to present operations	Planning	GEC
Prospector	Innovative Looking to break new ground High-risk strategies Search for new opportunities Can create change and uncertainty, forcing a response from competitors More attention given to market changes than to improving internal efficiency	Visionary	Sony
Analyser	Two aspects: stable and changing Stable: formal structures and search for efficiencies Changing: competitors monitored and strategies amended as promising ideas seen (followers)	Planning Incremental	M&S
Reactor	Characterised by an ability to respond effectively to change pressures Adjustment are therefore forced on the firm in order to avert crises	Adaptive	IBM

Table 3-8 Miles and Snow typologies and preferred mode of strategy creation
Source: Thompson, 1997

However, on implementation companies may abandon the intended strategy or change it incrementally as a reaction to environmental changes. In addition companies make adaptive changes to realised strategies as a result of learning and adjusting to environmental changes. According to Mintzberg (1987) *'strategies can form as well as be formulated'*. A realised strategy can emerge in response to an evolving situation, or it can be brought about deliberately through a process of formulation followed by implementation. But when these planned intentions do not produce the desired actions, organisations are left with unrealised strategies. Mintzberg (1987) calls strategies that appear without clear intentions - or in spite of them - emergent strategies, and states that purely deliberate strategy precludes learning once the strategy is formulated; emergent strategy fosters it (Mintzberg and Waters, 1985).

Marketing strategy elements as characterised by empirical research to linked corporate cultures			
Marketing strategy elements	**Corporate culture type**		
	Defender	**Prospector**	**Analyser**
Product (development of new)	Low	High	Moderate - high
Diversification	Low	Moderate	Moderate
Horizontal integration	Low	Moderate - high	Moderate
Marketing research	Low	Moderate	Moderate
Place (importance of location)	Moderate	Moderate	Moderate
Target market (size)	Narrow	Broad	Mixed
Product / market growth	Market penetration	Market development Product development Diversification	Market penetration Product development
Customer information system	Moderate	High	High
Extent of environmental scanning	Low	High	High
Overall marketing influence	Low	High - moderate	High
Price (importance of)	High	High	High
Product mix breadth	Narrow	Broad	Changing
Decision making	Centralised	Decentralised	Both
Promotion (general type)	Non-personal	Personal	Both
Backward integration	High, mixed	Low, mixed	not identified
Customer satisfaction emphasis	High	Moderate	
Customer service level provided	High	Moderate - low	
Forward integration	High	Low	
Product quality	High	Low - moderate	

Table 3-9 Corporate culture types and their marketing strategies

Source: McDaniel & Kolari, 1987

Not just the corporate culture types differ, but the marketing strategy elements differ also. Table 3-9 shows the different corporate culture types and marketing strategy elements associated with each other in more detail.

The Miles and Snow model is called the 'adaptation model' as it contends that the major thrust of strategic management should be the alignment of the organisational activities with key dimensions of the organisation's environment (Aldag & Stearns, 1991). In contrast to this, Porter (1980) developed the 'competitive model' of organisational strategy, which contends that the nature and the degree of competition in an industry determine the strategy that is appropriate for managers to formulate and implement.

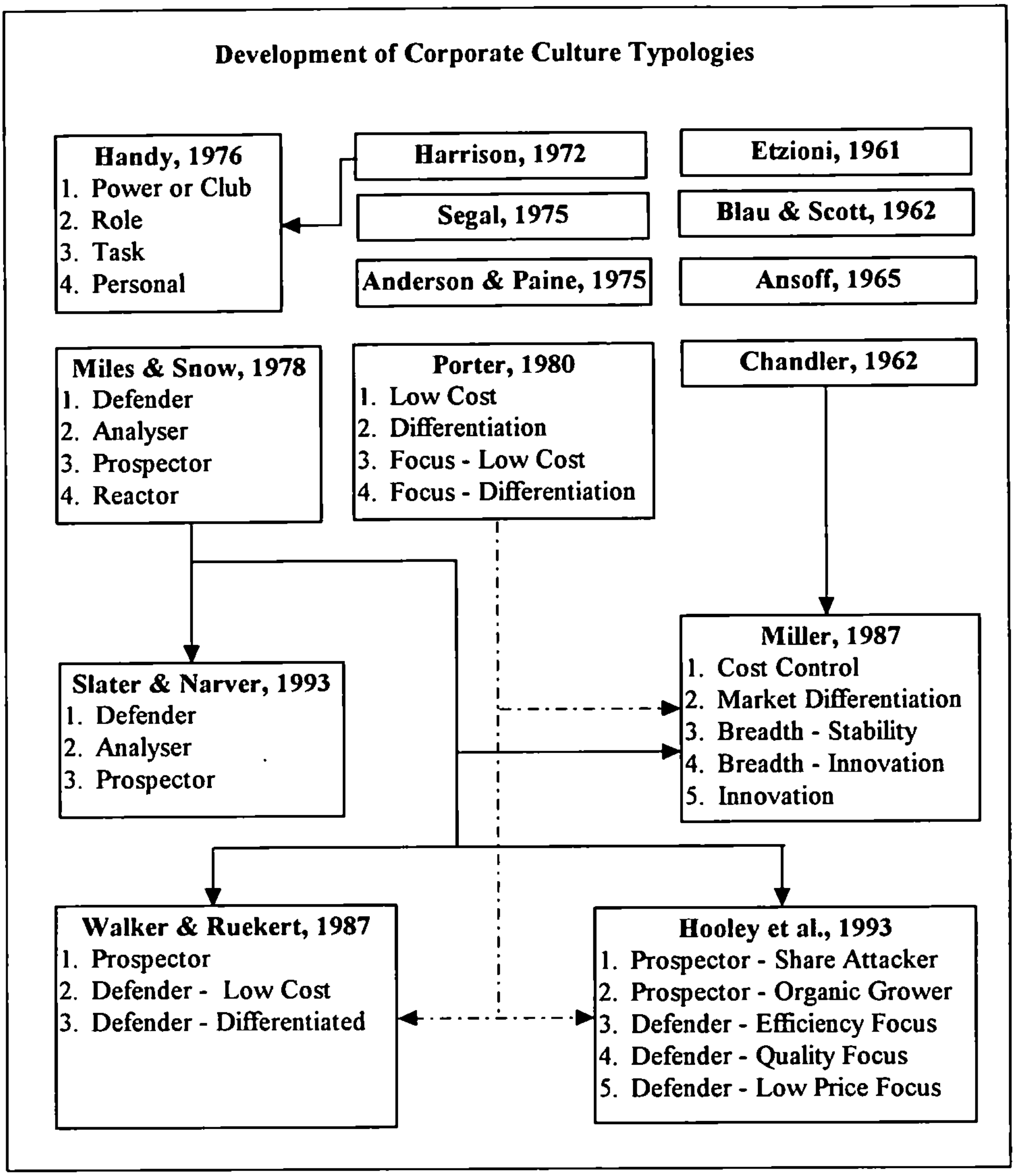


Figure 3-3 Development of corporate culture typologies
Source: the author

In identifying strategic types of corporate culture two main approaches may be adopted. The first approach, termed a priori, identifies strategic types based on a theoretical, conceptual model and is then tested using empirical data. Porter's classification is an example of this approach. The second approach, called post-hoc, identifies types through pattern searching within empirical data, as is the case with the Miles and Snow approach.

The post-hoc approach appears to be more extensive in empirical work to identify typologies which exist in particular industries (see for example Cool & Schendel, 1987, 1988; and McKee et al., 1989) and across industries (Douglas and Rhee, 1989; Hooley, Lynch and Jobber, 1992; Hooley, Beracs and Kolos, 1993). It was concluded that the post-hoc approach to corporate culture adopted in this research therefore also requires the application of the Miles and Snow approach. This is discussed in more detail in section 3.4.

3.4 Summary

The literature review in this chapter provides the theoretical basis for the study of the ferry service offer, the key groups of elements of which can be seen as the core ferry service offer and the augmented ferry service offer. It also provides the theoretical basis for application of corporate culture models using the Miles and Snow typologies (defender, reactor, analyser, and prospector). This theoretical underpinning for the research may supported by appropriate empirical evidence from a variety of researchers into different industries. Of special relevance to this study is part of a study of ferry services undertaken by Matear (1991), in particular those elements which concentrate on benefits sought by ferry users. Such benefits, as Cowell (1982) identified, make up the service concept. Corporate management decisions are made regarding the service offer (service form, service elements, and service level) and the service delivery system (people, process, physical evidence).

The current study concentrates specifically on the 'product' aspect of the ferry service offer, which can be investigated by applying the concepts of the core and augmented service offer, derived from various authors (see tables 3-3, 3-4, and 3-5), and discussed in detail in this chapter. This service offer classification will be used as the basis for the development of a conceptual model in chapter 4.

Corporate decision making is assumed to be influenced by the dominant corporate culture. Based on the analysis in this chapter of the different types of corporate culture described in theoretical and empirical research, it would appear that the Miles and Snow typology, which identifies the way an organisation changes its products in alignment with the environment, provides the best basis for further development.

The classification of corporate strategies, based on Porter's model, was initially considered and indeed has been applied in a paper published by the author in relation to the UK ferry market (Heijveld and Gray, 1996a - see appendix). However, it was ultimately not considered appropriate for the current study, because of its emphasis on the nature and degree of competition and the need to establish these strategies a-priori. In fact Porter's classification can be seen as normative whereas Miles and Snow's classification can be seen as explanatory.

Miles and Snow argue that, as well as being a classification, their typology can be used to explain behaviour (Miles and Snow, 1978, 1984, 1986; Snow and Hambrick, 1980; Snow and Hrebeniak, 1980; Hambrick, 1983; McDaniel and Kolari, 1987; Walker and Ruekert, 1987; McKee, Varadarajan and Pride, 1989; Hooley et al, 1992, 1993; Slater and Narver, 1993; Thompson, 1997). It is this combination of classification and explanatory capability of the Miles and Snow typologies which more fully meets the requirements of this research. The reasons for not including the cultural classifications of Handy (1976) as shown in table 3-6 or Miller's (1987) integrative framework as shown in table 3-7 are that both concentrate on organisational structure, the focus of which is outside the scope of this study. Furthermore, to the best of the author's knowledge, no empirical academic research on the basis of these classifications has been undertaken.

The next chapter applies key theoretical concepts of this chapter to the practical world of the UK ferry industry, described in chapter 2, to develop an appropriate conceptual model to form the basis of the empirical enquiry of this research.

Chapter 4

Conceptual model development

4. Conceptual Model Development.

4.1 Introduction

Central to this chapter is the conceptual model. The use of models has been described as:

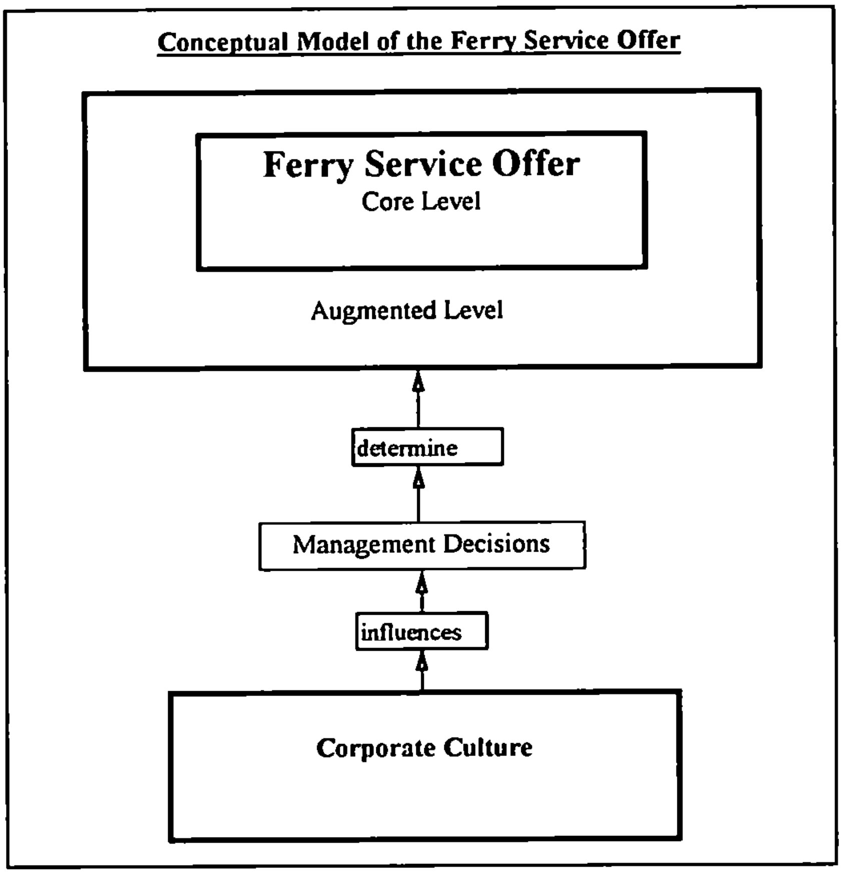
> 'Models are undeniably beautiful, and a man may justly be proud to be seen in their company. But they have their hidden vices. The question is, after all, not only whether they are good to look at, but whether we can live happily with them' (Kaplan, 1973)

and as:

> 'Models have become widely accepted as a means for studying complex phenomena. A model is a substitute for some real equipment or system. The value of a model arises from its improving understanding of obscure behaviour characteristics more effectively than could be done by observing the real system. A model, compared to the real system it represents can yield information at lower cost. Knowledge can be obtained more quickly and for conditions not observable in real life' (Forrester, 1961)

Models (see Loomba, 1978) can be classified according to criterion (such as: purpose, degree of abstraction, behaviour characteristics, degree of certainty, form or structure, and procedure or method of solution) and category (such as: descriptive, explanatory, predictive, physical, graphic, schematic, mathematical, static, linear, certainty, analytical, and simulation). A concept (see also chapter 5, section 3) is defined as: 'an abstract idea', 'the conjuction of all the characteristic features of something', and 'a theoretical construct within some theory' (Collins, 1986).

The conceptual model of the 'ferry service offer' (shown in figure 4-1) comprises the ferry service offer which is the practical result of management decisions by the service providers at two levels. The first level is the core ferry service offer, which needs to be provided simply to satisfy the core needs identified. The second level is the augmented ferry service offer, which comprises those service offering elements in addition to the core ferry service offer and are the result of a reaction of management towards changes in the environment. The way of reacting to changes in the environment, as identified by Miles and Snow (1978), which include different customer expectations and changes in technical developments, is mainly influenced by the prevailing and distinct corporate culture of these providers and results in changes in the total ferry service offer by different augmentations.



Source: Author

Figure 4-1 The conceptual model of the ferry service offer.

Chapter 2 explained that the UK ferry industry, as a whole, provides a service offer that appears to be identical in terms of the individual components of the total service. In general, the aim of the service providers is to satisfy ferry customer needs, which at both the core and the augmented level comprise the different stages of the service as experienced by any ferry user. These stages are the main service elements of pre-booking, booking, access, port of departure, sea voyage, port of arrival, exit, and after-sales (see figure 4-2). Access and exit describe the components of the ferry service offer in terms of road and rail infrastructure enabling ferry passengers to reach the ferry terminals, by means of private or public transport, to and from and in the ferry ports. The ferry terminals, in the ports of departure and arrival, vary from the most simple to the very sophisticated and are operated by different organisations, as is the case with the ferry ports. The ferry crossing or sea voyage is the most evident feature of the overall service with different routes and operators. In addition to these physical provisions there is also the less tangible system of reservations (which includes promotion of the ferry service offer), bookings, and after-sales.

The providers of goods and services, at these various stages, are not always the same organisations but could be one or more of the following in a variety of combinations: the ferry operator, the port operator, the port authority, local -, regional -, or national government, or an independent third party, e.g. as operator of the ferry terminal restaurants.

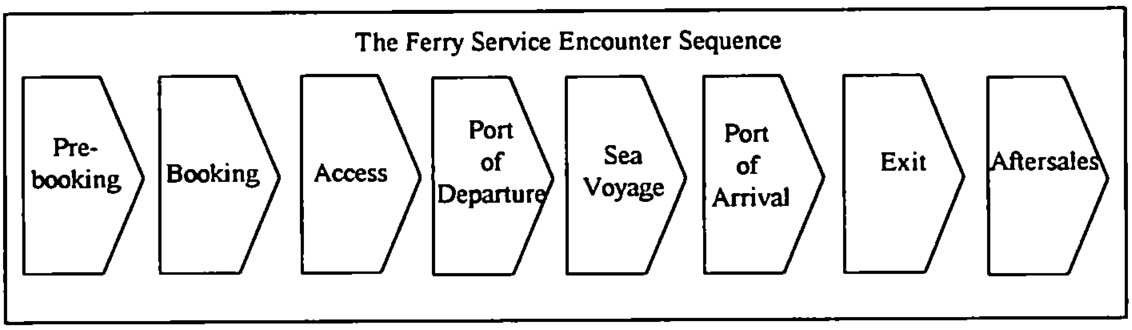


Figure 4-2 The ferry service encounter
Source: Adapted from Zeithaml & Bitter (1996), Matear (1991)

Figure 4-2 shows the application of the service encounter sequences as adapted from Zeithaml and Bitner (1996). The service encounter sequence can be defined both by the provider of the service and by the consumer of the service (customer). Ideally the two definitions should match each other closely. In practice this is not always the case, in particular when the consumer sees the 'product' in far wider terms than the provider or providers. For example, a customer wishing to undertake a ferry crossing is likely to view the 'whole' of the service encounter as described in figure 4-2 as the ferry service offer, whereas the ferry operator's interest and involvement may only be concentrated on some of the components of the offer.

Zeithaml and Bitner (1996) identify two provider gaps, gap 1 and 2, and two customer gaps, gap 3 and 4 (see figure 4-3).

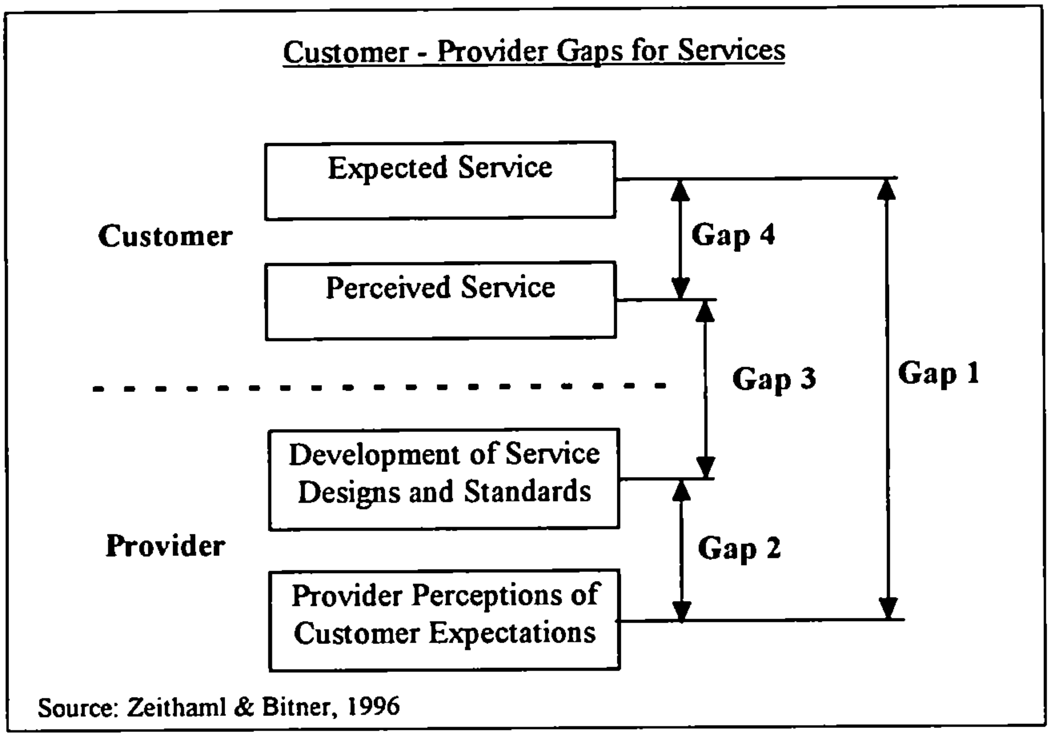


Figure 4-3 Customer - Provider gaps for services

Gap 1 is the difference between customer expectations and the provider perceptions of these customer expectations. Despite a genuine interest in meeting customer expectations, companies may miss the mark by thinking inside out - they believe what the customers *should* want and deliver this rather than finding out what they *do* want. In the ferry industry marketing research is undertaken by an independent market research organisation working for the collective benefit of the ferry operators through, for example, the Passenger Shipping Association. It is also undertaken in-house by the ferry operators and ports (related to the author by several ferry service providers). The results of this research plays an increasingly large part in the development of marketing strategies as evidenced by

Matear (1991), IRN (1993), Crimmin (1993), and Laine (1994). Nevertheless, the key factors which determine the size of this gap are related to inadequate use of marketing research, lack of interaction between management and customers and insufficient communication between management and contact employees. Gap 2 is the difference between the development of (customer-driven) service designs and standards and the company perception of consumer expectations. The key factors relating to the service standards are inadequate standardisation of service behaviour and actions, absence of formal process for setting service quality goals, and lack of customer defined standards. Gap 3 is the difference between the service provided and the perception of the customer of the service. Gap 4 is the difference between the expected service and the perceived service.

Customer expectations of service levels, as described in section 3.2.4, range from abstract to concrete. As was seen in figure 3-2, the general concepts, dimensions and attributes (levels 1, 2 and 3) are central in this study, whereas level 4 specific action or behaviour of the service offer, where concrete standards can be set and diagnostic capability is high, is outside the scope of this study. The Matear (1991) survey has resulted into the establishment of what can be labelled the (Irish Sea) ferry passengers' expected service. Matear's (1991) study was based on responses of 3,244 completed face-to-face interviews of passengers on board of ferries operating between Stranraer and Larne (1,256 respondents), between Holyhead and Dun-Laoghaire (1,265 respondents), and between Fishguard and Rosslare (723 respondents). The elements which were considered part of the 'expected ferry service offer' also form, where relevant, the basis of the postal survey in this study (see questionnaire in appendix B), which ensures that responses from the providers of the ferry service are based, where relevant, on the same elements as the ferry customer respondents in Matear's survey. The validity and the reliability of the ferry service elements included in the questionnaire were tested and found to be good, see table 7-2. For further analysis it was found useful to recategorize the ferry service offer elements, not as a sequential experience of the ferry customer, but functionally under the headings of ferry route, ferry, ferry port terminal, and infrastructure. Some of the sequential elements are identical or similar. For example, under the heading ferry port terminal, the port of arrival is also the port of departure for the reverse journey. The infrastructure comprises the tangible elements of ferry port terminal road / rail access and exit and the intangible elements of pre-booking, booking, and after-sales. The reason for this recategorisation is because of the perception of the target research respondents, who are the providers of the various parts of the total ferry service offer. Whereas the ferry customer may or may not distinguish between these functional parts of the total ferry service offer, the providers will certainly see the service from their viewpoint, which is defined by the role or function they perform.

From this modified ferry service encounter sequence, based on customers expectations, the main questionnaire is derived (see appendix B). The headings used for the first part of this questionnaire are 'facilities at port of arrival / departure', 'facilities during ferry crossing', 'pre-booking', 'booking', and 'access/exit'. A further specification of ferry service elements under these headings is derived from Matear (1991) and discussions with ferry service providers (see Gray, Heijveld and Joint, 1995) as described in chapter 3. A detailed explanation of the data required in the questionnaire can be found in chapter 5.

In chapter 3 relevant underlying theoretical concepts associated with the ferry service offer were identified. In this chapter, relevant concepts will be applied to the research topic.

4.2 Management decisions of ferry service offer providers.

Management decisions regarding the exact nature of the ferry service offer are made by the providers of the ferry service. They decide, independently and jointly, which specific service offer is going to be provided. These providers can be divided into three groups: the ferry companies, which provide the vessel and produce the sea crossing; the ferry port organisations (operators, authorities and private third parties), whose physical geographical location and installed port infrastructure enable the embarkation and disembarkation of passengers and cars; and the (local, regional, and national) governments which provide the political framework of support. In some cases a single organisation may occupy more than one ferry provider role (e.g. a ferry company could also operate the port, or a ferry company could be government owned or financed).

The ferry companies which operate services from the United Kingdom are in the main European ferry operators, some of which are UK based and others are based in Ireland, Norway, Sweden, Denmark, Germany, the Netherlands, Belgium, Greece and France. The ferry ports can also be divided in UK ports and non-UK ports; as shown in chapter 2 (table 2-2: International routes).

The levels of government can be divided in local, regional, and national government (and increasingly the European government). For this study the local government is often represented by the port authority and the political support provided for it. This sometimes translates in reality into specific grants and subsidies, but mostly in the physical provision of port access and exit infrastructure (for both ferry user and ferry service provider) as part of local development plans. These local plans often are part of regional plans. Regional authorities, however, often face the problem of having responsibility of two or more ports within their region, all of which may be interested in maintaining or developing ferry services. As opposed to local authorities, whose ferry service objectives are conveniently narrowly focused, the objectives of regional governments in providing ferry services require the setting of priorities in favour and in support of specific ports from a range under their control. The national and European government influence the ferry service offer in terms of policy decisions (such as on competition and cabotage) and pass legislation directly concerned with the safe operation of ferry services. The scope of this study does not include a detailed investigation of the role of the national and European government and it is assumed that all the providers of the ferry service offer comply with existing legislation. Therefore the governments of interest are the local ones (represented also by the ports) and the regional ones, in their role as ferry service providers.

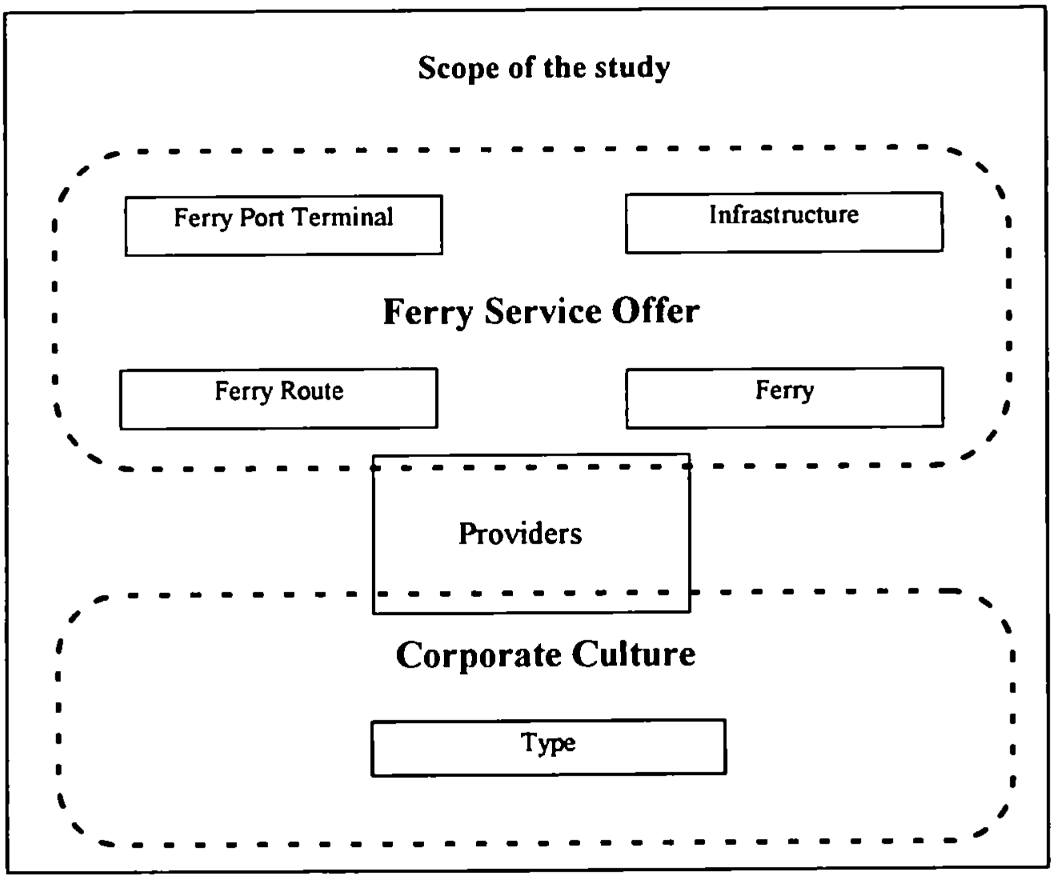


Figure 4-4 Scope of the study
Source: Author

The scope of study, see figure 4-2, comprises the ferry service offer, which has been divided in the ferry, the ferry route, the ferry port terminal, and the infrastructure, and the type of corporate culture of the ferry service providers.

4.3 Formulation of research hypotheses.

The objective of this study was given at the beginning of chapter 1. The subsequent practical description of the UK ferry industry in chapter 2, and the theoretical review in chapter 3 have determined that these objectives may be achieved by focusing on the core and feasible augmentations of the ferry service offer and the reasons for them. The conceptual model and its underlying principles enable the development of the research hypotheses for this study. The first one is:

H1.: There is a core level in the ferry service offer which must be provided by all service providers, irrespective of any changes in the environment. This core ferry service offer is similar for all ferry services and comprises the minimal acceptable service elements.

In addition to this core level, there are other elements of the ferry service offer, which may or may not be provided. It would seem reasonable to assume that the benefits the organisation offers (the service offer) are based on the benefits sought by the customer (Cowell, 1984). In reality there may be a variety of reasons, such as the service provider ignoring or being unaware of particular consumer needs, shortage of finance, unsuitable employees, or unavailable equipment. Any of these make it possible for the management of a ferry service not to offer goods and services based on consumer benefits sought (or customer expectations) only. In this case the service offer would not be based on the consumer benefits sought alone, but on the company's attitude towards the customers and its strategy and tactics in achieving the objectives of the company.

As discussed in chapter 3, this concept of describing *how things are done* in a particular company relates to the corporate culture (Deal and Kennedy, 1982). So it can be argued that the additions to the core service offer are determined by the corporate culture. The augmented service offer (the offer is additional to the core ferry service offer) may be explained by the type of corporate culture of the service providers (Miles and Snow, 1978). This leads to the formulation of the second hypothesis:

H2: The core service offer is augmented, depending on the ferry service provider's reaction to changes in the environment, and is influenced by the dominant corporate culture type of the service provider.

The approach adopted in this work does not tackle consumer expectations directly. Direct studies of consumer expectations are important, as knowledge of them is essential in providing the right service, but it is management decisions based on these expectations which will directly cause any similarities and differences in service offerings. The work assumes that the type of corporate culture determines the reaction of the service providers to all changes in environment, including customer expectations. By adopting this approach the study does not attempt to look directly at consumer expectations as an input into the decision model. Instead, consumer expectations and all other factors are 'filtered' through the decision making process of the providers. In adopting this approach, it is not implied that direct studies of ferry customers are without value, simply that they are beyond the scope of the research. Nevertheless, results of such studies are referred to and made use of in this work.

The conceptual model (figure 4-1) and the scope of the study (figure 4-2) provide the framework for the formulation of the research hypotheses presented in this chapter. In the next chapter the hypotheses are operationalised (i.e. the required specific data to test them is identified) so that the subsequent empirical work can be undertaken.

Chapter 5

Operationalisation of the conceptual model

5. Operationalisation of the conceptual model.

5.1 Introduction

The conceptual model developed in chapter 4 has resulted in the formulation of research hypotheses. The testing of these hypotheses is now the main objective of this study. To test these hypotheses the model has to be operationalised. The conceptual model is operationalised by identifying the data required, by establishing methods of collecting this specific data, by actually collecting the data, by analysing the data, by obtaining results from the analysis, and by drawing conclusions on the validity of the formulated hypotheses.

This chapter concentrates on the data required, data measurement and the data collection. Chapter 6 concentrates on the analytical methodology. In chapter 7 the results from the analysis will be presented, and chapter 8 contains the conclusions.

To test the hypotheses developed in the conceptual model it will be necessary to design an appropriate research instrument. The research design is the framework or plan for a study used as a guide in collecting and analysing data, and ensures that the study will be relevant to the problem.

Research designs can be divided in exploratory (emphasis on discoveries and insights), descriptive (emphasis on determining the frequency with which something occurs or the relationship between variables and is typically guided by an initial hypothesis), and causal research (concerned with cause and effect relationships).

The design of this instrument comprises the data needs, data measurement, data collection, and the validity of the research instrument.

The study concentrates on the providers of the ferry services from the United Kingdom and aims to determine a precise definition of the ferry service offer. The data needed will cover a wide range of variables, of both a quantitative and a qualitative nature.

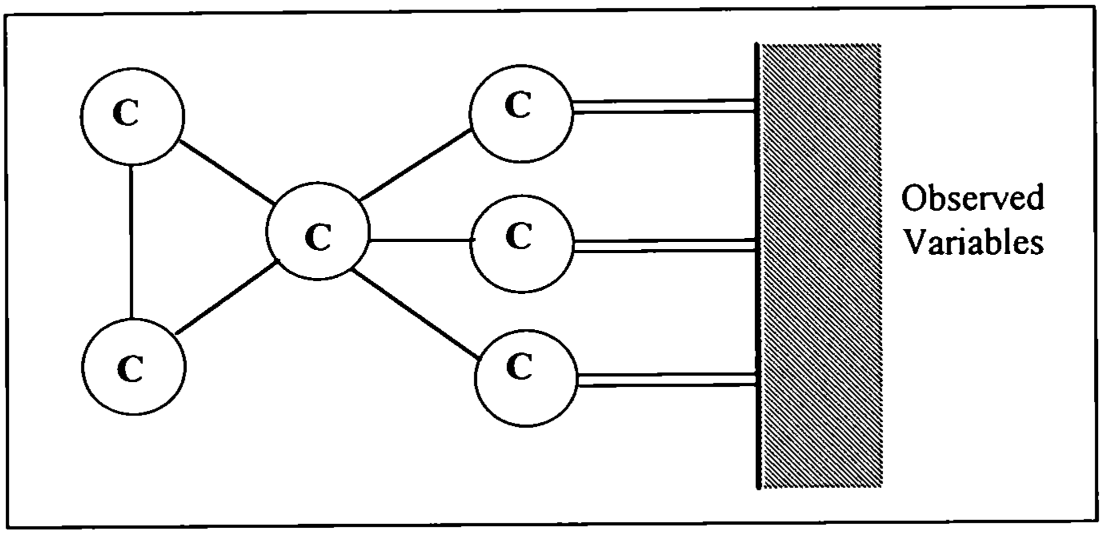
5.2 Data requirements.

The data required to operationalise the conceptual model can be divided in data relating to the ferry service offer and data relating to the corporate culture. Data required for the corporate culture consists of that to identify the *type* of corporate culture. Data required to analyse the ferry service offer needs to be divided into data relating to the *ferry route*, the *ferry*, the *ferry port terminal*, and the *infrastructure* which includes: pre-booking, booking, road and rail access/exit and after-sales. Profile data to describe the respondents personally and their corporation is also required. The reason for collecting personal data is to establish whether their professional and academic profile justifies them to be qualified as 'expert' respondents. The corporate profile enables data comparison based on these facts and the corporate culture type. Figure 5-2 shows the main headings of the data required for the conceptual model.

The required data of type of corporate culture, ferry route, ferry, ferry port terminal, and infrastructure describes the hypothetical constructs, however, it does not measure the constructs of corporate culture and ferry service offer directly, and this factor is now addressed.

5.3 Data measurement.

Measurement is defined as 'rules for assigning numbers to objects to represent quantities of attributes' (Churchill, 1991). In figure 5-1 the essence of the measurement problem is shown. In order to explain phenomena theories are used. The theories or models consist of constructs (a circle labelled C), and the constructs are linked by single lines and represent constitutional or conceptual definitions. Conceptual definitions define a construct in terms of other constructs in the set. The definition may take the form of an equation that precisely expresses the relationship of the construct to other constructs, such as in physics and chemistry, or it may only be imprecisely stated, as is usually the case out of necessity in the social sciences.



Source: Churchill , 1991

Figure 5-1 The structure of science and the problems of measurement

Some constructs are linked to observed variables by double lines. These double lines represent operational definitions. An operational definition describes how the construct is to be measured. It specifies the activities that must be completed in order to assign a value to the construct. A conceptual definition logically precedes an operational definition and guides its development. In order to establish whether a relationship exists among the constructs of the model, some of the constructs must be related to observable data, as a conceptual model which cannot be supported or refuted by empirical data is not legitimately considered a theory. For example, a study by Gaski and Etzel (1986) shows the measurement of concepts, such as product quality, price and advertising, in terms of the sum of responses on a number of specific items, such as 'I am satisfied with most products I buy', 'Most prices are fair', and 'I enjoy most ads', each measured on a five point agree-disagree scale.

5.4 Levels of measurement.

Measurement is the assignment of numbers or codes to observations (Norusis, 1988) and levels of measurement are distinguished by ordering and distance properties. The basic typology of measurement scales was listed by Stevens (1946). He identified the nominal, ordinal, interval and ratio classification of levels of measurement. The level of measurement determines the appropriate statistical technique for data analysis.

5.4.1 Nominal measurement.

The nominal level of measurement assumes no relationship between values. Each value serves merely as a label or name for a distinct category. For example the name of a ferry and the names of the ports for a particular ferry route are nominal variables. As the numbers assigned to these variables are merely identifiers, none of the properties of numbers for further analysis, such as addition and multiplication, can be applied.

5.4.2 Ordinal measurement.

The ordinal level of measurement can be achieved when ranking or ordering of variables according to some criterion is possible. For example, cabins on board of a ferry may be classified according to the level of comfort and added facilities by assigning numbers to the cabin types. Allocating the number one to a basic cabin and the number three to a luxury one results in an ordering of these types of cabins and enables immediate comparison by concluding that a cabin classified as '3' is better than one classified as '1'. It does not, however, tell whether the luxury cabin is three times better, as ordinal measurement does not specify any distance value between categories of variables.

5.4.3 Interval measurement.

Interval measurements have the property of meaningful distances between values based on an arbitrarily determined zero-point. If one were to determine the level of comfort among ferry passengers during a particular crossing in the bar, shop, cinema and restaurant by measuring the ambient temperature, then, by finding that both the bar and the restaurant were 18° C, the shop 24° C, and the cinema 12° C, it could be concluded that the difference in ambient temperature between the shop and the bar, and between the restaurant and the cinema was exactly the same (6° C). However, since there is no inherent zero-point (0° C is not the absence of temperature, but the temperature of melting ice under an ambient air pressure of 1 bar), it cannot be concluded that the shop is twice as 'hot' as the cinema. For statistical analysis, however, the existence of a zero-point is seldom critical.

5.4.4 Ratio measurement.

Ratio measurements have a meaningful zero-point, and the same ordering and distance properties of an interval scale. This means that ratio comparisons between measurements can be made. For example a high-speed ferry operating at a speed of 40 knots travels twice as fast as a conventional ferry operating at a speed of 20 knots. Statistical analysis of ratio variables means that, since ratio measurements satisfy all the properties of the real number system, any appropriate technique can be applied.

5.5 Measurement model.

An appropriate measurement model requires to address the problems concerned with measurement. This includes answering questions such as: 'What do the observed measurements really measure ?', 'In what way and how well can one measure the kind of things that need to be measured ?', and 'How can validities and reliabilities of the measures be expressed ?'

5.6 Validity and reliability of the research instrument.

The validity of a measuring instrument is described as 'the extent to which differences in scores on it reflect true differences among individuals on the characteristic we seek to measure, rather than constant or random errors' (Selltiz, Wrightsman, and Cook, 1976). While it is the aim of the researcher to generate responses that truly describe the concepts accurately, it is not always possible to achieve, because of errors. A constant error, or systematic error, affects the measurement in a constant way, for example calculating the tonnage of a ferry by using an inaccurate formula. A random error affects the measurement in an irregular way, for instance different rounding of (more or less decimals) by different people calculating the tonnage of a ferry with the right formula, will give different values for the same characteristics (the tonnage has not changed). Any measurement instrument or scale that measures accurately what it was intended to measure is said to have validity. Validity cannot be established with full certainty, but is always inferred. There are two types of inferences used in establishing the validity of a research instrument. The first one is direct assessment of validity, and the second one is indirect assessment of validity by means of using tests of reliability.

5.6.1 Direct assessment of validity.

Direct assessment techniques of validity comprise pragmatic validity, concurrent validity, content validity, and construct validity.

5.6.1.1 Pragmatic validity

Pragmatic validity, sometimes called predictive or criterion-related validity, is the accuracy with which the result of the respondents (criterion variable) predicts a future behaviour (predictor variable). An example is to predict the success of a new ferry route based on the current satisfaction score of existing passengers on similar routes.

5.6.1.2 Concurrent validity

Concurrent validity, another type of pragmatic validity, measures the relationship between the predictor variable and the criterion variable when both are determined at the same time. An example is to establish whether existing ferry passengers are satisfied with the current service. Both pragmatic and concurrent validity are determined by the correlation between the measuring instrument and the characteristic or behaviour being measured. The higher the correlation, the better the validity.

5.6.1.3 Content validity

Content validity, or face validity, is the adequacy with which the measure captures the domain of the characteristic. As this is a matter of personal judgement, it can never be guaranteed. By using the right procedures to develop the research instrument, criticism in regards to the appropriate domain can be minimised. In this study the appropriate domain of the concepts to be measured has been established by analysing how others have defined these concepts as was shown by the literature review (chapter 3). Further to these definitions the list of number of items has been expanded by including a range of questions related to the specific topics. Most of these were included as a result of various meetings and other contacts with ferry service providers.

5.6.1.4 Construct validity

Construct validity is the assessment of internal consistency and how well the research instrument captures the concept, trait, or construct it is supposed to be measuring. This means that each item in the instrument must reflect the construct and must also show a correlation with other items in the instrument (Peter, 1981). If the concept or construct exists, it should also be measurable by other independent methods, but as they all are measuring the same construct, a high level of correlation should exist among them. This confirmation of the existence of a construct as determined by the correlations of independent measures is called convergent validity. In contrast, discriminant validity provides evidence of construct validity by measuring low or negative correlation with measures from which the concept is supposed to differ. One way of establishing the convergent and discriminant validity of a measure is by means of the multitrait-multimethod matrix of Campbell and Fiske (1959); see also: Schmitt, Coyle & Saari (1977) , and Schwab (1980). A test based on internal consistency most commonly used (for reliability) is Cronbach's alpha (see for first use of Cronbach's alpha in this study and a detailed explanation section 7.2.2. in chapter 7; for further reading see Cronbach, 1951).

5.6.2 Indirect assessment of validity by means of reliability.

Reliability is the obtaining of similar results provided by independent, but comparable, measures of the same object, trait or construct (Churchill, 1991). Evaluation of reliability consists of determining how much of the variation in scores is the result of inconsistencies in measurement (Peter, 1979). Reliability, however, does not mean that a measure is valid. For example when it is decided to measure the capacity of passenger car ferries by using different formulae, and the results of these calculations are similar, then the measures are reliable. However, if instead of metres, the calculators, by mistake used yards, the measures would not be valid. Evidence of reliability, therefore does not determine validity, but when a measure is valid it is also reliable.

Evidence of the reliability of a measure can be obtained by measuring the same objects or individuals at two different points in time and then correlating the scores. This test, known as stability, is also known as test-retest reliability assessment. This study offers no scope for such a test.

Evidence of the reliability of a measure can also be obtained by equivalence. The equivalence measure of reliability focuses on the internal consistency of the set of items forming the scale. Reliability analysis comprises the following methods: the split-half reliability model (resulting in the Guttman split half coefficient, or the Spearman-Brown coefficient), Cronbach's alpha, the strictly parallel, and the parallel model (Norusis, 1993).

In this study, looking at the conceptual model in figure 4.1. and the scope of the study (figure 4-2), both the ferry service offer and the corporate culture can be seen as 'latent' variables; as they represent concepts which cannot readily be described and measured. They can however, be described by a number of observed variables or a number of other latent variables determined by specific observed variables. These observed variables can be measured physically (size of ferry in metres or number of passenger cabins) or in the form of stated opinions. For this study the variables (latent and observable) required to describe the ferry service offer have been identified in figure 5-2 and are listed in detail in tables 5-1 to 5-13 . Data regarding the return of questionnaires to identify specific characteristics of the respondents, labelled individual and corporate profile, are shown in detail in tables 5-14 and 5-15 respectively. The perceived corporate culture of the respondents is identified in a separate questionnaire. The description of these Miles & Snow types of corporate culture are listed in appendix C.

Data required for this study

Ferry Service Offer

5-1	importance of on-board facilities and services
5-2	preferred providers of on-board facilities and services
5-3	importance of ferry terminal facilities and services
5-4	preferred provider of ferry terminal facilities and services
5-5	importance of infrastructure
5-6	preferred provider of infrastructure

Providers

5-13	individual profile
5-14	corporate profile

Corporate Culture

5-7	importance of target customers
5-8	price base for ferry terminal tariffs
5-9	importance of reasons for growth
5-10	importance of environmental factors
5-11	competition
5-12	commitment
5-13	Miles & Snow corporate culture type

Figure 5-2 Data required for this study

5.7 Data required for identification of the ferry service offer.

Data required to measure the ferry service offer (see figure 5-2) is divided under a number of different headings, which consist of expressions of opinion as stated by the providers of the ferry service offer (or parts of that offer), of observed or calculated variables, of a combination of these variables, and of facts. The following headings have been identified and are shown in separate tables. They are the importance of on-board facilities and services (table 5-1), the preferred providers of on-board facilities and services (table 5-2), the importance of ferry terminal facilities and services (table 5-3), the preferred providers of ferry terminal facilities and services (table 5-4), the importance and preferred providers of infrastructure (table 5-5 and table 5-6), the target customers considered important (table 5-7), the price base for ferry terminal tariffs (table 5-8), reasons for growth and their importance (table 5-9), the importance of environmental factors (table 5-10), competitors - rivalry among existing operators (table 5-11), commitment (table 5-12), and the data required for the Miles and Snow corporate culture type (table 5-13).

5.7.1 On-board facilities and services.

The existence of on-board facilities and services has been identified as data required to describe the ferry service offer (see table 5-1).

Variables required for analysis of Ferry Service Offer Latent variable: Importance of on-board facilities and services		
Described by	Measured by	
	Level	Level description
Importance of cinema		
Importance of swimming pool		1. Very important
Importance of spa / health club		2. Important
Importance of casino	ordinal	3. Neutral
Importance of bar		4. Unimportant
Importance of shop		5. Very unimportant
Importance of restaurant		

Table 5-1 Data required for ferry service offer: importance of on-board facilities and services

In order to determine whether a company perceives some of these elements as important or not a five-point ratings scale ranging from 'very important' to 'very unimportant' is required to collect these opinions. The main reason for selecting a five-point scale is that it has been advocated as being appropriate by several researchers (see also: Lehmann and Hulbert, 1972; Matell and Jacoby, 1972; and Green and Rao, 1970) These opinions express the corporate attitude towards these facilities and services provided on board, and therefore is assumed to be a measure of the corporate culture of these providers. Tables 5-1 and 5-2 show the importance and preferred provider of cinema, swimming pool, spa/health club, casino, bar, shop, and restaurant.

Variables required for analysis of Ferry Service Offer Latent variable: Preferred provider of on-board facilities and services		
Described by	Measured by	
	Level	Level description
Provider of cinema	nominal	1. Port authority 2. Port operator 3. Ferry operator 4. Government 5. Independent 3rd party 6. Combination of providers
Provider of swimming pool		
Provider of spa / health club		
Provider of casino		
Provider of bar		
Provider of shop		
Provider of restaurant		

Table 5-2 Data required for ferry service offer: preferred provider of on-board facilities and services

5.7.2 Port terminal facilities and services

Variables required for analysis of Ferry Service Offer Latent variable: Importance of ferry terminal facilities and services		
Described by	Measured by	
	Levels	Level description
Terminal buildings	ordinal	1. Very important 2. Important 3. Neutral 4. Unimportant 5. Very unimportant
Terminal waiting area		
Security		
Baggage handling		
Restaurants		
Cafeteria		
Linkspans		
Special facilities for children		
Special facilities for disabled		
Special facilities for business travellers		
Special facilities for lorry drivers		
Special facilities for motorists		

Table 5-3 Data required for ferry service offer: importance of ferry terminal facilities and services

Data required for ferry terminal facilities and services in terms of perceived importance by the providers and their preference for whom should provide these ferry service elements are shown in tables 5-3 and 5-4.

Variables required for analysis of Ferry Service Offer Latent variable: Preferred provider of ferry terminal facilities and services		
Described by	Measured by	
	Levels	Level description
Terminal buildings	nominal	1. Port authority 2. Port operator 3. Ferry operator 4. Government 5. Independent 3rd party 6. Combination of providers
Terminal waiting area		
Security		
Baggage handling		
Restaurants		
Cafeteria		
Linkspans		
Special facilities for children		
Special facilities for disabled		
Special facilities for business travellers		
Special facilities for lorry drivers		
Special facilities for motorists		

Table 5-4 Data required for ferry service offer: preferred provider of ferry terminal facilities and services

5.7.3 Infrastructure

Variables required for analysis of Ferry Service Offer Latent variable: Importance of infrastructure		
Described by	Measured by	
	Levels	Level description
Importance of advertising the service	ordinal	1. Very important 2. Important 3. Neutral 4. Unimportant 5. Very unimportant
Importance of providing route information		
Importance of taking reservations		
Importance of issuing tickets		
Importance of keeping passenger / cargo lists		
Importance of road links to/from the ferry terminal		
Importance of rail links to/from the ferry terminal		
Importance of bus services to/from the terminal		
Importance of signposting to/from the terminal		

Table 5-5 Data required for ferry service offer: importance of infrastructure

The service elements identified as part of the infrastructure of the ferry service comprise advertising the service, provision of route information, taking reservations, issuing tickets, keeping passenger and cargo lists, the road links to and from the terminal, the rail links, bus services and the signposting. The stated importance of the elements and the preference of the providers of these aspects of the service is the data required for infrastructure as can be seen in tables 5-5 and 5-6.

Variables required for analysis of Ferry Service Offer Latent variable: Preferred provider of infrastructure		
Described by	Measured by	
	Levels	Level description
Provider of advertising the service	nominal	1. Port authority 2. Port operator 3. Ferry operator 4. Government 5. Independent 3rd party 6. Combination of providers
Provider of route information		
Provider taking reservations		
Provider of issuing tickets		
Provider of keeping passenger/cargo lists		
Provider of road links to/from the terminal		
Provider of rail links to/from the terminal		
Provider of bus services to/from the terminal		
Provider of signposting to/from the terminal		

Table 5-6 Data required for ferry service offer: preferred provider of infrastructure

5.8 Data required for the identification of corporate culture

The way a company sees itself, its customers, its competitors, the environment, and other providers of the total ferry service is largely influenced by the dominant corporate culture. Data required (see section 5.2) for the corporate culture comprises target market, price base for ferry terminals, reasons for growth, external environmental factors, competition, and commitment.

5.8.1 Target market

The target market, comprising the target customers, is of critical importance for decisions on the ferry service offer provided. The perception of providers in order of importance is the data required. Table 5-7 lists the target customers. They can for practical reasons be divided in passengers and freight. The passenger market comprises independent holiday makers, package tour holiday makers, business travellers, students, day trippers or short stay passengers, coaches, and mini cruise passengers. The freight market is represented by driver accompanied lorries, unaccompanied trailers, and livestock / animal transport. The latter has been a matter of considerable attention in the UK, attracting protesters to stop the trade of live calves and sheep to the Continent. These protest have resulted in some ferry operators refusing to carry live animals on board their ferries.

<table>
<tr><th colspan="3">Variables required for analysis of corporate culture
Latent variable: Importance of target customers</th></tr>
<tr><th rowspan="2">Described by</th><th colspan="2">Measured by</th></tr>
<tr><th>Levels</th><th>Level Description</th></tr>
<tr><td>Independent holiday makers</td><td rowspan="10">ordinal</td><td rowspan="10">1. Very important
2. Important
3. Neutral
4. Unimportant
5. Very unimportant</td></tr>
<tr><td>Package tour holiday makers</td></tr>
<tr><td>Business travellers</td></tr>
<tr><td>Students</td></tr>
<tr><td>Day trippers (short stay)</td></tr>
<tr><td>Mini cruise passengers</td></tr>
<tr><td>Driver accompanied lorries</td></tr>
<tr><td>Unaccompanied trailers</td></tr>
<tr><td>Coaches</td></tr>
<tr><td>Livestock / animal transport</td></tr>
</table>

Table 5-7 Data required for corporate culture: target customers

5.8.2 Pricing of ferry terminals

<table>
<tr><th colspan="3">Variables required for analysis of corporate culture
Latent variable: Price base used by ports for ferry terminals</th></tr>
<tr><th rowspan="2">Described by</th><th colspan="2">Measured by</th></tr>
<tr><th>Levels</th><th>Level Description</th></tr>
<tr><td>Marine charges (pilots, tugs)</td><td rowspan="5">nominal</td><td rowspan="5">1 = Yes; 0 = No</td></tr>
<tr><td>Berthing / quays</td></tr>
<tr><td>Vehicles</td></tr>
<tr><td>Passengers</td></tr>
<tr><td>Others (specified)</td></tr>
</table>

Table 5-8 Data required for corporate culture: port (ferry terminal) pricing

Port tariffs are levied on a range of criteria. Data required to assess whether ports currently use any one or more of these criteria for charging ferry operators when calling at their ports is listed in table 5.-8. The criteria specified are marine charges (tugs and pilots), berthing, quays, vehicles carried, passengers carried, other charges to be specified by respondent.

5.8.3 Reasons for growth.

The market orientation in terms of growth is largely determined by the prevailing culture at the providing company. The importance of these factors as perceived by the various providers, therefore, is the data required to measure this construct. Table 5-9 shows the elements identified.

Variables required for analysis of corporate culture Latent variable: Importance of reasons for growth		
Described by	Measured by	
	Levels	Level Description
Diversification	ordinal	1. Very important 2. Important 3. Neutral 4. Unimportant 5. Very unimportant
Underutilisation of existing capacity		
Public relations		
Increasing profit		
Increasing employment		
Others (specified)		

Table 5-9 Data required for corporate culture: importance of reasons for growth

5.8.4 External environment

The factors identified as the external environment (legal - economic, social - cultural, political - legal, technological, and natural) are largely outside the control and influence of decision makers. However the perception of the providers of the ferry service as to how important they are is data which needs to be collected. The degree of importance will reflect the corporate culture towards these environmental factors. Table 5-10 shows these factors.

Variables required for analysis of corporate culture Latent variable: Importance external environmental factors		
Described by	Measured by	
	Level	Level description
Financial / economic environment	ordinal	1. Very important 2. Important 3. Neutral 4. Unimportant 5. Very unimportant
Social / cultural environment		
Political / legal environment		
Technological environment		
Natural factors		
Other environmental factors		

Table 5-10 Data required for corporate culture: importance of external environmental factors

5.8.5 Competition.

Table 5-11 identifies the data required for determining the attitude of providers in regard to competition. The rivalry among existing ferry operators (see also Porter, 1980) is very important to determine the competitive culture among rival operators.

Variables required for analysis of Corporate Culture Latent variable: Competition		
Described by	Measured by	
	Levels	Level description
Threats of first port / ferry competitor - importance	ordinal	1. Very important 2. Important 3. Neutral 4. Unimportant 5. Very unimportant
Threats of second port / ferry competitor - importance		
Threats of third port / ferry competitor - importance		
Threats of fourth port / ferry competitor - importance		
Prefers one operator only on route	nominal	1 = Yes; 0 = No
Prefers two or more competing operators on route	nominal	1 = Yes; 0 = No
Prefers two or more collaborating operators on route	nominal	1 = Yes; 0 = No
Reasons for competitive mode of operation	nominal	
Most preferred ferry / port operator and reasons why	nominal	
Most preferred ferry / port operator and reasons why	nominal	

Table 5-11 Data required for corporate culture: competition

5.8.6 Commitment.

Variables required for analysis of corporate culture Latent variable: commitment		
Described by	Measured by	
	Levels	Level description
Guaranteed operating period by ferry operator	ordinal	1. Very important 2. Important 3. Neutral 4. Unimportant 5. Very unimportant
Guaranteed schedule by ferry operator		
Financial commitment of ferry operator		
Other commitments by ferry operator		
Priority berthing in port		
Allocation of open space in port		
Financial investments of port		
Allocation of sheds and buildings in port		
Dedicated labour in port		
Other commitments by port operator		

Table 5-12 Data required for corporate culture: commitment

Data required for the commitment sought by providers is shown in table 5-12. It comprises elements such as guaranteed operating period and schedule, financial commitment of the ferry operator and the investments of the ports, priority berthing, and allocation of open space, sheds and warehouses and dedicated labour.

5.8.7 Miles & Snow type

As stated in chapter 3, section 3, corporate culture has been divided in four types by Miles & Snow (1978). They are analyser, prospector, defender, and reactor. Table 5-13 shows the data required.

Variables required for analysis of corporate culture Latent variable: Miles & Snow type		
Described by	Measured by	
	Levels	Level description
Prospector	nominal	1 = type 1
Analyser		2 = type 2
Defender		3 = type 3
Reactor		4 = type 4

Table 5-13 Data required for corporate culture: Miles & Snow type

5.9 Profile data required of the provider of the service.

The profile data (see section 5.2) consists of individual characteristics of the respondent (individual profile) and the corporate characteristics of the organisation in which the respondent works (corporate profile).

5.9.1 Individual profile

The individual profile needs to establish some socio-economic variables of respondents, such as: job title, number of years in that position, number of years with the company, number of years in the industry, nationality, residency, educational background, professional qualifications, and membership of professional organisations. An indication of the respondents' influence on decision making and exposure to direct customer contact against direct employee contact is also required (see table 5-14).

Variables required personal profile of respondent	
Described by	Measurement level
Job description	nominal
Number of years in this position	ratio
Number of years with this organisation	ratio
Number of years in this industry	ratio
Nationality	nominal
Professional and academic qualifications	nominal
Influence on decision making process	ordinal

Table 5-14 Data required for personal profile of respondents

5.9.2 Corporate profile

The data required to develop a corporate profile comprises the name of the organisation, ownership, annual turnover, nationality, and number of employees (full time and part time) and can be seen in table 5-15.

Variables required for corporate profile of respondents			
Described by	Measured by		
	Unit	Level	Level description
Type of ownership		nominal	1 = Public, 2 = Private, 3 = Combination, 4 = Trust
Name of organisation		nominal	
Annual turnover	£	ratio	
Nationality		nominal	
Full time employees	number	ratio	
Part time employees	number	ratio	

Table 5-15 Data required for corporate profile

5.10 Data collection.

From the data requirements and the measurement requirements of the data, it is now possible to determine precisely the secondary and primary data to be collected for this study.

5.10.1 Data sources and response rate.

Sources of the required data for this specific study depend on whether it is classified as secondary data (data which already exists and has been collected, sometimes by others, for a different purpose) or as primary data (which does not exist and will have to be collected specifically for this purpose). Some of the data for this study can be classified as secondary data.

The secondary data comprises all relevant data collected by the author of this research from sources such as academic research studies on UK ferries, ferry company brochures, British Government sources (MMC reports, HMSO) and other statistics, travel/motorist organisation information on ferries (in particular the AA and Which? magazine), from newspapers and trade magazines (in particular ABC World Cruise Guide and Cruise & Ferry Info).

The primary data concentrates on data collected by the researcher from ferry operators, port operators, and regional governments during the period of December 1994 to March 1995 in the form of a postal questionnaire. This study, conducted by the researcher, was an analysis of existing and of potential development of new ferry routes in the Atlantic Arc. The research was funded by the Atlantic Arc Commission (for whom a separate report was prepared on another topic related to ferries) and is therefore restricted to the ferry routes in the Atlantic Arc. The survey is therefore somewhat wider than the requirements of this research, since it includes routes which do not include UK ports.

The selection of potential respondents for this study is based on the definition of the target population which is 'the providers of ferry services in and from the United Kingdom'. This would provide a sampling frame of 23 ferry operators, 23 international ferry ports and 23 minor domestic ferry ports, and 21 regions.

For the Atlantic Arc study the same respondents were identified as the target population, but, because of the different geographical configuration, it extended to Ireland, France, Spain and Portugal and was limited in the UK to the Atlantic Arc regions. This provided a sampling frame of 31 ferry operators and 98 ports providing domestic and international ferry services within the geographical area of 23 regional governments in Ireland, United Kingdom, France, Spain, and Portugal.

Data collection was carried out in the form of a postal questionnaire sent to the target response group. The reason for selecting postal questionnaires, in favour of personal interviews or by telephone, was the perceived advantage of this research instrument over the others for this particular study. The reasons for this are given below.

The first requirement of the data to be collected and to make it suitable for further analysis was the collection of identical data from a wide geographical area. This ruled out personal interviews in terms of time and finance constraints as perceived by the researcher. Contacting the respondents by telephone was not considered feasible. The questionnaire is rather lengthy and would have taken at least 15 to 20 minutes to complete on the phone. Studies on telephone surveys suggest that this is undesirable (see: Czaja, Blair & Sebestik, 1982; O'Rourke & Blair, 1983; and Childers & Skinner, 1985). A postal questionnaire, however, can be completed at one's leisure and a quiet period may be selected by the respondents to complete the questionnaire (Churchill, 1991).

The selection of the questionnaire enabled the use of predesigned questions, which the respondents should be able to answer fairly easily. A great number of questions asked for the opinion of the respondents. A suitable 5-point Likert scale range from very important to very unimportant enabled quick completion of the relevant questions. Open-ended questions were included to allow personal opinions and observations to be made by the respondents for items not covered by the standard questionnaire. The questionnaire was accompanied by a covering letter explaining the purpose of the study and the interest of the researcher. A preferred completion time was indicated (the full questionnaire is shown in appendix B)

There are some problems with postal questionnaires. The response to mailed questionnaires cannot completely be controlled by the researcher and the response rate and quality of response were identified as areas of concern. Techniques for improving these have been widely discussed by Linsky (1965). One of the actions taken by the researcher was to promise anonymity of individual respondents. Futrell & Hise (1982) found that anonymity resulted in a lower item omission rate to sensitive questions, and a main concern in this survey was the sensitive nature of the information required. Indeed one major ferry operator, in particular, explained in a detailed letter the reason for refusing to complete the questionnaire was that they would not risk that these sensitive details were obtained by their competitors and give away their competitive advantage. Therefore the questionnaire was not coded in any way, nor did it contain other means of identification if the respondents or their organisations wished to remain anonymous.

	Primary Data Collection			
	Ferry Companies	Ports	Regions	Total
Sampling frame	23	46	21	90
Respondents	10 - (43.5 %)	13 - (28.3 %)	5 - (23.8 %)	30 - (33.3 %)
Included questionnaires	7 - (30.4 %)	13 - (28.3 %)	4 - (19.0 %)	24 - (26.6 %)

Table 5-16 Primary data collection: sampling frame and response rate.

To facilitate ease of return for the respondent of the completed questionnaire, the respondent was asked to use an enclosed window envelope which showed the return address on the cover of the questionnaire and required no further action than to have it sent to the post room. In spite of this some of the respondents used their own envelopes, often requiring the writing or typing of the return address. Free-post return was considered, but it was argued that since all respondents worked for organisations, with established post-room procedures, the need for doing so was not seen as important.

All respondents were promised a completed report of the study, if they wished to receive one. Research has shown that there is a positive correlation between the offer of the results and the level of response (Dillman, 1978), although Donmeyer (1985) found no such evidence for a range of response characteristics. All respondents who returned a questionnaire, and those who sent letters with comments, but declined for commercial reasons to complete the questionnaire, were sent a report during October 1995. The questionnaire was sent to all ferry operators, port operators and regional governments included in the sampling frame.

Table 5-16 shows the details of the response rates. The sampling frame, which is the total population, is relatively small, since there are not many ferry companies in operation; 23 operating routes which include a UK port. The number of ports is slightly larger, but still relatively small with 46 UK ports considered suitable for ferry operations. There are 21 regions which are officially part of the Atlantic Arc. There are 21 UK regions which cover the 46 UK ports which are relevant for this study. As can be seen from the table the sampling frame for this study was 90. The overall response was 33 % which is above the expected level of mail surveys to organisations. The percentage of providers of ferry services whose questionnaires were included was 30.4 %. The response rate of the ports was similar (28.3 %), but that of the regions was slightly lower (23.8 %). The total percentage of useful questionnaires relevant to this study was 26.6 %. Cox (1966) reported that the pattern for six mail surveys on industrial goods and services (as opposed to consumer surveys) resulted in an average response rate of 28.8 % (this study 33.3 %).

The perception of the importance of the different ferry service elements by providers of the ferry service and who should provide a particular part (or attribute) of the service is well covered by this data. A sample of the questionnaires, one for ports and regional governments and another for the ferry operator are included (see appendix B). The questionnaires share a large amount of common parts and have only been modified to suit their specific business (port or ferry).

5.11 Survey errors.

Much research in social sciences is subject to survey errors and the potential for a number of different types of errors and their associated costs exist (Cox, 1966; Filion, 1975; Selltiz et al., 1976; Assael, 1976; Dillman, 1978; Childers and Skinner, 1985; Groves, 1989; Gill and Johnson, 1991). They comprise coverage errors, from the failure to include a potential respondent in the population; nonresponse errors, from the failure to collect data from all persons in the sample frame; sampling errors, from the heterogeneity on the survey measures among persons in the population; measurement errors, from inaccuracies in responses recorded on the survey instrument, which arise from errors due to respondents inability to answer questions; failure or unwillingness to report the correct answer for psychological reasons; errors due to the weakness in the wording of the questionnaire; and errors due to the mode of data collection (Czaja et al., 1982). Methods to reduce such errors have cost implications for the survey, for example increased sample size. Errors can also be related to each other in practice. For example, Groves (1989) states that reducing nonresponse by aggressively persuading sample persons to co-operate may result in larger measurement errors in the survey data (see also: Linsky, 1975; Futrell and Hise, 1982;

O'Rourke and Blair, 1983, Donmeyer, 1985; Bryman, 1988).

For this study, based in part on a postal survey, the whole question of nonresponse and the possible biases arising therefrom are of particular interest (Ferber, 1948; Filion, 1975). Nonresponse error arises because some persons in the sample frame used by the survey cannot be located or refuse the request of the researcher to complete and return the questionnaire (Luck and Rubin, 1987; Brandt, 1987; Groves, 1989; Bryman and Cramer, 1993).

5.11.1 Nonresponse bias

Nonresponse, together with coverage and sampling errors are the source of errors of nonobservation. Nonresponse bias can be expressed mathematically as:

$$E_{s,t,i,a}\ ((P_{nr})_{stia}\ (y_{stia} - (y_{nr})_{stia}))$$

where $(P_{nr})_{stia}$ = proportion of the sample that is nonrespondent for the s-th sample, t-th trial, i-th set of questionnaires, and the a-th mailing pattern.

and

$(y_{nr})_{stia})$ = mean of true values for those nonrespondents on the s-th sample, t-th trial, i-th set of questionnaires, and the a-th mailing pattern.

Nonresponse rates are often used mistakenly as a measure of quality of the survey statistics (Groves, 1989). Among all nonsampling errors nonresponse rate has captured the attention of many practitioners, because of the ease of measuring the percentage. However, the nonresponse rate is just one component of the error, and does not by itself fully measure the nonresponse error.

Nonresponse error can be described by its two components; the nonresponse rate and the difference between nonrespondents and respondents to the questionnaire. For simple statistics the nonresponse error is a multiplicative function of nonresponse rate and the difference on the statistic between nonrespondents and respondents. The latter term is generally unknown (for mathematical formulae see: Groves, 1989: 156 - 183).

Speculation on whether the nonresponse error increases with the number of nonrespondents depends on whether the group of nonrespondents resembles the respondents, since it could be assumed that if these groups are similar then the results are not affected negatively. Nonresponse as a result of noncontact is a design error made by the researcher. This was not the case in this study as the total population was clearly defined and all potential respondents were identified by name. Of course, nonresponse as a result of failing to complete and return the questionnaire is outside the control of the researcher. Theories of human behaviour may be used to find reasons for the latter and methods to reduce this type of error have been applied based on suggestions from existing literature. Some of the respondents wrote a separate letter explaining the reasons for not participating, such as the fear to reveal corporate strategies or not seeing the benefit of providing this information without any rewards.

Another problem in reporting a detailed breakdown of the characteristics of the nonrespondents is that it may violate the promised confidentiality. This apllies particularly in cases where the small number of respondents in the sample frame means that individual companies may easily be identified by people with knowledge of the industry (Childers and Skinner, 1985). For this reason, a breakdown of the respondents and non-respondents will be given in such a way that it is fairly difficult to identify the respondents, by means of listing a non-obvious heading, for example port of arrival, rather that UK port of origin or a specific route combination. Even if an attempt to identify the respondents is undertaken, it will not be possible for anyone to link the responses, analysis and conclusions to the specific respondents.

5.11.2 Nonresponse of ferry operators

Non-respondents to postal survey by port of arrival and traffic carried in 1994				
Port of Arrival	Passengers	Cars	Buses	Trailers
Ardrossan	2,691	307	.	.
Belfast	26,682	2,508	.	.
Bergen	141,733	15,468	365	3,534
Bilbao	142,838	20,959	.	309
Boulogne	.	.	.	.
Caen	1,140,093	296,913	3,130	82,741
Calais	10,056,309	1,838,524	90,380	480,719
Cherbourg	644,092	188,253	.	12,831
Cherbourg	451,358	112,253	746	88,080
Cork	191,449	52,644	150	5,078
Dublin	32,257	2,914	.	.
Dunkerque	1,693,984	230,233	12,430	97,379
East Cowes	1,041,130	241,236	2,940	39,021
Esbjerg	228,647	28,445	377	.
Esbjerg	53,898	9,170	204	.
Fishbourne	2,363,000	661,000	13,300	110,000
Fleetwood	20,180	60	.	57
Gothenburg	18,661	4,274	81	.
Gourock	668,157	358,069	1,966	10,752
Hamburg	200,597	33,914	364	.
Hamburg	55,621	10,880	80	.
Heysham	257,222	46,531	339	.
Larne	590,373	150,020	1,638	106,499
Le Havre	820,635	225,819	.	128,377
Lerwick	56,389	10,425	47	3,697
Lerwick	11,917	1,830	22	36
Liverpool	107,042	17,169	.	.
Roscoff	529,843	138,696	827	8,082
Rotterdam	597,472	132,059	.	.
Ryde	1,327,000	.	.	.
Santander	176,062	44,168	167	3,695
St Malo	598,380	170,064	600	9,090
St Malo	114,000	30,000	.	.
Stromness	13,738	1,825	3	350
Stromness	131,829	35,393	109	2,832
Vlissingen	195,141	24,195	1,041	13,593
West Cowes	798,049	.	.	.
Weymouth	.	.	.	.
Yarmouth	1,179,000	261,000	3,000	29,000
Zeebrugge	413,563	60,885	.	.
Zeebrugge	248,967	2,102	.	250,587
Zeebrugge	489,143	124,043	1,820	69,114
Total	27,829,142	5,584,248	136,126	1,555,453

Table 5-17 Nonrespondent ferry operators to postal survey

Respondents to postal survey by port of arrival and traffic carried in 1994				
Port of Arrival	Passengers	Cars	Buses	Trailers
Belfast	414,334	87,821	.	.
Boulogne	898,887	131,514	.	.
Calais	1,276,156	239,662	.	.
Calais	6,928,000	1,145,000	56,600	363,800
Cherbourg	581,000	140,300	1,000	14,800
Clyde Services	3,000,000	534,000	6,600	39,200
Dieppe	1,177,000	174,900	4,300	50,500
Dublin	710,764	120,457	4,053	29,705
Dun Laoghaire	1,460,000	254,100	3,400	46,200
Dunkerque	58,000	64,400	.	.
Hoek van Holland	1,177,000	220,700	4,300	100,500
Larne	1,286,000	285,800	3,600	140,600
Ostend	1,547,223	232,035	7,650	154,655
Rosslare	336,026	81,554	2,444	19,317
Rosslare	844,000	158,700	3,500	39,000
Scheveningen	3,473	.	.	85,000
Western Isles	3,200,000	771,000	12,600	74,000
Total	24,897,863	4,641,943	110,047	1,157,277

Table 5-18 Respondents of postal survey

The ferry operators who completed the questionnaires which were included in the analysis can be described in terms of their market share in 1994 of the total UK ferry market. Table 5-17 shows the available route statistics in 1994 of the nonrespondents by port of arrival and table 5-18 shows the reported figures for the respondents (Cruise & Ferry Info, 1995). Comparing the respondents to the nonrespondents results in a market share for passengers in 1994 of 47.2 % for the respondents, 45.4 % of the cars, 44.7 % of the buses, and 42.7 % of the trailers. These statistics could be labelled as a good sample, however, as can be seen from the tables 5-17 and 5-18 the available data is incomplete and therefore gives only an indication of the traffic numbers involved. Another problem is the range of ferry services offered, from the highly frequent (more than hourly) short crossings to the less frequent (less than daily) longer ones and the number of operators to the same destination. So to concentrate on the busiest port of destination, Calais, with 18,260,465 passengers arriving by ferry in 1994 it shows that the respondents represent 44.9 % of the trade.

By taking account of the number of trips the number of passengers, cars, buses, and trailers can be calculated. Table 5-19 shows a comparison between the nonrespondents and the respondents and also shows the combined figures of the traffic per trip.

Comparison of nonrespondent and respondent ferry operators on the basis of the mean of the number of ferry customers per trip (crossing) by mode in 1994				
Ferry Operator	Passengers	Cars	Buses	Trailers
Nonrespondent	362	77	1	19
Respondent	309	63	2	26
Total population	347	73	1	21

Table 5-19 Mean ferry traffic per trip by type of respondent ferry operator

It can be seen from table 5-19 that the differences in mean traffic numbers per trip between the respondents and nonrespondents among the ferry operators is small. It can be argued that the 'experience' of carrying ferry customers of different modes is reasonably balanced between the nonrespondents and the respondent ferry operators. Also, as shown in tables 5-17 and 5-18, the whole spectrum of ferry services and a wide geographical spread of these services is present for both nonrespondents and respondents. From this it could be argued that the results of the analysis are a good representation of the total population of ferry operators. A possible bias on the basis of statistical theory is therefore present, but cannot accurately be calculated. However, on the basis of practical considerations, it is argued that any possible bias based on the nonresponse of ferry operators is unlikely to be large and should not seriously effect the results at this stage of the study. Of course, during the interpretation of the results of the analysis, great care will be taken to explain any significant variations on the basis of the sample of the respondents and nonrespondent ferry operators.

5.11.3 Nonrespondent ports

The comparison of the nonrespondents to the respondents of the ports shows that the total number of passengers carried by nonrespondent ports in 1994 was 32,500,256 this is 61.6 % of the total number of passengers carried (see also table 2-3). The number of cars carried in 1994 by the nonrespondents is 5,670,087 which is 55.4 % of the total, the number of buses carried is 193,076 which is 78.8 % of the total, and the number of trailers carried is 1,819,644 which is 67.0 % of the total. Looking at these absolute figures it follows that the respondent ferry operators represent 38.4 % of the passengers carried in 1994, 44.6 % of the cars, 21.3 % of the buses, and 23.0 % of the trailers. Comparing the port respondents to the ferry operators, this indicates, in absolute numbers, a lower response for passengers (81.2 %), about the same response for cars (98.3 %), slightly less then half the response for buses (48.2 %), and over three quarter of the trailer traffic (77.2 %).

Table 5-20 shows the comparison of the port respondents and nonrespondents on the basis of the average number of ferry customers per trip by mode in 1994. It can be seen that these are fairly similar for each mode and therefore it could be argued that, on the basis of these (mean) traffic figures and the fairly even geographical spread of the port respondents and nonrespondents, it allows the researcher to regard the data collected as fairly representative of the total UK port population.

Comparison of nonrespondent and respondent ferry port organisations on the basis of the mean of the number of ferry customers per trip by mode in 1994				
Port	Passengers	Cars	Buses	Trailers
Nonrespondent	346	68	2	21
Respondent	348	79	1	18
Total population	347	73	1	21

Table 5-20 Mean ferry traffic per trip by type of respondent port

Possible theoretical bias of the results deriving from the nonresponse of ports cannot be calculated at this stage of the study. Practical bias may appear to be negligible as individual port respondents vary among each other in terms of modal split in ferry traffic as much as the nonrespondents.

5.11.4 Nonrespondent governmental regions

The actual numbers of ferry customers by UK governmental region divided in nonrespondents and respondents for the year 1994 by mode are for passengers 44,002,496 and 8,724,509 respectively, 8,130,749 and 2,095,442 for cars, 222,036 and 24,137 for buses, and 2,470,445 and 242,285 for trailers. This shows a nonrespondent / respondent ratio of 0.198 for passengers, a ratio of 0.257 for cars, a ratio of 0.108 for buses, and a ratio of 0.09 for trailers. These figures are not particularly good. However, in providing the actual ferry services the governmental regions are of course the least important group compared to the ferry operators and the ports.

Comparison of nonrespondent and respondent of UK governmental regions on the basis of the mean of the number of ferry customers per trip by mode in 1994				
Region	Passengers	Cars	Buses	Trailers
Nonrespondent	342	72	1	22
Respondent	371	75	1	15
Total population	347	73	1	21

Table 5-21 Mean ferry traffic per trip by type of respondent governmental region

As can be seen in table 5-21 the mean of the number of ferry customers per trip and by mode in 1994 is similar for the nonrespondents and the respondents of the governmental regions. It could be argued that the average respondent has the same exposure to ferry customer needs as the average nonrespondent. This may result in the development of a similar perception of customer expectations in both groups. Therefore no significant differences in opinions between respondents and nonrespondents are likely to exist in the provider perception of ferry customer expectations. The geographical range of the respondent governmental regions however shows a bias towards the West of the UK and a concentration on the extreme South and North (Scotland).

5.11.5 Overall comparison of nonresponse

An overall comparison of the nonrespondents with the respondents in terms of average number of ferry passengers per trip by mode and by provider type can be seen in table 5-22. Table 5-22 shows that some differences exist, and that the mean of ferry customers per trip by modal split of the groups of nonrespondents and respondents do not match exactly the mean of the total population. Theoretically this may lead to some bias of the results. However, as can be seen from table 5-22 the differences are very small in some cases, for example for the port respondents in terms of passenger traffic, to fairly large in others, for example, trailer traffic for the governmental region respondents. In practical terms, however, it could be argued that the respondents, overall, represent the total population fairly well and that the data collected provide a good basis for further analysis. It is, of course, necessary to keep these potential differences in mind during the interpretation of the results of the analysis.

Nonrespondents and respondents average number of ferry customers per trip in 1994 by modal split and provider type				
Mode	Total Population	Provider	Nonrespondents	Respondents
Passengers	347	Ferry operators	362	309
		Ports	.346	348
		Regions	342	371
Cars	73	Ferry operators	77	63
		Ports	68	79
		Regions	72	75
Buses	1	Ferry operators	1	2
		Ports	2	1
		Regions	1	1
Trailers	21	Ferry operators	19	26
		Ports	21	18
		Regions	22	15

Table 5-22 Overall comparison of nonrespondents, respondents and total population

Not just the actual traffic numbers of ferry customers by mode, or the mean of these figures, provide a useful insight into any possible bias, but also the average number of ferry trips per day. Table 5-23 shows the nonrespondents and respondents in terms of total population by provider type. It can be seen that little difference exists among the ferry operators, port and regions for either group of respondents, but that nonrespondents have a slightly higher average (11.7, 11.9, and 11.8 respectively) compared to the respondents.

Comparison of nonrespondents and respondents on the basis of the mean of the average number of trips (ferry crossing) per day by provider in 1994			
Type	Ferry operators	Ports	Regions
Nonrespondent	11.7	11.9	11.8
Respondent	10.8	10.9	9.7
Total population	11.4	11.4	11.4

Table 5-23 Comparison of nonrespondents and respondents trips per day by provider

5.12 Summary

This chapter has described the operationalisation of the conceptual model and has identified the data required for this study. The data collected, by means of a postal questionnaire, is the basis for further analysis described in the next chapter. Various aspects of survey errors, in particular nonresponse, have been investigated and no substantial bias was established.

Chapter 6

Analytical methodology

6. Analytical methodology.

6.1 Introduction

The first step in any process of data analysis requires the undertaking of a *preliminary* data analysis, which gives an initial overview of the data collected and any simple patterns in questions answered or other variables collected. It also shows the missing values. A detailed screening of the data is necessary to identify possible mistakes in the data. This may be the result of errors during data collection, coding or during data input. Further methodologies which describe the data are statistics in the form of measures of central tendency (mode, median, and mean), measures of dispersion (range, variance, and standard deviation), and measures of shape (skewness, and kurtosis). Also useful is graphical representation of the data in the form of histograms, boxplots, line diagrams, and bar charts. If some values are extreme (e.g. ferry route distance), or if the pattern of numbers is unusual (e.g. all answers are the same, such as the preferred provider of bar and restaurant on-board ferries), or if some unexpected variability is noticed (e.g. who should provide the linkspans) then, the reasons why this has occurred should be identified by either returning to the original respondent or data source or by looking at other variables that may explain it.

No single measure is best for all situations, so different measures based on the type of data - nominal, ordinal, interval and ratio, the hypothesis of interest and the properties of the various measures are all to be considered when selecting an index or measure of association (see also Norusis, 1993a; Churchill, 1991, and Luck and Rubin 1987). Following the preliminary analysis (see also: appendices H, I and K) the methodologies to test the hypotheses 1 (ferry service offer) and 2 (corporate culture types) are identified in figure 6-1.

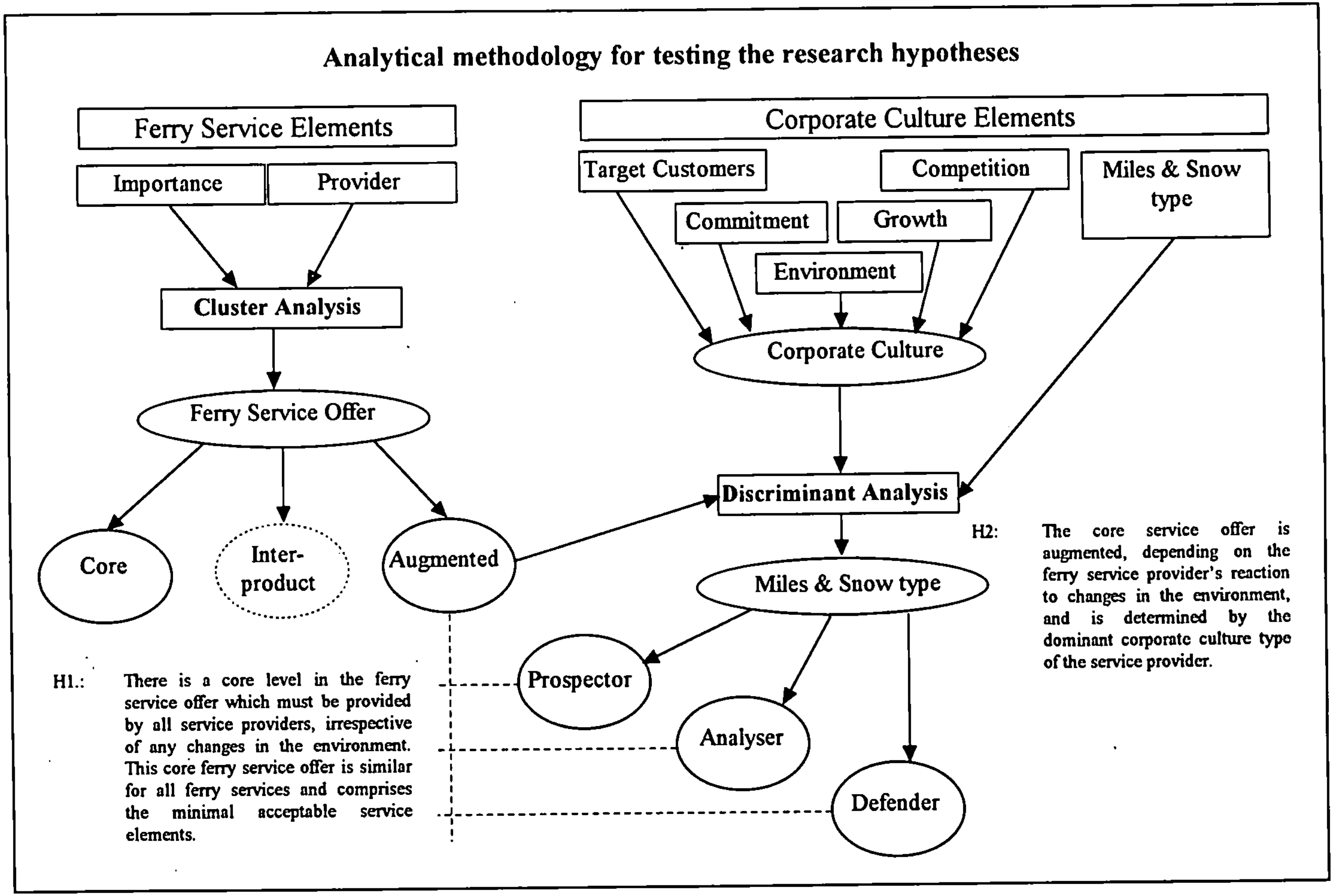


Figure 6-1 Analytical methodology for testing the research hypotheses.

6.2 Ferry Service Offer

The appropriate analytical methods for this research are determined by the objectives of the study and the type of data collected. The objectives of the study are formulated as hypotheses (see chapter 4, section 3). The first hypothesis aims to establish that a core level in the ferry service offer must exist. This means that a specific structure of interrelationships among ferry service elements (variables) is to be identified. This structure (core level and additional levels) is determined by data measured at the ordinal level (importance) and at the nominal level (preferred provider). This would normally require the use of factor analysis (see diagram G-1). However, this methodology also reduces the dimensions of these variables into principal components, something that is not desired in this study, because all dimensions (variables) contribute to describing the existing ferry service offers.

To determine the appropriate relationship among these ferry service elements cluster analysis would be most suitable, as cluster analysis looks for structures among cases or respondents. It is, however, necessary that a transformation of the data is undertaken (making the ferry service elements the 'cases or respondents'), to achieve the objectives. This transformation is achieved by transposing the variables and the cases, which results in the ferry service elements becoming the 'cases or respondents' and the respondents becoming the variables, and at the same time converting the nominal and ordinal (non-metric) measurements into metric (percentages) measurements. The method used to achieve this is cross-tabulation. The input data for the cluster analysis are the results of the crosstabulation (see appendix A) and the output of the cluster analysis is which ferry service elements can be classified as being of core level and which ferry service elements belong to augmented levels of the ferry service offer. It also determines the preferred provider at these different levels.

6.3 Corporate culture types

The second hypothesis requires the determination of the dominant corporate culture of the respondents in order to establish whether it explains any differences in the augmented level of the ferry service offer. The data to determine the dominant corporate level is collected and measured at nominal and ordinal levels (non-metric). So, for this part of the study one dependent variable (the dominant corporate culture) is to be predicted by other independent variables. The dependent variable (the identified Miles and Snow type) which has been collected from respondents, is nominal in measurement level and it is assumed that a linear relationship exists among the independent variables. Therefore the appropriate analytical method is multiple discriminant analysis, because the single dependent variable is multichotomous (defender, analyser, prospecter, reactor) and the independent variables are metric (degree of importance). The result of the discriminant analysis describes the augmented ferry service elements in terms of a particular, dominant Miles and Snow type of corporate culture.

6.4 Summary

This chapter identified the analytical methodology for testing the research hypotheses. In addition to the preliminary analysis, two major techniques are being used: cluster analysis to test the first hypothesis, and multiple discriminant analysis to test the second hypothesis of the study (see figure 6-1). Alternative methods, such as factor analysis (see appendix N) for the first hypothesis, and conjoint analysis (see appendix M) or linear probability models (see appendix O) for the second hypothesis, as shown in figure G-1 in appendix G, were rejected as inappropriate for this study, given the objective, and are not discussed any further. Brief explanations of cluster analysis and multiple discriminant analysis are included in this chapter, and also, in more detail, in the next chapter, when explaining specifically how the analysis is undertaken and the results obtained.

Chapter 7

Analysis of results

7. Analysis of Results.

7.1 Introduction

This work seeks to identify the core and feasible augmentations of the ferry service offer and the reasons for them. In chapter 4 the following two research hypotheses for this study were developed. The first one was:

H1.: There is a core level in the ferry service offer which must be provided by all service providers, irrespective of any changes in the environment. This core ferry service offer is similar for all ferry services and comprises the minimal acceptable service elements.

and the second research hypothesis was:

H2: The core service offer is augmented, depending on the ferry service provider's reaction to changes in the environment, and is influenced by the dominant corporate culture type of the service provider.

The testing of the first hypothesis concentrates on the ferry service offer and testing of the second hypothesis concentrates on both the ferry service offer and the corporate culture. Therefore the analysis will comprise two parts. The first part deals with the various aspects of the ferry service offer (shown in section 7.2). In this part the results of a crosstabulation of the importance of the various service elements as perceived by ferry operators, ports and government respondents and the preferred provider are analysed. The product levels of the ferry service offer are then investigated by means of cluster analysis and the providers of these service levels are identified (section 7.3). The combined importance and preferred provider of ferry service elements are presented in section 7.4. The second part deals with the identification of the dominant corporate culture in terms of Miles and Snow types and consequent analysis; this can be seen in section 7.6. This also includes the description of the augmented ferry service offer, both in terms of importance and provider, and the elements of the corporate profile in terms of the dominant Miles and Snow corporate culture type.

7.2 Ferry service offer

The ferry service offer comprises a large number of ferry service elements, which were introduced in chapter 4 and 5, sections 7.1 , 7.2, and 7.3. In section 7.2.1 these are analysed for their perceived importance and for preferred provider in the form of crosstabulations (see appendix A for full tables).

7.2.1 Ferry service elements

The ferry service elements of interest are those identified in section 5.7. The results of the crosstabulation are reported in full in appendix A. The crosstabulations in appendix A have been divided in four groups, three groups are based on the type of respondent (ferry operator, port, and regional government) and the final group contains the overall scores. Table 7-1 shows a summary of the importance ranking of the respondent groups listed in the crosstabulations (Full details in appendix A).

The ranking in table 7-1 is based on the percentage of respondents classifying an element as important. The highest percentage (100 %) means than all respondents of a particular group considered a particular ferry service element as very important and the element was given the number 1. Ferry service elements with identical percentages are given the same ranking number.

It can be seen from table 7-1 that all respondents, and all groups, perceive linkspans as very important (see also table A-16 in appendix A). This is to be expected, since tidal variations, which can be around 8 metres in some ports, require linkspans to bridge the difference in height between the ramp of the ferry, when lowered, and the level of the pier at the ferry terminal to allow cars and lorries to safely embark and disembark.

Ferry service element ranking of importance (by respondent groups)				
Ferry service elements	Respondent group			
	All	Ferry	Port	Region
Linkspans	1	1	1	1
Advertising	2	1	4	9
Road links	2	3	7	1
Reservations	3	3	1	9
Signposting	4	6	4	5
Issuing tickets	5	3	6	19
Passenger list	6	7	1	19
Route information	7	7	8	9
Restaurants on-board	8	14	9	5
Terminal buildings	9	7	9	19
Bar on-board	10	7	13	9
Shop on-board	11	7	15	5
Bus services	12	16	14	1
Security at terminal	13	7	15	18
Lorry drivers' facilities term	14	13	15	9
Motorists' facilities terminal	14	16	11	9
Rail links	16	18	12	5
Terminal waiting area	17	14	18	9
Disabled facilities at terminal	18	20	19	1
Baggage handling	19	18	20	9
Cafeteria at terminal	20	20	20	22
Business travellers' facilities	21	20	22	22
Children facilities at terminal	21	20	26	9
Cinema on-board	23	20	24	22
Restaurants at terminal	23	20	25	22
Casino on-board	25	20	23	22
Spa - health club on-board	26	20	27	22
Swimming pool on-board	26	20	27	22

Table 7-1 Ferry service elements ranking of importance

Looking at the ranking of all respondents in table 7-1 it can also be seen that the first seven ferry service elements are in the categories of pre-booking (advertising, route information), booking (reservations, issuing tickets, and passenger lists) and access / exit (linkspans, road links and signposting). Of the latter category bus services are ranked as 12 and rail links as

16. The remainder, and ranked less important, are the ferry service elements belonging to the ferry terminal and on-board facilities.

Table 7-1 shows a fair amount of agreement among respondent groups. It is obvious that certain ferry service elements are more important than others, but at which rank a ferry service element can be labelled 'core' and at which 'augmented' ferry service offer cannot be determined from this. Therefore the next stage is to use the same basic information and perform a cluster analysis to determine the 'core' and 'augmented' ferry service elements (see chapter 6 and figure 6-1). To enable a valid cluster analysis the concepts to be measured (constructs) are tested for reliability.

7.2.2 Ferry service offer construct validity

The ferry service offer comprises a number of ferry service elements which have been measured in importance by a scale as developed in chapter 5. To establish whether the concept is adequately captured by the scale requires testing for validity by means of a reliability analysis (see also section 5.6.). Construct validity, or the assessment of internal consistency, is required in order to determine how well the survey data measures the concept of ferry service offer. This is done by means of a test called Cronbach's alpha and the results are shown in table 7-2.

Cronbach's alpha (α) is based on the average correlation of items within a test, if the items are standardised to a standard deviation of 1. The assumption is that the items (importance of ferry service elements) on the scale (to measure the ferry service offer) are positively correlated with each other, because they are measuring the same concept or hypothetical construct (ferry service offer). Therefore α can be interpreted as a correlation coefficient and has ranges between 0 and 1 (1 being a perfect correlation).

Reliability analysis-scale (alpha)
Importance of ferry service elements

Reliability Coefficients 26 items
Alpha = .8337 Standardised item alpha = .8573

Ferry Service Element	Mean	Std Dev	Alpha if FSE deleted *
Advertising the service	1.0000	.0000	
Linkspans at terminal	1.0000	.0000	
Taking reservations	1.0588	.2425	.8305
Issuing tickets	1.0588	.2425	.8305
Road links to/from terminal	1.1176	.3321	.8342
Signposting	1.1176	.3321	.8303
Providing route information	1.2941	.5879	.8293
Keeping pass./cargo lists	1.2941	.5879	.8336
Terminal buildings	1.4118	.7123	.8332
On-board bar	1.4118	.6183	.8243
On-board restaurants	1.4118	.7123	.8229
Terminal motorists facilities	1.5294	.6243	.8257
Terminal security	1.5882	.7952	.8405
On-board shops	1.5882	.8703	.8209
Terminal waiting area	1.6471	.7019	.8322
Bus services to/from terminal	1.7059	.9852	.8249
Terminal lorry drivers facilities	1.7647	1.0914	.8283
Rail links to/from terminal	1.8235	.9510	.8304
Disabled facilities at terminal	1.8235	.6359	.8250
Terminal cafeterias	2.1765	.7276	.8207
Baggage handling	2.3529	1.1695	.8392
Children's facilities at terminal	2.4706	.8745	.8172
Business travellers facilities	2.5882	.8703	.8240
On-board cinema	2.8824	1.2690	.8139
Terminal restaurants	2.9412	1.1440	.8287
On-board casino	3.6471	1.2217	.8378
On-board spa	3.9412	.9663	.8255
On-board swimming pool	4.2353	.8314	.8245

Table 7-2 Reliability of importance of ferry service elements

Note: Coding of mean score in table 7.2.:

1= Very Important, 2=Important, 3=Neutral, 4=Unimportant, 5=Very Unimportant

* Value of Cronbach's Alpha if FSE (ferry service element) is deleted (see explanation in text)

Importance of Ferry Service Element (All respondents in percentages)					
Ferry Service Elements	Importance				
	Very Important	Important	Neutral	Unimportant	Very Unimportant
Linkspans	100.0	.0	.0	.0	.0
Advertising	87.5	12.5	.0	.0	.0
Road links	87.5	12.5	.0	.0	.0
Reservations	86.4	13.6	.0	.0	.0
Signposting	83.3	16.7	.0	.0	.0
Issuing tickets	78.3	21.7	.0	.0	.0
Passenger list	73.9	21.8	4.3	.0	.0
Route information	66.6	29.2	4.2	.0	.0
Restaurants on-board	62.5	20.8	16.7	.0	.0
Terminal buildings	58.4	33.3	8.3	.0	.0
Bar on-board	54.2	29.2	16.6	.0	.0
Shop on-board	54.1	29.2	12.5	4.2	.0
Bus services	52.2	34.8	.0	8.7	4.3
Security at terminal	47.9	34.8	13.0	4.3	.0
Lorry drivers' facilities term	47.6	38.1	14.3	.0	.0
Train links	45.5	27.3	22.7	4.5	.0
Motorists' facilities terminal	47.6	47.6	4.8	.0	.0
Waiting area at terminal	41.7	50.0	8.3	.0	.0
Disabled facilities at terminal	27.3	59.1	13.6	.0	.0
Baggage handling	19.0	42.9	19.0	14.3	4.8
Cafeteria at terminal	9.5	52.4	33.3	4.8	.0
Children facilities at terminal	9.1	45.5	36.3	9.1	.0
Business travellers' facilities	9.1	36.4	40.9	13.6	.0
Cinema on-board	4.8	47.6	28.6	9.5	9.5
Restaurants at terminal	4.8	28.6	33.3	23.8	9.5
Casino on-board	4.3	13.0	26.1	30.5	26.1
Spa - health club on-board	.0	4.8	33.3	33.3	28.6
Swimming pool on-board	.0	.0	28.6	28.6	42.8

Table 7-3 Importance of ferry service elements (all respondents)

In table 7-2 it can be seen that alpha is 0.8337, which means the scale is fairly reliable. The reliability coefficient was calculated for 26 items (ferry service elements), since both advertising the service and linkspans had zero variance, and were therefore excluded from the test. To determine whether the scale can be improved by deleting a particular item the last column in table 7-2 indicates what the score of α would have been if a particular ferry service element is deleted. It can be seen that all values exceed a score of 0.81 and little, if any, improvement can be achieved in reliability by deleting items from the scale. Another value listed in table 7-2 is the standardised item alpha (.8573) which would be obtained if all the items included in the scale would have been standardised to have a variance of 1. (For a more detailed explanation of Cronbach's α and the statistical formula see Norusis, 1993: 147-148). A higher value for Cronbach's α indicates that the scale of the measurement instrument is capturing the concept under investigation better. Therefore the 26 ferry service elements are deemed to measure the ferry service offer very well, so that a cluster analysis can be safely undertaken (Norusis, 1993).

In table 7-3 a summary of all crosstabulations (see appendix A) of the importance of the ferry service as expressed by all respondents is shown. These figures form the basis for the classification of the ferry service offer by means of a hierarchical cluster analysis.

7.2.3 Classification by means of cluster analysis

Cluster analysis is a technique used for combining observations into groups or clusters such that (1) observations in each group are similar to each other, and (2) observations from one group are different from observations of other groups (Sharma, 1996).

The results produced by the hierarchical cluster analysis can best be illustrated by the agglomeration schedule (see table 7-4) and a dendogram (see figure 7-1). The rows in figure 7-1 show the 28 cases which are being clustered. They are identified by their label and sequential number corresponding to their order in the file. The first row shows the ferry service element of 'advertising' of the ferry, and the last row shows 'restaurants at terminal'. The label and associated number are identical in both table 7-4 and figure 7-1, but only appropriate for this particular run of the cluster analysis; the label is user defined, but the number is allocated by the SPSS software, so a change in elements entered could result in the same labels being given different numbers.

Hierarchical Cluster Analysis Agglomeration schedule using average linkage between groups method						
Stage	Clusters combined		Coefficient	Stage cluster 1st appears		Next stage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	1	19	.000000	0	0	2
2	1	16	2.420000	1	0	3
3	1	23	29.926666	2	0	17
4	13	21	31.160000	0	0	10
5	3	22	34.459999	0	0	9
6	11	15	37.860001	0	0	12
7	14	28	52.820000	0	0	20
8	6	8	75.260002	0	0	13
9	3	26	86.959999	5	0	10
10	3	13	128.619995	9	4	14
11	7	24	151.660004	0	0	18
12	11	20	159.419998	6	0	17
13	6	9	176.080002	8	0	15
14	3	27	223.295990	10	0	16
15	5	6	305.953339	0	13	21
16	3	18	319.230011	14	0	19
17	1	11	337.250000	3	12	23
18	7	25	372.549988	11	0	26
19	3	4	388.942841	16	0	24
20	10	14	470.020020	0	7	24
21	2	5	489.210022	0	15	22
22	2	17	660.228027	21	0	26
23	1	12	807.894348	17	0	25
24	3	10	888.241699	19	20	25
25	1	3	2102.377197	23	24	27
26	2	7	2818.975586	22	18	27
27	1	2	5586.364258	25	26	0

Table 7-4 Agglomeration schedule

There are different ways of combining objects (in this case ferry service elements) into clusters. A commonly used method is agglomerative hierarchical cluster analysis, where clusters are formed by grouping cases into a number of growing clusters until all cases are member of one single cluster. (For nonhierarchical clustering methods, see Everitt, 1980). The actual process follows a certain sequence. Before the analysis it is assumed that all cases are separate clusters. At first, two of the case are combined into a single cluster. Next, either a third case is added to this cluster, or two other cases are merged into a new cluster. This process repeats itself; either individual cases are added to existing clusters, or two existing clusters are combined. Once a cluster is formed it cannot be split but only combined with others. The criteria, upon which it is decided which of the cases (or clusters) are combined at each step, are based on a matrix of either distances or similarities between pairs of cases (Norusis, 1993).

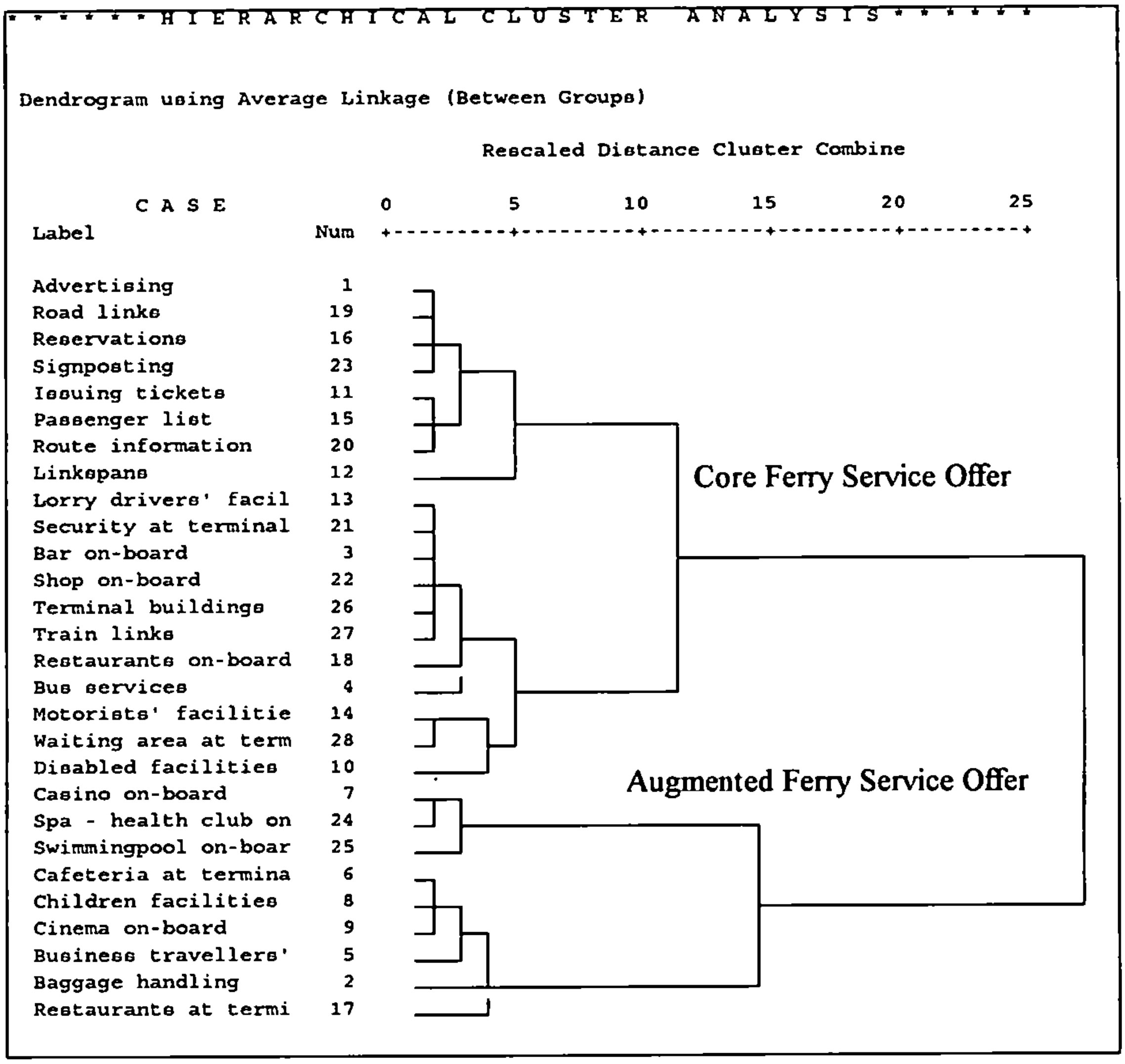


Figure 7-1 Dendogram of importance of ferry service elements.

One of the simplest methods is (1) single linkage or nearest neighbour technique where cases are combined based on the smallest distance or largest similarity between them. Other methods used are (2) the complete linkage method or furthest neighbour technique, where the distance is calculated between the two furthest points, (3) centroid clustering method, where the distance between two clusters is calculated as their means of all variables, (4) the median clustering method, where clusters combined are weighted equally in the computation of the centroid (regardless of the number of cases), and (5) Ward's method, which combines clusters with the smallest increase in the overall sum of the squared within cluster distances. When, instead of distances, other similarity measures are used (such as cosine and Pearson correlation) the criteria for combining are reversed. This means that clusters with large similarities are combined.

For this analysis, however, (6) the between-groups linkage method, also known as the average linkage between groups method is used. This method is different from the others as it uses information about all the pairs of distances and not the nearest or the furthest. Empirical comparisons of the performance of the different clustering algorithms were examined by Punj and Stewart (1983) who found that the average linkage method was more accurate and outperformed other methods in studies undertaken by Cunningham and Ogilvie (1972), Milligan and Isaac (1978), Edelbrock (1979), and Edelbrock and McLaughlin (1980). For this reason the average linkage between groups method has received preference in this study over the others (see also: Dillon & Goldstein 1984, Norusis, 1993; Hair, Anderson, Tatham & Black, 1995, and Sharma, 1996)

The average linkage between groups method, or the UPGMA (unweighted pair-group method using arithmic averages) method, defines the distance between the two clusters as the average of the distances between all pairs of cases in which one member of the pair is from each of the clusters. In the results, see table 7-4, where cases 1, 19, 16 and 23 form one cluster, and 11, 15 and 20 form another cluster, the distance between these two clusters is taken to be the average of the distances between the following pairs of cases: (1,11) (1,15) (1,20), then (19,11) (19,15) (19,20) and so on.

Table 7-4 shows the sequence of the cluster analysis. The first row of the agglomeration schedule shows stage 1 of the 27-stage solution. The cases 1 and 19 (advertising and road links, columns two (*cluster 1*) and three (*cluster* 2) under the heading (*clusters combined*), are the first two cases to be combined into a new cluster.

Clusters of Ferry Service Elements All Respondents (by Importance)						
Ferry Service Element	Number of Clusters					
	2	3	4	5	6	7
Advertising	1	1	1	1	1	1
Issuing tickets	1	1	1	1	1	1
Passenger list	1	1	1	1	1	1
Reservations	1	1	1	1	1	1
Road links	1	1	1	1	1	1
Route information	1	1	1	1	1	1
Signposting	1	1	1	1	1	1
Linkspans	1	1	1	1	6	6
Bar on-board	1	1	3	3	3	3
Bus services	1	1	3	3	3	3
Lorry drivers' facilities terminal	1	1	3	3	3	3
Restaurants on-board	1	1	3	3	3	3
Security at terminal	1	1	3	3	3	3
Shop on-board	1	1	3	3	3	3
Terminal buildings	1	1	3	3	3	3
Train links	1	1	3	3	3	3
Disabled facilities at terminal	1	1	3	5	5	5
Motorists' facilities terminal	1	1	3	5	5	5
Waiting area at terminal	1	1	3	5	5	5
Baggage handling	2	2	2	2	2	2
Business travellers' facilities	2	2	2	2	2	2
Cafeteria at terminal	2	2	2	2	2	2
Children facilities at terminal	2	2	2	2	2	2
Cinema on-board	2	2	2	2	2	2
Restaurants at terminal	2	2	2	2	2	7
Casino on-board	2	3	4	4	4	4
Spa - health club on-board	2	3	4	4	4	4
Swimming pool on-board	2	3	4	4	4	4

Table 7-5 Clusters of ferry service elements

The numbers in these columns refer to cases and clusters. The cluster number is always the same as the number of its earliest case, so the cluster formed by cases 1, 19, 16, and 23 is cluster 1, and the cluster formed cases 11, 15, and 20 is called cluster 11. The column labelled *Coefficient* contains the squared Euclidean distance between all the importance ratings of these two ferry service elements, which indicates the dissimilarity between the clusters being combined at each stage.

Examination of these values will provide a guidance in deciding how many clusters are needed to represent the data. Small coefficients indicate that reasonably similar clusters are being formed. Large coefficients show that very dissimilar cases are combined to form clusters. A relatively large increase in the value of the distance measure between one stage and the next will create a new cluster, for example stage 25 where the distance of 2102.377197 between the clusters 1 and 3 creates the cluster labelled 'core ferry service offer' in figure 7-1 and the distance of 2818.975586 between clusters 2 and 7 creates the cluster labelled 'augmented ferry service offer' in figure 7-1.

The column labelled *Stage cluster 1st appears* shows at which stage a multicase cluster is first formed. For example, looking at the row labelled stage 17 shows that case (cluster) 1 had earlier been part of a merger at stage 3 and the case (cluster) 11 in the *cluster 2* column shows that case 11 was earlier involved in a combination at stage 12. The next stage that cluster 1 will appear at is stage 23 (see column '*Next stage*') in the same way that in stage 12 the '*Next stage*' of cluster 11 is indicated as stage 17.

It is also useful to display the same information about cluster membership in the form of a table (see table 7-5). From this table it can easily be seen to which clusters the various ferry service elements belong in respectively two-, three-, four-, five-, six-, or seven-cluster solutions. This gives a clear indication how similar or different a particular ferry service element is. For example 'linkspans' and 'signposting' are in the same cluster up to, and including, the level at which the ferry service offer is described in five clusters, and therefore are very similar in perceived importance. When describing the ferry service offer in six clusters however, the 'linkspans' element is differentiated from 'signposting' and the other remaining ferry service elements and is in a cluster of its own.

There are many criteria and guidelines which suggest how to select the number of appropriate clusters, although there is no standard, objective selection procedure. The distances between successive stages (as seen in the agglomeration schedule in table 7-4) may serve as a useful guideline (see: Hair et al.: 1995). For instance, choosing to stop when this distance exceeds a specific value or when a sudden increase in the average linkage coefficient occurs, such as from 888 to 2102 in stage 25 of the cluster analysis results in table 7-4.

Hair et al. (1995) suggest that the underlying theoretical concepts may indicate a logical number of clusters. In this study, for example, this could be two clusters, one representing the core service offer, and the other representing the augmented service offer. However, in order not to prejudge the outcome, in the final analysis a number of different cluster solutions have been computed, ranging from two to seven clusters, and the decision which number of clusters to select among the alternative solutions has not only been based on the theoretical foundations, but also includes practical judgement and common sense. Looking at the cluster membership of the ferry service elements in table 7-5 and the dendogram in figure 7-1 suggests the existence of two main clusters, which could be called the core ferry service offer and the augmented ferry service offer.

The reason for identifying one cluster as core and the other as augmented is based on the ferry service elements which comprise each cluster. Those in the 'core' cluster are ferry service elements without which the ferry service offer would be difficult, if not impossible, to provide; for example road links. These elements could be seen as 'must have' in order to provide a ferry service. The ferry service elements in the other cluster are not critical or essential in providing the service logically and therefore are labelled 'augmented'. In table 7-6 the ferry service elements which as a result of the cluster analysis have been identified as core or augmented are listed.

Ferry Service Offer Core and Augmented Ferry Service Elements	
Level	Ferry Service Element
Core	Terminal Buildings Terminal Waiting Area Linkspans Motorists facilities at terminal Advertising Route information Keeping passengers/ cargo lists Making reservations Issuing tickets Restaurant on-board Shop on-board Road links Signposting Disabled facilities at terminal Lorrydriver facilities at terminal Security at terminal Bar on-board Bus services Rail links
Augmented	Business travellers' facilities at terminal Childrens' facilities at terminal Cafeteria at terminal Cinema on-board Baggage handling Restaurant at terminal Casino on-board Spa on-board Swimming pool on-board

Table 7-6 Core and augmented ferry service offer

7.2.3.1 Validation of the clusters

The analytical process as carried out for all respondents is repeated for the three main provider groups in order to validate the initial results. Ideally the validation process attempts to assure that the cluster solution is representative of the general population of UK ferry services considered in this study, and therefore possible to extend to other ferry services, and that it is stable over time. The most direct method (although often not performed because of cost or time constraints) is to obtain different samples of the same population, perform a cluster analysis on each, compare the cluster solutions and assess how they correspond. For this study this approach was not considered appropriate and feasible, mainly because of the small size of the population of respondents. A common approach, however, is to split the sample into two or more groups at random. This approach has been applied for this study and from the sample of all respondents 20 out of the 28 ferry service elements were selected four times at random.

The results in the form of dendograms are shown in appendix L in figures L-1, L-2, L-3 and L-4. The combined results can be seen in table 7-7 and clearly suggest that the categories to which these ferry service elements have been allocated are the correct ones, as they are stable over all of these four random cluster analyses. In addition to these random tests, however, it was considered logical and appropriate for this study to perform a cluster analysis for each of the provider groups - ferry respondents, port respondents, and government regions respondents. Each group is analysed separately and the cluster solutions are compared, the combined results are shown in table 7-9.

Random cluster analysis 1 shows that the 20 randomly selected ferry service elements, as does random cluster analysis 2, random cluster analysis 3, and random cluster analysis 4, are allocated to the same cluster, regardless which of the eight random ferry service elements are not included. It can be concluded that the initial full cluster analysis is sufficiently validated by the results of the four random analyses.

Ferry Service Offer Classification (by random selection of 20 out of 28 service elements)				
Ferry Service Element	Cluster Analysis			
	1	2	3	4
	classified as			
Terminal Buildings	core			core
Signposting		core	core	core
Route information	core	core	core	core
Road links	core	core	core	core
Restaurant on-board	core			core
Reservations		core	core	
Issuing tickets	core	core		
Linkspans	core	core	core	core
Advertising	core		core	core
Keeping passenger/cargo lists	core		core	core
Terminal waiting area	core			core
Shop on-board		core	core	
Security at terminal	core	core		core
Lorrydrivers' fac. terminal	core	core		core
Bar on-board	core	core	core	core
Rail links		core	core	core
Motorist facilities at terminal	core	core		
Disabled facilities at terminal	core	core	core	core
Bus services	core	core	core	core
Children's facilities at terminal			augmented	augmented
Baggage handling	augmented	augmented	augmented	
Swimming pool on-board	augmented	augmented	augmented	
Spa / health club on-board			augmented	augmented
Restaurant at terminal			augmented	augmented
Businesstraveller fac. terminal	augmented	augmented		augmented
Cafeteria at terminal	augmented	augmented	augmented	augmented
Cinema on-board		augmented	augmented	
Casino on-board	augmented	augmented	augmented	augmented

Table 7-7 Core and augmented ferry service offer random classification

7.2.4 The ferry respondents

The basis of the cluster analysis for the ferry respondents is the stated importance of the different ferry service elements. In table L-1 the total for this group of ferry service providers can be seen and the agglomeration schedule of the ferry respondents can be seen in table L-2, appendix L, the cluster membership of the various ferry service elements in table L-3 and the dendogram in figure L-5, appendix L.

The dendogram of the perceived importance of the ferry service elements according to the ferry respondents, as can be seen in figure L-5, appendix L, shows a clear distinction between the two major clusters (and a third one - swimming pool and spa / healthclub on-board). The cluster labelled 'core ferry service offer' contains those ferry service elements perceived as in the *important* part of the scale, and the cluster labelled ' augmented ferry service offer' contains the ferry service elements which are perceived as belonging to the *unimportant* part of the scale.

7.2.5 The government regions respondents

The input data for the cluster analysis of the respondent from the UK regions can be seen in table L-4, appendix L This data is the total percentage of expressed importance of the identified ferry service elements (see also appendix A). The agglomeration schedule of the region respondents can be seen in table L-5 and the cluster membership of the various ferry service elements in table L-6 and the dendogram in figure L-6, appendix L.

The dendogram with the perceived importance of ferry service elements for the regions respondents shows that the two major clusters labelled 'core ferry service offer' and 'augmented ferry service offer' can clearly be identified (see figure L-6). The elements which are part of the core ferry service offer are those which are perceived to be at the *important* end of the scale and those which are in the cluster labelled augmented ferry service are the ferry service elements which are perceived by regions respondents to be located at the *unimportant* end of the scale.

7.2.6 The port respondents

The input data for the cluster analysis of the respondent from the UK ports can be seen in table L-7. This data is the total percentage of expressed importance of the identified ferry service elements (see also appendix A - crosstabulations of ferry service elements). The agglomeration schedule of the port respondents can be seen in table L-8 and the cluster membership of the various ferry service elements in table L-9 and the dendogram in figure L-7.

The dendogram of the perceived importance of different ferry service elements according to port respondents shows initially the existence of two main clusters (see figure 7-9). The cluster labelled 'core ferry service offer' contains the ferry service elements which tend to be placed in the *important* part of the measurement scale and the ferry service elements which are clustered in the 'augmented ferry service offer' are generally placed in the *unimportant* part of the measurement scale.

7.2.7 Personal profiles

Individual profiles of the respondents have been collected as identified in chapter 5, section 9.1. An analysis of all respondents shows that they are likely to have a good knowledge of ferry service offers on the basis of their job description alone. Their personal profile in terms of years employed in the industry, in their current company, and in their current job, in addition to professional qualifications justifies them being identified as ferry experts (see table 7-8).

Of all respondents the average number of years (based on 21 respondents) employed in the industry is 21 years, with the shortest period being five years and the longest period being 38 years. The average number of years of all (22) respondents employed in their current company (organisation) is 13 years, the shortest period is just one year, however, this respondent has been in the industry for 30 years, and the longest period of employment with the current company are two respondents with both 28 years of employment. The number of years the 23 respondents are employed in their current job is, on average, five years.

Personal job profile of respondents					
Group	Job title	Qualifications	Number of years employed in		
			industry	company	job
Port	Port Manager	FCIS	38	14	14
	Harbour Master	Master Mariner	30	1	1
		MCIT, MICE	28	28	7
	Dep. Harbour Master	Master Mariner	28	14	14
	Chief Harbour Master	Master Mariner	26	26	2
	General Manager	BA, MA	25	7	7
	Development Manager	HNC Civ.Eng.	20	10	4
	Operations Director	BA, MCIT	20	2	2
	General Manager	Master Mariner	17	10	1
	Deputy Secretary		11	11	11
	Harbour Master	Master Mariner	9	6	3
	Harbour Master	Master Mariner			
Port Respondents		Total	252	129	67
		Average	23	12	6
Region	Principal Planning Off.	MRTPI	30	25	10
	Ass. Principal Engineer	BSc, MEng, MICE	25	25	10
	Transport Planning Off.	Eng.Tech.	7	7	2
	Principal Eur. Officer	BA, MRTPI		2	1
Region Respondents		Total	62	59	23
		Average	21	15	6
Ferry	Ferry Service Manager		35	35	6
	Corp. Planning Man.	BA, FSS, MCIT	28	28	18
	Corp.Strategy Manager	MA, MSc	25	25	4
	Operations Director	BA, MCIT, FBIM	20	2	2
	VP Ferries & Ports	MA, MBA, MCIT	11	8	2
	Marketing Manager	NIMA-C	6	6	2
	Passenger Manager	LL.B.	5	2	1
Ferry Respondents		Total	130	106	35
		Average	19	15	5
All Respondents		Total	444	294	125
		Average	21	13	5
		Number included	21	22	23

Table 7-8 Personal job profile of respondent

For the different groups of respondents the average number of years in the industry for port respondents is 23 years, for region respondents this is 21 years and for the ferry respondents 19 years of employment in the industry. The average period of employment by the current company is 12 years for ports, 15 years for regions and also 15 years for the ferry respondents. The average number of years in the current job is six years for port respondents, six years for the regions and five years for the ferry respondents.

In terms of professional and academic qualifications the respondents' profiles appear impressive. The professional qualifications include Master Mariner (six in total - all port respondents), Member of the Chartered Institute of Shipbrokers, Civil Engineer, Member of the Chartered Institute of Transport, Member of the Road and Transport Planning Institute, Engineer Technician, Marketer (NIMA-C), and Member of the British Institute of Management (now Institute of Management). Academic qualifications include a HNC, first degrees, such as, BA, BSc, and LL.B., and postgraduate degrees, such as, MA, MSc, MEng, and MBA.

7.2.8 Pragmatic validity

The cluster solutions of all respondents, ferry respondents only, region respondents only, and the port respondents only are combined in table 7-9. Comparing their responses is therefore necessary to validate the results. It can be seen that agreement exists on the ferry service elements of terminal buildings, signposting, route information, road links, restaurant on-board, making reservations, issuing tickets, linkspans, and advertising as all are labelled 'core' ferry service offer in the cluster results of all groups analysed. Interestingly, all these elements, apart from restaurant on-board (self service or waiter service), are not at all part of the ferry, but instead of the infrastructure.

Ferry Service Offer Classification (by provider groups)				
Ferry Service Element	Ferry Service Provider			
	All	Ferry	Port	Region
	classified as			
Terminal Buildings	core	core	core	core
Signposting	core	core	core	core
Route information	core	core	core	core
Road links	core	core	core	core
Restaurant on-board	core	core	core	core
Reservations	core	core	core	core
Issuing tickets	core	core	core	core
Linkspans	core	core	core	core
Advertising	core	core	core	core
Keeping passenger/cargo lists	core	core	core	augmented
Terminal waiting area	core	core	augmented	core
Shop on-board	core	core	augmented	core
Security at terminal	core	core	augmented	core
Lorrydrivers' facilities terminal	core	core	augmented	core
Bar on-board	core	core	augmented	core
Rail links	core	augmented	augmented	core
Motorist facilities at terminal	core	augmented	augmented	core
Disabled facilities at terminal	core	augmented	augmented	core
Bus services	core	augmented	augmented	core
Children's facilities at terminal	augmented	augmented	augmented	core
Baggage handling	augmented	augmented	augmented	core
Swimming pool on-board	augmented	augmented	augmented	augmented
Spa / health club on-board	augmented	augmented	augmented	augmented
Restaurant at terminal	augmented	augmented	augmented	augmented
Business traveller fac. terminal	augmented	augmented	augmented	augmented
Cafeteria at terminal	augmented	augmented	augmented	augmented
Cinema on-board	augmented	augmented	augmented	augmented
Casino on-board	augmented	augmented	augmented	augmented

Table 7-9 Core and augmented ferry service offer classification by all groups

A number of ferry service elements, namely, keeping passenger / cargo lists, terminal waiting area, shop on-board, lorrydrivers' facilities at terminal, and bar on-board have all been labelled either as a result from the cluster analysis of the region or port respondents as 'augmented'.

However, none of these ferry service elements has been labelled 'augmented' by the ferry respondent cluster analysis results. Therefore it can be argued that these ferry service elements should neither be classified as core nor as augmented, but as something in between these two classifications. As can be seen from table 3-1 Levitt (1980) identifies this intermediate level as the 'expected product', Kotler (1980) identifies it as the 'tangible product', and Eiglier and Langeard (1981) identify this level as 'peripheral'. However, none of these product classifications is an adequate description of the 'in between' nature of the ferry service elements under discussion. It appears, therefore, appropriate to confirm the allocation of these ferry service elements, which are considered to belong to either core or augmented product level, depending on the category of respondents, and introduce, as a result of this study, a more accurate description of these ferry service elements and label them as belonging to the *inter-product* level. The term, more accurately describes their potential for becoming core elements of the ferry service offer.

Finally, the ferry service elements which have been described in the cluster analysis by at least two groups, all of whom include the ferry and port respondents, as augmented will be considered the 'augmented ferry service offer'. These ferry service elements are rail links, motorist facilities at terminal, disabled facilities at terminal, bus services, children's facilities at terminal, baggage handling, swimming pool on-board, spa/health club on-board, restaurant at terminal, cinema on-board, and casino on-board. The augmented ferry service could, on the basis of its components of ferry service elements, also be described as 'additional or augmented ferry service facilities and services'.

7.2.9 Ferry service offer summary

From these results it follows that the ferry service offer comprises three levels: core, inter-product and augmented. These findings are largely in agreement with the theory as described in chapter 3 (see in particular table 3-1, table 3-2 and table 3-3) and matches the principles of the total product concept as developed by Collins (1989).

7.3 Provider of the ferry service elements.

The analysis of the ferry service offer also considers the preferred provider of these elements. These providers include the port authority, port operator, ferry operator, government, private third party, or a combination of these. The reliability of the scale (see table L-10) is quite good with a value for Cronbach's alpha of 0.8447. This technique and the interpretation of the results is discussed earlier in this chapter (see 7.2.2).

Since the original data collected is nominal, as respondents were asked to state the category of their preferred provider of a particular ferry service element, transformation of the data for further analysis was undertaken. The procedure followed was to take the percentages of the various categories of providers as stated by the respondents (see appendix A - crosstabulations), which transforms the original data into interval data and use these to form clusters of provider categories (see table L-11 in appendix L).

The cluster analysis performed on the preferred provider of the ferry service elements resulted in the agglomeration schedule, shown in table L-12 (appendix L), which gives some guidance on the clusters which represents the data best. The first cluster formed in stage 1 and stage 15 comprises the ferry service elements of 'terminal buildings ' (26), 'waiting area at terminal' (28), and 'linkspans' (12). The numbers and associated labels of the ferry service elements for this analysis can be seen in figure L-8 in appendix L .

In table L-13 the provider clusters are shown in the form of cluster membership of the ferry service elements for two to seven clusters. The first cluster formed shows that the ferry service elements of terminal buildings, waiting area at terminal and linkspans are allocated in the same cluster for all six solutions and this cluster has been labelled 'port authority'. In the same way the other clusters formed were also labelled in terms of provider. The resulting clusters were (1) ferry operator, (2) ferry / port combination, (3) private third party, (4) port / ferry combination, (5) port authority, and (6) government.

Ferry Service Offer (preferred provider of ferry service element)	
Preferred Provider	Ferry Service Element
Ferry Operator (cluster 1)	Bar on-board Restaurants on-board Shop on-board Advertising the service Keeping passengers / cargo lists Taking reservations Route information Issuing tickets Swimmingpool on-board Casino on-board Cinema on-board Spa / health club on-board
Ferry/port Combination (cluster 2)	Baggage handling Business travellers' facilities at terminal
Private Third Party (cluster 3)	Restaurants at terminal Cafeteria at terminal Bus services
Port/ferry Combination (cluster 4)	Lorry drivers' facilities at terminal Motorists' facilities at terminal Children's' facilities at terminal Disabled facilities at terminal Security at terminal
Port Authority (cluster 5)	Linkspans Terminal buildings Waiting area at terminal
Government (cluster 6)	Signposting Road links Rail links

Table 7-10 Ferry service offer in terms of provider

The difference between the ferry/port combination and the port/ ferry combination is that the first mentioned provider was given greater preference over the other; this means that for example baggage handling is to be initiated by the ferry operator and the facility provided jointly with the port, and that for example security at the ferry terminal is initially provided by the port, but in co-operation and consultation with the ferry operator to operate a shared security system. Table 7-10 summarises the results of the cluster analysis of the ferry service offer in terms of preferred provider.

7.4 Combined importance and provider of ferry service elements

The combined results of the cluster analysis are shown in the following tables. Table 7-11 shows the ferry service offer with the service elements associated with the core level. Table 7-12 and table 7-13 show respectively the service elements associated with the inter-product and augmented level. In addition, all tables also show the preferred provider of these service elements.

Core Ferry Service Offer	
Provider	Ferry Service Element
Ferry Operator	Restaurants on-board Advertising the service Taking reservations Route information Issuing tickets
Port Authority	Linkspans Terminal buildings
Government	Signposting Road links

Table 7-11 Core ferry service offer in terms of provider

Inter-product Ferry Service Offer	
Provider	Ferry Service Element
Ferry Operator	Bar on-board Keeping passenger / cargo list Shop on-board
Port/ferry Combination	Lorry drivers' facilities at terminal Security at terminal
Port Authority	Waiting area at terminal

Table 7-12 Expected ferry service offer in terms of provider

Augmented Ferry Service Offer	
Provider	Ferry Service Element
Ferry Operator	Swimming pool on-board Casino on-board Cinema on-board Spa / health club on-board
Ferry/port Combination	Baggage handling Business travellers' facilities at terminal
Government	Rail links
Port/ferry Combination	Children's' facilities at terminal Motorists' facilities at terminal Disabled facilities at terminal
Private Third Party	Restaurants at terminal Bus services Cafeteria at terminal

Table 7-13 Augmented ferry service offer in terms of provider

7.5 Summary of ferry service offer

Categorising the ferry service offer in terms of customer experience (see also figure 1-1 in chapter 1) by level (core, inter-product and augmented) and provider (ferry operator, government, private third party, port authority, and combination) results in the summary of the ferry service offer and can be seen in table 7-14.

The ferry service offer by category of ferry service element by level and by provider					
Ferry service elements		Ferry service offer level			Provider
Category	Description	Core	Inter	Augm	
Pre-booking	Advertising	*			Ferry operator
	Route information	*			Ferry operator
Booking	Reservations	*			Ferry operator
	Issuing tickets	*			Ferry operator
	Passenger lists		*		Ferry operator
Access/Exit	Road links	*			Government
	Rail links			*	Government
	Bus services			*	Third party
	Signposting	*			Government
Terminal	Buildings	*			Port authority
	Waiting area		*		Port authority
	Security		*		Combination
	Baggage handling			*	Combination
	Restaurant			*	Third party
	Cafeteria			*	Third party
	Linkspans	*			Port authority
Special facilities for:	Children			*	Combination
	Disabled			*	Combination
	Business travellers			*	Combination
	Lorry drivers		*		Combination
	Motorists			*	Combination
On-board ferry	Shop		*		Ferry operator
	Restaurant	*			Ferry operator
	Spa/health club			*	Ferry operator
	Casino			*	Ferry operator
	Bar		*		Ferry operator
	Cinema			*	Ferry operator
	Swimmingpool			*	Ferry operator

Table 7-14 The ferry service offer by category of service elements and provider

7.6 Corporate culture

In the previous paragraphs of this chapter the first research hypothesis was tested and it was found that the ferry service offer comprises three levels: core, inter-product and augmented. This part of the analysis concentrates on testing the second research hypothesis which states:

H2: The core service offer is augmented, depending on the ferry service provider's reaction to changes in the environment, and is influenced by the dominant corporate culture type of the service provider.

The first part of the analysis, therefore, concentrates on establishing which corporate culture elements (see section 5.8) are perceived as important. The main aspects of the corporate culture are described by the concepts of target customers (market), price base for ferry terminals, reasons for growth, external environmental factors, competition and commitment. This part of the analysis also looks at which dominant corporate culture types in terms of Miles and Snow typology exist among respondents. The second part aims to describe the augmented ferry service offer in terms of these typologies (see also figure 6-1 in chapter 6).

7.6.1 Target customers (market).

The target customers have been identified in section 5.8.1. (see also table 7-15). The reliability of the scale (see section 7.2.2) for this concept based on the ten elements is expressed in a Cronbach's alpha of 0.8330 (for 19 cases). The analysis of variance between measures results in a F-value of 4.9211 and a probability of 0.0000 with nine degrees of freedom. Table F-1 in appendix F (crosstabulations corporate culture) shows the perceived importance of these categories according to port, region and ferry operator respondents and table 7-15 is a simplified summary of these results, which ranks the perceived importance by respondent group.

Target customers (market) ranking of perceived importance (by respondent groups)				
Target customers	Respondents			
	All	Ferry	Port	Region
Driver accompanied lorries	1	2	1	2
Independent holidaymakers	2	1	2	3
Package holidaymakers	3	4	3	1
Unaccompanied trailers	4	3	4	3
Coaches	5	4	5	3
Business travellers	6	8	6	3
Animals / livestock	7	8	7	9
Mini cruise passengers	8	4	8	7
Day-trippers (short stay)	8	4	8	7
Students	10	10	10	10

Table 7-15 Target customers ranking of perceived importance

It can be seen from table 7-15 that driver accompanied lorries, independent holidaymakers, package holidaymakers and unaccompanied trailers are ranked highest in perceived importance as target customers (or market). This confirms the hybrid, or dual, role of the ferry service offer, see also chapter 2, which is aimed at both the consumer (holidaymakers) and industrial market (lorries and trailers) by most of the ferry companies. Concentration on just passengers or mainly driver accompanied lorries and trailers occurs at some ferry operators and is part of their business strategy and both types of ferry operators are among the respondents of this study. This will of course give some bias in their responses in favour of the one or the other type of target passenger (market), but serves very well as an indicator of the quality of the answers. Next in ranking are coaches, business travellers and the carriage of animals / livestock, all of whom can be classified as industrial customers. Coaches are very dominant on some routes, and are almost non-existent on others. Business travellers are a market where competition with the ferries is provided by airlines, and to a lesser extent the Channel tunnel. The former has the advantage of speed, but has the disadvantage that the business traveller cannot take the car. The Channel tunnel is a more equal competitor to ferries operating in the English Channel region. Attempts to attract and keep business travellers as customers by ferry operators are the creation of business facilities, Club Class and conference facilities on board of the vessels (see also chapter 2, section 3.3.6). Animal / livestock transport is less important than the others, but still significant, as three respondents consider it as very important and three respondents consider it important (see table F-1 in appendix F). Some of the major ferry operators have stopped the export of calves to the Continent in response to violent protests in recent years by concerned members of the UK public.

Price base of ferry port terminal charges (by ports, regions and ferry operators)				
Price base	According to	Yes number (%)	No number (%)	Total number (%)
Marine charges	Port	6 (35.3)	4 (23.5)	10 (58.8)
	Region			
	Ferry	5 (29.4)	2 (11.8)	7 (41.2)
	Total	11 (64.7)	6 (35.3)	17 (100.0)
Berthing / quays	Port	10 (52.6)	1 (5.3)	11 (57.9)
	Region	1 (5.3)		1 (5.3)
	Ferry	5 (26.3)	2 (10.5)	7 (36.8)
	Total	16 (84.2)	3 (15.8)	19 (100.0)
Vehicles	Port	10 (52.6)	1 (5.3)	11 (57.9)
	Region	1 (5.3)		1 (5.3)
	Ferry	6 (31.6)	1 (5.3)	7 (36.8)
	Total	17 (89.5	2 (10.5)	19 (100.0)
Passengers	Port	10 (52.6)	1 (5.3)	11 (57.9)
	Region	1 (5.3)		1 (5.3)
	Ferry	5 (26.3)	2 (10.5)	7 (36.8)
	Total	16 (84.2)	3 (15.8)	19 (100.0)
Others	Cargo / tonne Consolidated vehicle and passenger handling charge Size of the vessel			

Table 7-16 Price base of ferry port terminal charges

7.6.2 Price base

The preferred price base used by ports to charge for ferry terminals according to the respondents is shown in table 7-16 in both number and percentage. The price bases identified are (see section 5.8.2) marine charges - service elements such as pilots and tugs, berthing and quays, and the number of vehicles and passengers. Responses indicated that charges for cargo per tonne, the size of the vessel, and a consolidated vehicle and passenger handling charge could also be used as a price base. As can be seen all identified price bases are acceptable to the majority of ferry operators, and, as can be expected, by the majority of port respondents. A low response rate for the regions is evident.

7.6.3 Reasons for growth

As reasons for growth diversification of present ferry services, underutilisation of existing capacity, public relations, increasing profit, and increasing employment were identified (see section 5.8.3) and the perceived importance of these criteria according to port, region and ferry respondents is shown in detail in table F-2 of appendix F (crosstabulations of corporate culture).

Ranking of reasons for growth of ferry services (perceived importance by respondent groups)				
Reasons for growth	Respondents			
	All	Ferry	Port	Region
Profit	1	1	2	5
Utilisation of spare capacity	2	2	1	3
Diversification	3	3	3	3
Employment	4	4	4	1
Public relations	5	5	5	2

Table 7-17 Reasons for growth of ferry services (ranking of importance by respondents)

The reliability of this scale is expressed by Cronbach's alpha, which is 0.5262 for these five elements based on 18 cases. Analysis of variance shows a F-value of 5.1916 between measures (prob. = 0.0010) with 4 degrees of freedom. Deletion of the element of increasing profit results in an alpha of 0.7246 for the four remaining elements (N = 18 cases) and the variance between measures changes the F-value slightly to 5.2695 (prob. = 0.0030) with 3 degrees of freedom). Table 7-17 shows a simplified summary of the importance of the different reasons for growth of ferry services.

In table 7-17 it can be seen that profit is the first reason for growth for ferry services when all respondents are taken into account, and also when all ferry respondents are considered. This profit motive is to be expected as many ferry operators are private organisations with shareholders. The ranking of the port respondents, who consider the utilisation of spare capacity as the first reason, and the respondents from government regions, who consider employment as their main reason, is also explained by the nature of their respective organisations. Diversification, possible as a means to spread the current risk, is ranked third by all categories of respondents. Ranked last for all but the regions respondents, is public relations or the public image of a port to be recognised as a ferry port or the ferry operator to be seen as a major operator as a reason for growth. A possible explanation is that the regional representatives are more involved in promoting the benefits of their region in terms of employment potential in general and are, unlike the others, less focused on profit.

7.6.4 External environmental factors

The external environment can be described as those factors which influence a business organisation, but which cannot, unlike internal factors, be controlled by management. The external environmental factors which influence the ferry service providers have been identified (see section 5.8.4) as financial, social, political, technical, and natural factors (such as deep water access). Their perceived importance are shown in detail in table F-3 of appendix F (crosstabulation corporate culture). A reliability analysis of the scale shows alpha = 0.4910 with N = 18 cases and N = 5 items. This value is poor, but there is some scope to improve alpha by deleting one or more of the elements (e.g. technical factors deleted will give α = 0.5399). The analysis of variance between measures results in a F-value of 16.4839 (prob. = .0000) with 4 degrees of freedom. A simplified summary ranking the importance of the external environmental factors as perceived by the respondents is shown in table 7-18.

Ranking of external environmental factors (perceived importance by respondent groups)				
External factor	Respondents			
	All	Ferry	Port	Region
Financial environment	1	1	1	1
Natural environment	2	2	2	3
Technical environment	3	3	3	2
Social environment	4	4	4	4
Political environment	5	5	5	5

Table 7-18 Ranking of external environmental factors of importance by respondents

The financial environment, see table 7-18, which includes the economic and financial factors is perceived of highest importance by all respondents. Respondents commented that the financial soundness of the parties involved is very important. The possibility of attracting grants and subsidies for infrastructure and the general need to provide a viable ferry service were also included as comments by respondents. Respondents also mentioned on the questionnaire that when the government was setting the requirements of the service, for example to ensure an essential sea transport link, the ports and ferry operators who provide the service were expected to be financially supported by the government to make the ferry service viable.

The natural environment ranked second in perceived importance. Specifically mentioned by respondents was the need for twenty-four hours access a day.

Technological factors are ranked next in importance, but were considered less important by the ferry respondents (see table F-3, appendix F). A possible explanation is that conventional ferry services rely on proven methods of ship construction and technologically well tested marine equipment. Technological factors of importance mentioned by respondents was related to fast ferries and related technology. These recently developed, technologically more advanced high speed systems, are less reliable or in some instance untested in all operational conditions. This may explain the concern expressed by respondents about the availability of professional (technical) services to repair and maintain existing and future vessels and equipment. Respondents also mentioned that, in order to maintain the advantage of fast craft, the appropriate infrastructure in terms of good road links and port access is important.

The social (and cultural) environment ranked fourth in perceived importance. Fifth and least important is the political / legal environment to respondents. This is perhaps somewhat surprising when one considers the importance of political and legal aspects to the provision of the total ferry service offer. The political environment, largely determined by the government in power, includes the legal and regulatory environment at local, regional, national and European level. Respondents did however, express the need for a stable and consistent government, and the importance it could have on employment. It can be seen from table F-3, appendix F, that the respondents from the ferry operators considered the political environment less important than the respondents from the regions (i.e. those working in the political environment), which is perhaps to be expected.

7.6.5 Competition

Competition among ferry service providers takes the form of ports competing among themselves, often supported by regional governments for selection by ferry operators, and ferry operators competing between routes or on the same route. In general, competition may take the form of one ferry operator on one route, two or more competing operators on one route, or two or more collaborating operators on one route (see section 5.8.5). Table 7-19 shows the preference of respondents in terms of competition.

Preferred competition of ferry services by ports, regions and ferry operators				
Preference	According to	Yes number (%)	No number (%)	Total number (%)
One ferry operator only on one route	Port	7 (58.3)	1 (8.3)	8 (66.7)
	Region	-	2 (16.7)	2 (16.7)
	Ferry	1 (8.3)	1 (8.3)	2 (16.7)
	Total	8 (66.7)	4 (33.3)	12 (100.0)
Two or more competing operators on one route	Port	1 (8.3)	4 (33.3)	5 (41.7)
	Region	1 (8.3)	1 (8.3)	2 (16.7)
	Ferry	5 (41.7)	-	5 (41.7)
	Total	7 (58.3)	5 (41.7)	12 (100.0)
Two or more collaborating operators on one route	Port	3 (33.3)	2 (22.2)	5 (55.6)
	Region	2 (22.2)	1 (11.1)	3 (33.3)
	Ferry	-	1 (11.1)	1 (11.1)
	Total	5 (55.6)	4 (44.4)	9 (100.0)

Table 7-19 Preferred competition of ferry services

Ferry operators prefer full competition with two or more ferry operators competing on one route, whereas the port respondents (but not the regional governments) favour one operator on one route and failing that two or more collaborating ferry operators on one route. Various reasons were given for favouring no competition, which were the current operator having an established track record, the reliability of the service provider and the threat to economic viability of all ferry operators in case of full competition.

7.6.6 Commitment

The commitment of ferry service providers can take various forms; the elements which have been identified are a guaranteed operating period, a guaranteed schedule, financial commitment, financial investments, priority berthing, allocation of open space, allocation of sheds and buildings and dedicated labour (see also section 5.8.6). A crosstabulation of these elements and their perceived importance according to port, region and ferry operator respondents can be seen in table F-4 of appendix F (crosstabulations: corporate culture).

Ranking of commitment (perceived importance by respondent groups)				
Commitment	Respondents			
	All	Ferry	Port	Region
Priority berthing	1	1	1	1
Guaranteed schedule	2	4	3	2
Allocation of open space	3	3	4	7
Financial commitment	4	2	5	4
Guaranteed operating period	5	6	2	3
Financial investments	6	5	7	5
Allocation of sheds / buildings	7	7	6	7
Dedicated labour	8	8	8	5

Table 7-20 Ranking of importance of commitment by respondent group

The reliability of the scale to measure the commitment concept as expressed in Cronbach's alpha is 0.4639 based on these eight elements and N = 16 cases. The analysis of variance shows that variation between measures results in a F-value of 4.4583 (prob. = 0.0002) with 7 degrees of freedom. The value of alpha can be increased to 0.8531 when excluding three of the elements and maintaining guaranteed operating period, guaranteed schedule, financial commitment, priority berthing and financial investments. Analysis of variance between measures gives a F-value of 4.3548 (prob. = 0.0037) with 4 degrees of freedom.

Table 7-20 shows a simplified summary of the ranking of the elements of commitment. As could be expected priority berthing ranks first in perceived importance for all respondent groups, without which it would be very difficult to maintain the second ranking element, guaranteed schedule.

7.7 Miles and Snow types of corporate culture

This section analyses the responses according to the Miles & Snow types of corporate culture as discussed in section 5.8.7. The four types are reactor, analyser, prospector and defender. Of these four types none of the respondents considered themselves to be a reactor. This is not unexpected as in the literature (see Walther and Ruekert, 1987) the reactor is, unlike the other three types, not seen as a permanent type, but rather for companies in the process of moving from one of the other three types.

A separate questionnaire with just one question was sent to the 24 respondents of the first questionnaire (see example in appendix E). A total of thirteen respondents completed the questionnaire, which gives a response rate of 54 %. The low number of responses, four ferry operators, six ports and two regions (see table 7-21), affects the predictive ability of the results for the total population and this aspect of the research requires an assessment of the non-respondents.

Miles & Snow Corporate Culture Type (as stated by respondent)	
Type	Number of respondents
Defender	3 Ports 1 Region
Prospector	2 Ferry operators 1 Port 1 Region
Analyser	2 Ferry operators 3 Ports

Table 7-21 Miles & Snow corporate culture types by respondent

7.7.1 Nonrespondents Miles and Snow type survey

Comparison of nonrespondent and respondent ferry operators to Miles and Snow type questionnaire on the basis of the mean of the number of ferry customers per trip by mode in 1994					
Miles & Snow type		Passengers	Cars	Buses	Trailers
Predicted	Stated				
Excluded	Nonrespondent	362	77	1	19
Prospector	Nonrespondent	*	*	*	*
	Prospector	326	63	2	22
	Mean	326	63	2	22
Analyser	Nonrespondent	390	75	2	18
	Analyser	265	40	1	27
	Mean	348	63	2	21
Defender	Nonrespondent	3	*	*	21
	Defender	#	#	#	#
	Mean	3	*	*	21
Total population	Mean	347	73	1	21
Note: * = missing values; # = no ferry operator responding stated this type Source: Adapted from Cruise and Ferry Info (1995)					

Table 7-22 Nonrespondent ferry operators by Miles and Snow type

Table 7-22 shows the comparison of the nonrespondent and respondent ferry operators to the Miles and Snow questionnaire on the basis of the mean of the number of ferry customers per trip by mode in 1994. Overall the nonrespondent and respondent ferry operators have similar average traffic figures; respectively 362 and 347 for passengers, 77 and 73 for cars, 1 and 1 for buses, and 19 and 21 for trailers. Larger differences can be observed for the three Miles and Snow types stated and predicted. For example the traffic means of prospectors and analysers are almost identical; 326 and 348 for passengers, 63 and 63 for cars, 2 and 2 for buses, and 22 and 21 for trailers. These two, however, differ completely from the defender in terms of the passenger figures, but are similar for the number of trailers. This ferry operator usually carries no cars and buses. In addition to the average traffic figures the total number is also useful for comparing nonrespondents and respondents.

The ferry operators who responded to the Miles and Snow questionnaire as being a prospector carried in 1994 a total of 16,100,377 passengers, 2,902,897 cars, 76,700 buses and 755,400 trailers. This represents 72 % in passengers carried in 1994 of the predicted prospectors, 69 % of the cars, 80 % of the buses, and 87 % of the trailers. The ferry operators who stated that their type of corporate culture was that of an analyser carried 1,547,790 passengers in 1994, 232,035 cars, 7,650 buses and 154,655 trailers. This represents 60 % of the passengers carried in 1994 by the respondents stating themselves as analysers out of the total of predicted analysers, 53 % of the cars, 54 % of the buses, and 76 % of the trailers. No defender was stated in response to the questionnaire, however the predicted defender carried only a small number of passengers (3,473), no cars or buses, and 85,000 trailers in 1994. This company, however specialises, in the transport of unaccompanied trailers for most of their ro-ro ferries and serves as a balance to one other ferry operator (a stated prospector), who concentrates on carrying passengers, cars and buses only.

Table 7-23 shows the comparison of the nonrespondent and respondent ports to the Miles and Snow questionnaire on the basis of the mean of the number of ferry customers per trip by mode in 1994. Overall the nonrespondent and respondent ports have different traffic figures; respectively 307 and 347 for passengers, 60 and 73 for cars, 1 and 1 for buses, and 22 and 21 for trailers. Larger differences can be observed for the three Miles and Snow types stated and predicted. The difference in nonrespondent and respondent defender, for example, shows a far larger average number of passengers and cars carried in 1994 by the nonrespondents, 622 and 140 respectively, compared to 207 passengers and 51 cars by the respondents. Trailer figures are the reverse 16 for the nonrespondent ports and 40 for the respondent ports predicted as defenders.

Comparison of nonrespondent and respondent ports to Miles and Snow type questionnaire on the basis of the mean of the number of ferry customers per trip by mode in 1994					
Miles & Snow type		Passengers	Cars	Buses	Trailers
Predicted	Stated				
Excluded	Nonrespondent	307	60	1	22
Prospector	Nonrespondent	#	#	#	#
	Prospector	437	123	1	20
	Mean	437	123	1	20
Analyser	Nonrespondent	*	*	*	*
	Analyser	297	44	1	14
	Mean	297	44	1	14
Defender	Nonrespondent	622	140	1	16
	Defender	207	51	0	40
	Mean	539	123	1	21
Total population	Mean	347	73	1	21
Note: * = missing values; # = no port responding stated this type Source: Adapted from Cruise and Ferry Info (1995)					

Table 7-23 Nonrespondent ports by Miles and Snow type

Of the port respondents to the Miles and Snow corporate culture type questionnaire those who stated themselves as being prospector carried 7,036,038 passengers in 1994, 1,563,008 cars, 17,030 buses, and 343,348 trailers. Representing 100 % of all traffic carried by ports predicted as prospectors. The ports stating themselves to be analysers carried 3,982,100 passengers in 1994, 922,043 cars, 15,383 buses and 93,374 trailers. This translates into 97 % of the passengers, 97 % of the cars, 100 % of the buses, and 100 % of the trailers carried in 1994 for the ports predicted as analysers. Ports stating themselves as defenders carried 451,358 passengers in 1994, 112,253 cars, 746 buses and 88,080 trailers. This represents 13 % of the passengers, 17 % of the cars, 8 % of the buses and 50 % of the buses of the ports predicted as being a defender.

Table 7-24 shows the comparison of the nonrespondent and respondent governmental regions to the Miles and Snow questionnaire on the basis of the mean of the number of ferry customers per trip by mode in 1994. Overall the nonrespondent and respondent governmental regions have similar average traffic figures; respectively 341 and 347 for passengers, 69 and 73 for cars, 1 and 1 for buses, and 21 and 21 for trailers. Larger differences can be observed for the three Miles and Snow types stated and predicted.

Comparison of nonrespondent and respondent governmental regions to Miles and Snow type questionnaire on the basis of the mean of the number of ferry customers per trip by mode in 1994					
Miles & Snow type		Passengers	Cars	Buses	Trailers
Predicted	Stated				
Excluded	Nonrespondent	341	69	1	21
Prospector	Nonrespondent	*	*	*	*
	Prospector	207	51	0	40
	Mean	207	51	0	40
Analyser	Nonrespondent	812	207	1	15
	Analyser	#	#	#	#
	Mean	812	207	1	15
Defender	Nonrespondent	*	*	*	*
	Defender	89	26	0	14
	Mean	89	26	0	14
Total population	Mean	347	73	1	21
Note: * = no nonrespondent governmental regions in category; # = no governmental regions responding stated this type Source: Adapted from Cruise and Ferry Info (1995)					

Table 7-24 Nonrespondent regional governments by Miles and Snow type

The regional governmental nonrespondents carried a total number of 44,111,212 passengers in 1994, 8,117,985 cars, 221,629 buses and 2,382,422 trailers. The governmental region which stated to be a prospector carried 451,358 passengers in 1994, together with 112,253 cars, 746 buses and 88,080 trailers. The governmental region stated to be a defender carried 7,458,530 passengers, 1,813,089 cars, 22,804 buses and 230,451 trailers in 1994. This amounts to 14.1 % of the passengers of the total traffic carried in the UK in 1994, 17.7 % of the cars, 9.2 % of the buses and 8.4 % of all trailers. The two regions predicted as analysers did not respond. One had no ferry traffic in 1994, the other represented a total of 705,905 passengers carried in 1994, 182, 864 cars, 994 buses and 11,777 trailers.

An overall comparison of the nonrespondent and respondent ferry operators, ports and governmental regions to the Miles and Snow questionnaire on the basis of the mean of the number of ferry crossings (trips) per day in 1994 can be seen in table 7-25. Overall the average number of daily crossings of nonrespondent and respondent providers are fairly close to the average of the total population. Table 7-25 shows that an average number of 11.4 daily ferry crossings were made in 1994 by the total population. Nonrespondent ferry operators had an average of 11.7 daily crossings, nonrespondent ports accounted for 13.2 daily trips and nonrespondent governmental regions for 10.7 ferry crossings per day. Larger differences can be observed for the three Miles and Snow types stated and predicted.

Comparison of nonrespondents and respondents by predicted and stated Miles and Snow type on the basis of the mean of the average number of trips (ferry crossing) per day by provider in 1994				
Miles & Snow type		Provider		
Predicted	Stated	Ferry operators	Ports	Governmental Regions
Excluded	Nonrespondent	11.7	13.2	10.7
	Mean	11.7	13.2	10.7
Prospector	Nonrespondent	*	*	*
	Prospector	12.3	16.4	6.0
	Mean	12.3	16.4	6.0
Analyser	Nonrespondent	3.7	*	1.5
	Analyser	16.0	1.1	#
	Mean	7.8	1.1	1.5
Defender	Nonrespondent	3.1	4.7	*
	Defender	#	6.0	40.6
	Mean	3.1	4.9	40.6
Total population		11.4	11.4	11.4
Note: * = no nonrespondent in category; # no stated M&S type respondent Source: Adapted from Cruise and Ferry Info (1995)				

Table 7-25 Nonrespondents by average number of daily ferry crossings

A further comparison of respondents and nonrespondents, in order to establish how different the respondents are from the nonrespondents is based on their respective annual turnover and full -time and part-time employees (see table 7-26).

Table 7-26 shows the regions, port and ferry operators according to their stated Miles and Snow type by turnover and employees. The reason for not including the responses of the regional governments in the calculation of the relevant statistics is that they are outliers in terms of turnover (budget) and number of employees (for example region 1 has 20,000 full-time and 10,000 part-time employees and an annual turnover of £ 650 million, or ECU 773.8 million) or failed to complete the questions on turnover and employees (both region 2 and region 4) and would therefore give a highly skewed image. However, two out of four regions responded to the questionnaire, and while their inclusion in this table is not appropriate it certainly is so for other parts of the analysis and their responses have been included in further analysis.

Response of Miles & Snow types of corporate culture (by category, turnover and employees)								
Respondent Category	M&S Type	N	Annual Turnover in ECU		Employees			
					Full time		Part time	
Regional Government	No response	2	773,809,524		20,000		10,000	
	Defender	1	1,785,714		60		10	
	Prospector	1	-		-		-	
	Subtotal	4						
			ECU value	Percentage	N	%	N	%
Port	No response	6	56,647,619	6 %	1,087	10 %	30	5 %
	Defender	3	23,690,476	2 %	283	3 %	29	5 %
	Prospector	1	17,857,143	2 %	60	1 %	10	0 %
	Analyser	3	15,285,714	1 %	332	3 %	1	0 %
	Subtotal	13	113,480,952	11 %	1,796	17 %	63	10 %
Ferry Company	No response	3	192,195,767	19 %	2,370	22 %	200	32 %
	Prospector	2	616,341,991	60 %	5,200	48 %	350	56 %
	Analyser	2	103,519,669	10 %	1,385	13 %	15	2 %
	Subtotal	7	913,247,903	89 %	8,955	83 %	565	90 %
	Grand Total	20	1,802,324,094	100 %	10,751	100 %	628	100 %

Table 7-26 Responses of stated Miles and Snow type of port and ferry operators by annual turnover and number of employees.

From table 7-26 it can be seen that the total percentage of non-response is 25 % based on the annual turnover of all port and ferry respondents (6 % for ports and 19 % for the ferry companies), based on full-time employees this is 37 % (5 % for ports and 32 % for ferry operators) and based on part-time employees 32 % (10 % for ports and 22 % for ferry operators). Table 7-26 also shows the breakdown of the stated Miles and Snow type of the ports and ferry operator in percentages of annual turnover and number of employees.

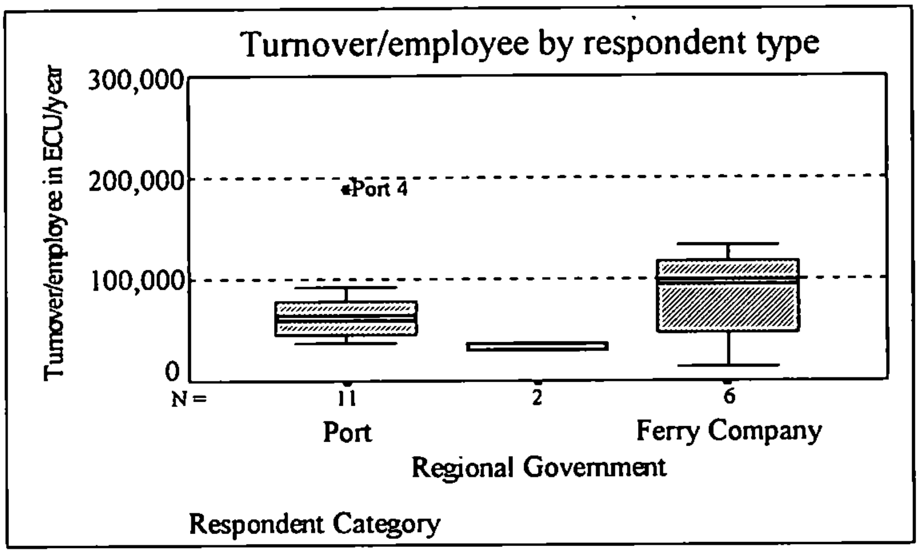


Figure 7-2 Turnover per employee by respondent type

Rather than expressing the assessment criteria in absolute values a relative value, turnover per employee, provides a better criterion for comparison between different groups. Figure 7- 2 shows a boxplot of turnover per employee (in ECU per year) by respondent type. The two regions have an average turnover per employee of ECU 32,226 per year, the ports ECU 72,977 (with port 4 as an outlier with a value of ECU 189,970 annual turnover), and the ferry operators ECU 85,516. In figure 7-3 the same criterion, annual turnover per employee in ECU, is used to compare the stated Miles and Snow corporate culture types. The eleven non-respondents, or missing values, have an average of ECU 65,701 annual turnover per employee (outlier ferry 5 has a value of ECU 134,680), the defenders have an average value of ECU 69, 247, the prospectors ECU 141,937 and the analysers have an average turnover per employee of ECU 44,319. These results show that a clear difference in turnover per employee (an important measurement of success and profitability) among the different corporate culture type groups which is statistically significant (F-value = 10.3543, sign.= 0.0046). This result contradicts the expectations of Slater and Narver (1993) who find that there is no difference in average profitability among the groups, but instead all differences are due to poor implementation of the dominant strategy and are therefore to be found within the groups. This study shows a within groups value of Eta = 0.8349 which is fairly consistent. However, profitability was defined by Narver and Slater (1993) as return on assets relative to all other competitors in the SBU (Strategic Business Unit)'s principal market, and therefore includes in addition to the revenue (turnover) also the cost, making the comparison difficult.

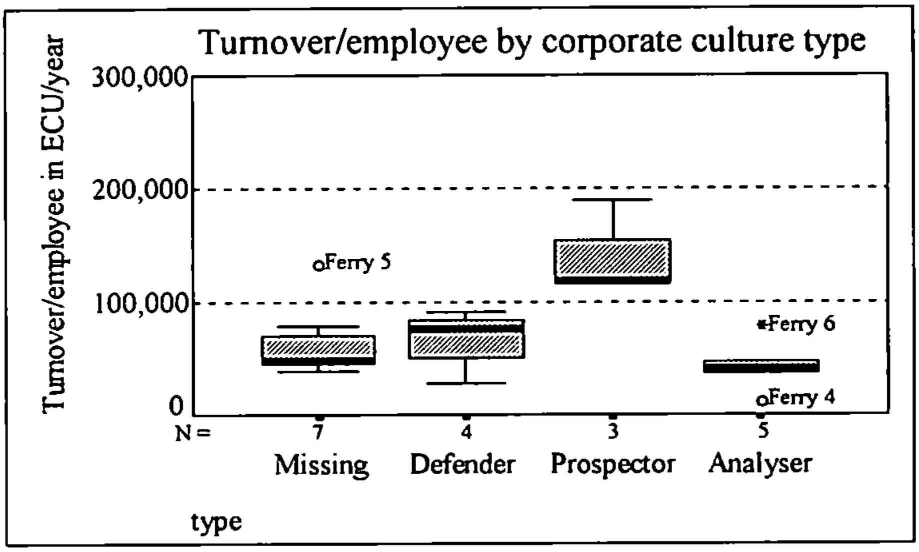


Figure 7-3 Turnover per employee by corporate culture type

7.8 Multiple discriminant analysis

The multivariate methodology which will be used to investigate the second hypothesis is called multiple discriminant analysis. The reason for selecting this method can be derived form the selection model figure G-1 in appendix G. The objective of multiple discriminant analysis is to obtain a variate which maximises the differences between groups of observations. Linear probability models (see also appendix O), a combination of multiple regression and multiple discriminant analysis, are to be considered, but according to Hair et al. (1995), in many instances, particularly with more than two levels of the dependent variable (three for this study - prospector, analyser and defender) discriminant analysis is the more appropriate technique. The other alternative, conjoint analysis (see appendix M), does not meet the research objectives of this study, but would be appropriate in a future study when the objective would be to evaluate different (complex) ferry service offers.

7.8.1 Selection of cases for analysis.

The first step in the discriminant analysis is to select the cases to be included in the analysis. The cases to be selected contain two types of variables; (independent) variables used as predictor variables and (dependent) variables which define the groups. A total of 41 predictor variables have been identified, see also section 5.8., to describe six concepts (augmented ferry service offer, commitment, target customers, external environment, reasons for growth and competition) which are assumed to make up corporate culture. After deciding which predictor variables are to be included, it must be decided whether to exclude cases with missing variables or to replace these with mean or median values. For this study, given the small number of cases, the fact that missing values appeared to be random and cases with missing values were not systematically different from the ones which contained values, it was decided that missing values would be replaced with the median of all remaining cases. This resulted in 24 completed cases comprising 41 predictor variables.

Table D-1 (appendix D) shows the 41 predictor variables. Table D-2 shows that the analysis of variance between measures results in a F-value of 15.6973 (prob.= 0.0000) with 40 degrees of freedom and that the reliability of the scale for these 41 items gives a Cronbach's alpha of 0.8541. The reason for including all 41 variables (taken together) in the analysis, and not separately the predictor variables of the six concepts, is that the scale of some of these concepts are good ($\alpha_{\text{target customers}} = 0.8330$ and $\alpha_{\text{augmented ferry service offer}} = 0.7898$) and other concepts ($\alpha_{\text{growth}} = 0.5262$, $\alpha_{\text{external environment}} = 0.4910$ and $\alpha_{\text{commitment}} = 0.4639$) are not particularly good in terms of Cronbach's alpha, as has been shown in the previous paragraphs. However, the scale for all variables (taken together) is very good.

The number of cases which contained variables which define the Miles & Snow type corporate culture groups (analyser, defender and prospector) were determined by the response to this special questionnaire, and resulted in thirteen valid cases as can be seen table D-3 appendix D. The SPSS output shown in the case summary (table D-3) indicates the number of cases eligible for inclusion (24) and the number of cases excluded (11) resulting in the number of cases included (13). Of these thirteen, four cases are identified as prospector (typerec 1), five cases are identified as analyser (typerec 2), and four cases are identified as defender (typerec 3). No weighting was applied as no theoretical reason justified doing so.

7.8.2 Analysis of Miles & Snow type differences

The second step is to analyse the differences between groups by examining the means (see table D-4) and the standard deviations (see table D-5). The row labelled *Total* in both these tables shows the value of the mean or standard deviation when all cases are grouped together. From table D-4 it can be seen that the means of each of the Miles & Snow type groups and the total mean are fairly similar for the predictor variable of baggage handling (AFSBAG_1) unlike, for example, social factors (ENVSOC_1) which shows that the group of prospectors (typerec 1) have a mean of 2 (= unimportant) and the group of analysers (typerec 2) have a mean of 4 (= important). From table D-5 similar information can be obtained with respect to the groups and total standard deviations. For example, independent holiday makers (CUSIHO_1) shows a standard deviation of .00000 for the prospector group (typerec 1) and 1.89297 for defenders (typerec 3). Looking at the combined output of table D-4 and D-5 shows which variables differ significantly and to which extent between Miles & Snow type groups.

Tests for univariate equality of group means can be seen in table D-6, which shows the predictor variables, Wilk's lambda, F-ratio, and significance. Wilk's lambda, sometimes called *U*-statistic, is the ratio of the within groups sum of squares to the total sum of squares when conducting a one-way analysis of the variable. For example, see table D-7, the within groups sum of squares of the predictor variable 'unaccompanied trailers' (CUSTRA_1) is 8.8000 and must be divided by the total sum of squares, which is 16.9231, to result in a Wilk's lambda (λ) of 0.52000. The same is true for one way analysis of variance for the social factors (ENVSOC_1) which results in λ = 10.75 / 20.7692 = 0.51759. A lambda value of 1 indicates that all observed Miles & Snow type group means are equal, and a value close to 0 indicates that most of the variability is caused by the differences between the means of the groups. The F-values and their significance, column three and four in table D-6, are identical to the results of an one-way analysis of variance. This can be seen by comparing, for example, the F-ratios and significance levels with 2 and 10 degrees of freedom in table D-6, to the F-ratios and F-probabilities in table D-7, for the predictor variables CUSTRA_1 (4.6154 / 0.0380) and ENVSOC_1 (4.6601 / 0.0371). If the observed significance (probability) level is small, for example less than 0.05, which is the case with the trailer variable and the social factor variable, the hypothesis that all group means are equal is rejected.

7.8.3 Linear multiple discriminant equation

The information provided by descriptive statistics and the univariate tests in the previous step helps to identify possible differences between groups of Miles & Snow types. However, the emphasis of discriminant analysis is on analysing the 41 selected variables simultaneously, and not on analysing one variable at a time. A linear combination of the predictor variables forms the bases of assigning cases to the right Miles & Snow type group. The Miles & Snow type serves as a single index (D) and can be expressed in the linear multiple discriminant equation

$$D = B_0 + B_1\ X_1\ + B_2\ X_2\ \ldots\ldots\ldots\ldots\ B_p\ X_p$$

X is the value of the independent variables and B is the coefficient estimated from the data. If the linear equation is to distinguish between the Miles and Snow types, the groups are to differ in their D -values. So, the B's are estimated in such a way that the values of discriminant function differ as much as possible between the groups, or to ensure that for the discriminant function the ratio between groups sum of squares / within groups sum of squares is at a maximum. The actual mechanics of computing the coefficients is beyond the scope of this study but interested readers are referred to Morrison (1967) and Tatsuoka (1971).

7.8.4 Classification

The next step is run the discriminant analysis programme. However, only variables which pass the tolerance test are entered and a maximum number of discriminant functions is specified. The default of the SPSS programme is 2. These and other programme specifications for this analysis can be seen in table D-8. Of the 41 variables 31 failed the tolerance test (see table D-9) and the unstandardized canonical discriminant function coefficients for the remaining 10 variables are listed in table 7-27.

Based on these coefficients the discriminant score for each case is calculated by multiplying the unstandardized coefficients by the values of the variables, summing these products and adding the constant. The discriminant scores for the 24 cases included in this analysis can be seen in columns 8 and 9 (the last two columns) of table 7-28 (classification output) resulting in classifying cases into one of three groups.

Unstandardized canonical discriminant function coefficients		
Predictor variable	Function 1	Function 2
Baggage handling at terminal	- 0.9877365	0.1353236
Bus services to/from terminal	- 3.8332042	- 1.1451633
Casino on-board	2.5925344	- 0.4004387
Rail links to/from terminal	1.4602141	1.3711199
Spa / health club on-board	- 1.7975442	1.1735917
Facilities for business travellers	- 2.0116901	- 0.0007101
Cafeteria at terminal	1.3820441	1.1220649
Facilities for children at terminal	2.4254090	- 0.1785807
Facilities for disabled at terminal	4.1515335	- 0.7142273
Facilities for motorists at terminal	- 1.4041684	0.0240069
(Constant)	- 6.7111862	- 2.9999018

Table 7-27 Unstandardized canonical discriminant function coefficients

Case Number	Mis Val	Sel	Actual Group	Highest Probability Group	P(D/G)	P(G/D)	2nd Highest Group	P(G/D)	Discrim Scores	
1			1	1	.6437	.9913	3	.0087	1.7867	-1.6029
2			1	1	.7500	.9999	3	.0000	.2804	-1.9554
3			UNGRPD	3	.0030	1.0000	1	.0000	5.1017	4.0497
4			2	2	.1562	1.0000	1	.0000	-5.0067	-.9964
5			UNGRPD	2	.1818	1.0000	1	.0000	-4.2212	-1.3249
6			2	2	.7568	1.0000	1	.0000	-4.2243	-.1122
7			UNGRPD	1	.2364	.9344	3	.0655	1.0356	.2249
8			UNGRPD	3	.0185	.8281	1	.1718	1.1664	1.8570
9			2	2	.1417	.9474	1	.0526	-1.8330	-.0499
10			UNGRPD	1	.2364	.9344	3	.0655	1.0356	.2249
11			UNGRPD	2	.2177	1.0000	1	.0000	-5.1895	1.4375
12			2	2	.1197	1.0000	1	.0000	-3.5902	2.5134
13			UNGRPD	3	.1721	.9989	1	.0011	2.5740	2.2925
14			3	3	.6980	.9993	1	.0007	4.3750	.2491
15			1	1	.8527	.9981	3	.0019	1.3612	-1.7210
16			UNGRPD	2	.8700	1.0000	1	.0000	-3.4037	.8627
17			3	3	.4642	.9717	1	.0283	2.5820	.9105
18			2	2	.8469	1.0000	1	.0000	-4.0626	.9388
19			3	3	.5676	.9999	1	.0001	3.8933	1.9525
20			UNGRPD	2	.0054	.9996	1	.0004	-4.0252	-2.7623
21			UNGRPD	2	.0054	.9510	1	.0482	-.9574	2.0924
22			1	1	.4690	.9981	2	.0014	.0054	-.5774
23			3	3	.7528	.9996	1	.0004	4.4327	.4510
24			UNGRPD	2	.0656	.9116	1	.0884	-1.4176	.6539

Table 7-28 Classification output

This classification is based on Bayes' rule. The probability that a respondent (case) with a particular discriminant score (D) is a member of a specific Miles & Snow type group (i) is estimated by

$$P(G_i \mid D) = P(D \mid G_{ii}) P(G_i) \;/\; \sum_{i=1}^{g} P(D \mid G_{ii}) P(G_i)$$

In the equation prior probability, displayed as P (G_i), is the likelihood that a case belongs to a particular group when no additional information is known. In this analysis, since the respondents are considered representative of the total population of ferry service providers, the observed number of respondents for each group is considered a good estimate of the prior probabilities. Table D-8 shows that this about 30 % (.30769) for both the prospector and defender group, and a little over 38 % (.38462) for the analyser group. The conditional probability, shown as P ($D \mid G_i$) in the equation, is calculated by assuming that a case belongs to a particular group (in this analysis group membership is known for 13 cases), and the probability of the observed score given membership in the group is estimated. This means that the conditional probability of D, given the group, provides an idea of how likely the score is for members of a particular group. However, when group membership is unknown, which is the case for 11 cases in this analysis, an estimate is required to determine the likelihood of membership of the three different groups on the basis of the available information (the predictor variable selected). This probability is known as posterior probability, denoted as P ($G_i \mid D$) and is calculated by solving the equation.

In table 7-28 it can be seen that the posterior probability, P(G/D), for case 1 to belong to the highest group 1 (prospector) is 99 % (0.9913) and the probability of it belonging to the second highest group (3 (defender) is less than 1 % (0.0087). The conditional probability, P(D/G), of case 1 being classified as belonging to group 1 (prospector) is 64 % (0.6437).

Classification results -

Actual Group	No. of Cases	Predicted Group Membership 1	2	3
Group 1 Prospector	4	4 100.0%	0 .0%	0 .0%
Group 2 Analyser	5	0 .0%	5 100.0%	0 .0%
Group 3 Defender	4	0 .0%	0 .0%	4 100.0%
Ungrouped cases	11	2 18.2%	6 54.5%	3 27.3%

Percent of "grouped" cases correctly classified: 100.00%

Classification processing summary

24 (Unweighted) cases were processed.
0 cases were excluded for missing or out-of-range group codes.
0 cases had at least one missing discriminating variable.
24 (Unweighted) cases were used for printed output.

Table 7-29 Classification results

Table 7-29 shows the actual groups and the number of cases predicted for a particular group. The percentage of 'grouped' cases correctly classified for this analysis is 100 %, which, of course, is a very good result.

7.8.5 Validation of the classification results

To validate the classification results a random test of the discriminant analysis was repeated fifteen (15) times with five sets of approximately 90 % of the cases included, five sets of approximately 80 % of the cases, and with five sets of approximately 70 % of the cases included. The results can be seen in table 7-30 and show that in four tests the percentage of cases correctly classified is less than 100 %, but still 80 % or above. In two tests an analyser was classified as a prospector, in another two tests a prospector was classified as an analyser, and in one test a prospector was classified as a defender. From these tests it follows that the predictor variables selected performed very well in the analysis. The predicted group membership was correctly classified and that these results are fairly stable when using random samples of all cases.

Results of random classification tests										
Random %	Cases	Correctly classified	Group membership of cases							Misclassification
			P	A	D	U	UP	UA	UD	
90	24	100 %	4	5	4	11	2	6	3	none
90	23	100 %	4	5	4	10	2	6	2	
90	21	100 %	4	5	3	9	4	4	1	
80	18	100 %	4	5	3	6	2	4	0	
80	21	100 %	4	5	2	10	4	5	1	
80	19	100 %	4	4	3	8	2	3	3	
90	20	100 %	4	3	4	9	4	2	3	
90	20	100 %	4	3	4	9	1	5	3	
80	22	100 %	3	5	4	10	2	8	0	
70	19	100 %	3	4	3	9	2	6	1	
70	16	100 %	2	4	3	7	0	4	3	
80	20	88.89 %	4	2	3	11	5	3	4	1 A as P
70	16	83.3 %	1	1	4	10	0	3	7	1 P as D
70	19	80 %	3	5	2	9	1	8	0	1PasA + 1A as P
70	18	80 %	2	5	3	8	1	6	1	1 P as A
Key: P = Prospector, A = Analyser, D = Defender, U = Ungrouped, UA = ungrouped classified as Analyser, UP = ungrouped classified as Prospector, UD =ungrouped classified as Defender										

Table 7-30 Results of random classification tests

7.8.6 Fisher's linear discriminant functions

Fisher's linear discriminant functions, shown in table D-10 in appendix D, is a set of coefficients which can be used directly for classification. A set of coefficients is obtained for each Miles and Snow type group and a respondent (case) is assigned to the type for which it has the largest discriminant score. For a detailed mathematical explanation see Sharma (1996: 277-8)

7.8.7 Canonical correlation

The canonical correlation (see table D-11 - column 5) is a measure of the degree of association between the discriminant scores and the groups. The canonical correlation for function 1 is 0.9640 and for function 2 is 0.7493. The eigenvalue shown in column 2 of table D-11 is the ratio of the between groups to within groups sum of squares. Large eigenvalues are associated with 'good' functions, which is the case for this analysis as eigenvalues of 13.1404 and 1.2802 are calculated for function 1 and function 2 respectively.

7.8.8 Interpretation of the discriminant function coefficients.

The unstandardized coefficients (as shown in table 7-27) are the multipliers of the variables when they are expressed in the original units. The magnitude of the indicators is determined by the underlying value of the predictor variables. All variables in this analysis, apart from 'competition', which has a nominal scale from one to three, have the same scale of importance ranging from 5 (very important) to 1 (very unimportant). Nevertheless, in order to compare scales, standardisation of the coefficients is required. This means that all variables are standardised to a mean of 0 and a standard deviation of 1. The standardised coefficients are shown in table D-11 (appendix D). Their signs are arbitrary, so all variables have to be looked at to determine which variable results in large or small function values. Large negative values can be seen for function 1 for the variables representing bus services, baggage handling, spa / health club on-board, special facilities for business travellers at the terminal, and special facilities for motorists at the terminal. Positive coefficients for function 1 are for the variables representing casino on-board, rail links to and from the terminal, special facilities for disabled passengers at terminal, special facilities for children at the terminal, and cafeteria at the terminal. The variables are listed for both functions in table 7-31.

Standardised canonical discriminant function coefficients (ordered)		
Description	Function 1	Function 2
Facilities for disabled at terminal	2.86125	-0.49225
Casino on-board	2.78018	-0.42942
Facilities for children at terminal	1.79873	-0.13244
Rail links to/from terminal	1.56591	1.47036
Cafeteria at terminal	1.13125	0.91845
Facilities for motorists at terminal	-0.74302	0.01270
Baggage handling at terminal	-1.11312	0.15250
Facilities for business travellers	-1.26433	0.00446
Spa / health club on-board	-1.45479	0.94981
Bus services to / from terminal	-4.64739	-1.38844

Table 7-31 Standardised discriminant coefficient functions

Table D-12 shows the descriptive statistics for the discriminant scores for function 1 (DIS1_1) and function 2 (DIS2_1) with the Miles and Snow type groups of the 13 respondents who stated their corporate culture type. The analysis of variance between function 1 and the Miles and Snow type groups shows a F-value of 65.7021 (prob. = 0.0000) . The difference in means for the groups is clear, with the prospectors having a mean of .8564, analysers, having a mean of -3.7434, and defenders having a mean of 3.8208. For function 2 the F-value is 6.4008 (prob.= 0.0162), prospectors mean = -1.4642, analysers mean = 0.4587, and defenders mean = 0.8908.

Table D-13 shows the structure matrix with the pooled within groups correlations between discriminating variables and the canonical discriminant function. The variables are listed in descending order of correlation and the function with which it has the highest correlation is shown with an asterisk(*). 'Growth for reasons of public relations' has the highest correlation to function 1 (0.59055) and 'minicruise passengers as target customers' has the highest correlation to function 2 (-. 57737).

Table D-14 shows the canonical discriminant functions evaluated at group means (group centroids). Group 1 (prospectors) has a positive mean for function 1 and a negative mean for function 2, Group 2 (analysers) has a negative mean for function 1 and a positive mean for function 2, and Group 3 (defenders) has a positive mean for both functions. Figure D-1 shows the territorial map for the three groups on both functions with the group centroid indicated with an asterisk (*).

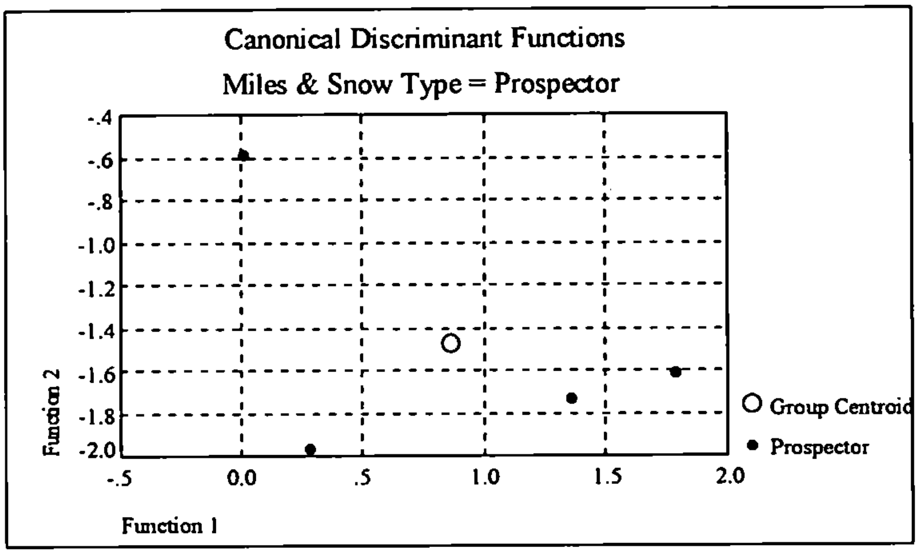


Figure 7-4 Canonical discriminant functions plot for prospectors

The location of the three Miles and Snow type groups and the ungrouped cases can be shown in more detail in separate plots. Figure 7-4 shows the canonical discriminant function plot for prospectors, figure 7-5 shows the analysers, figure 7-6 shows the defenders, figure 7-7 the ungrouped cases, and figure 7-8 shows all respondents in an all group scatterplot.

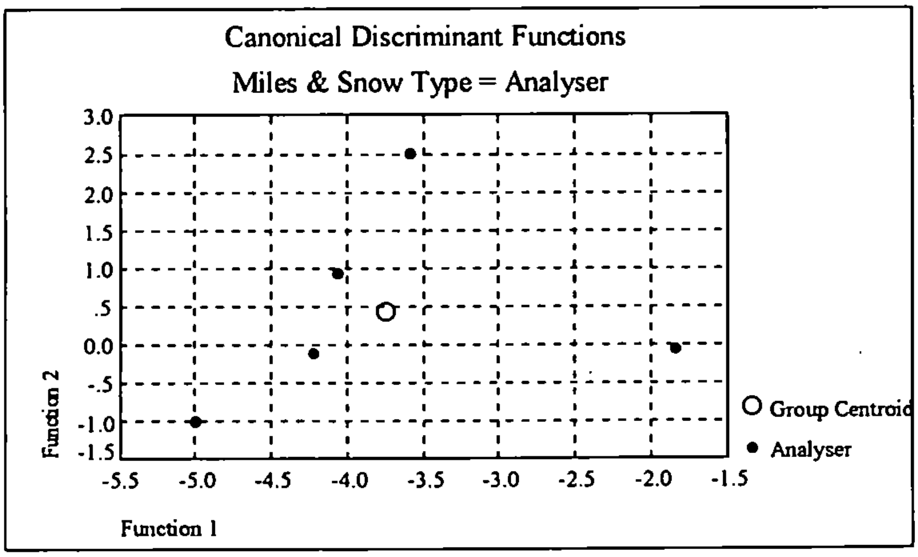


Figure 7-5 Canonical discriminant function plot for analysers

The ungrouped respondents, all of whom were allocated a predicted Miles and Snow type group, together with the respondents, who identified their own type are listed in table 7-32. A visual representation, in addition to this list, is the scatterplot (figure 7-9) which shows the respondents and their canonical discriminant functions.

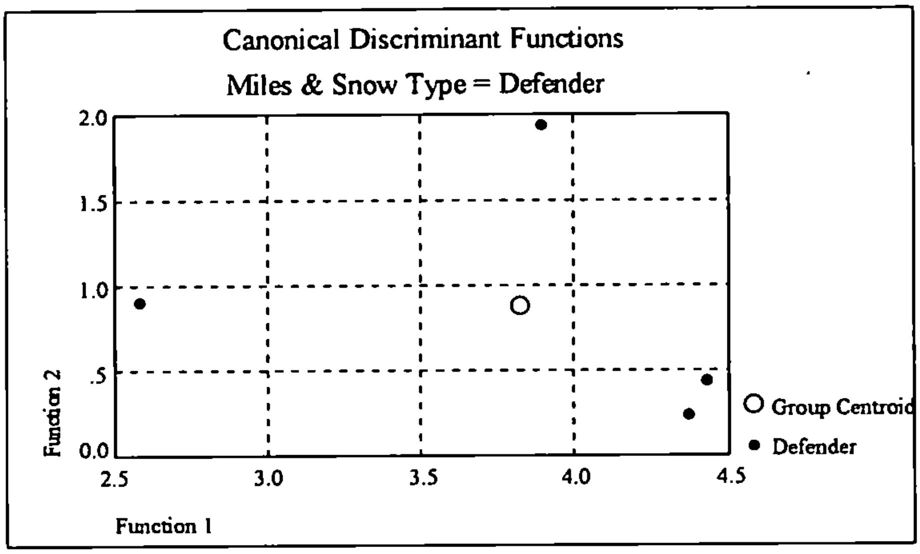


Figure 7-6 Canonical discriminant function plot for defender

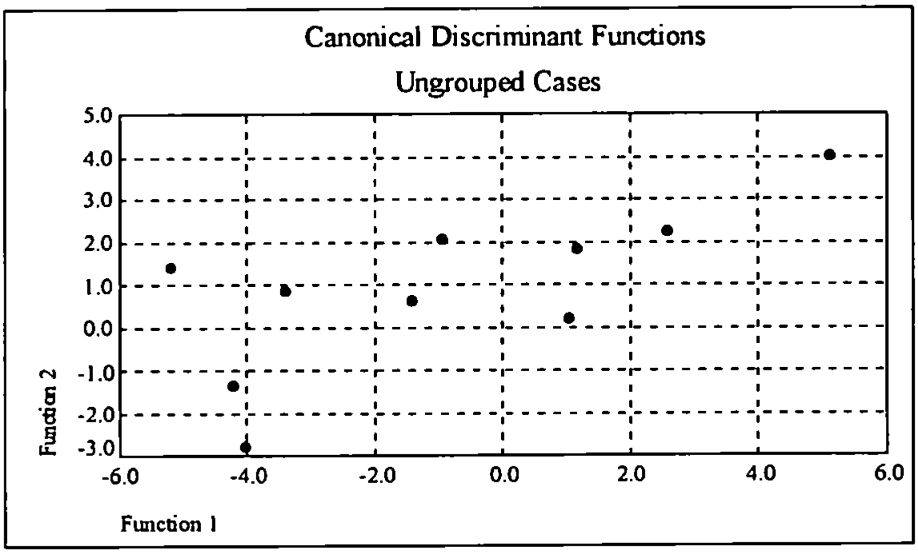


Figure 7-7 Canonical discriminant functions for ungrouped cases

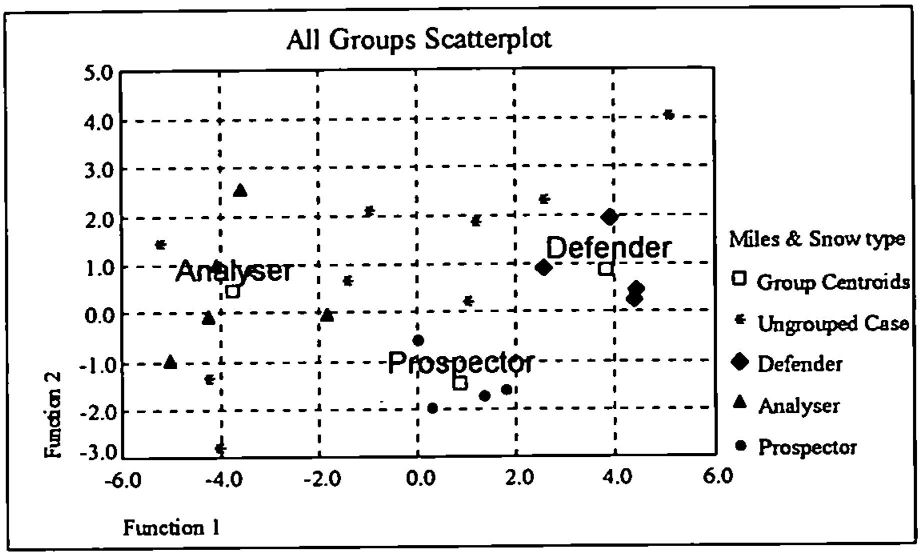


Figure 7-8 All group scatterplot

Predicted Miles & Snow Type	Respondent	Miles & Snow type
Prospector	Port 11	.
	Ferry 7	.
	Port 4	Prospector
	Ferry 1	Prospector
	Ferry 2	Prospector
	Region 2	Prospector
Analyser	Port 5	.
	Port 12	.
	Port 9	.
	Ferry 5	.
	Region 1	.
	Region 4	.
	Port 13	Analyser
	Port 7	Analyser
	Port 10	Analyser
	Ferry 4	Analyser
	Ferry 6	Analyser
Defender	Port 1	.
	Port 2	.
	Ferry 3	.
	Port 3	Defender
	Port 6	Defender
	Port 8	Defender
	Region 3	Defender

Table 7-32 Respondents by predicted Miles and Snow type

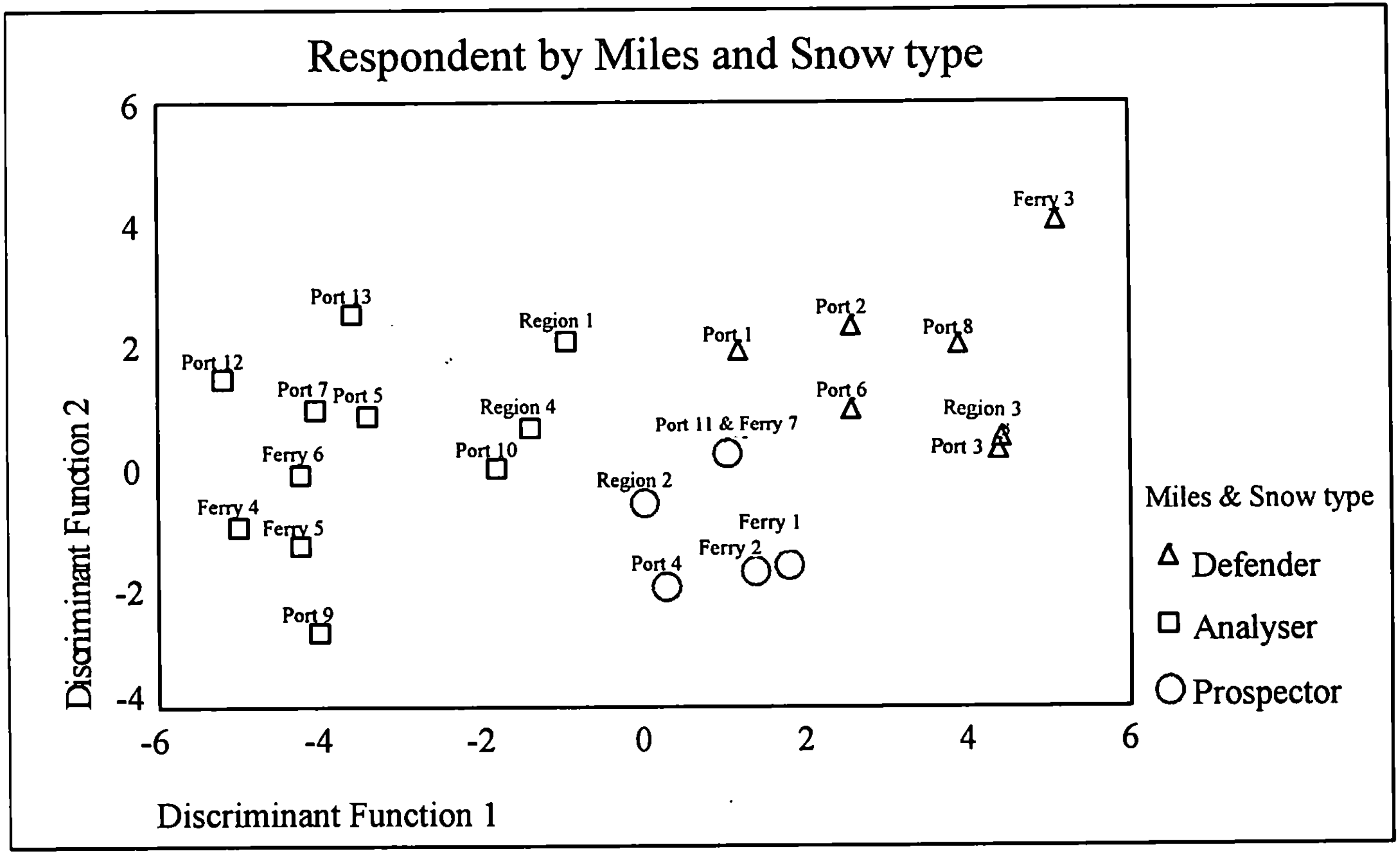


Figure 7-9 Discriminant functions of all respondents

7.9 The relationship between the augmented ferry service offer and corporate culture

The objective of this part of the study was to test the second hypothesis. It has been shown that by means of discriminant analysis the appropriate corporate culture type as defined by Miles and Snow can be predicted on the basis of the initially selected 41 predictor variables. After assessing the significance of these predictor variables it appeared that ten predictor variables discriminated significantly among the three Miles and Snow type groups of prospector, analyser, and defender. Figure 7-10 shows these augmented ferry service elements and their associated Fisher's linear discriminant function. From this it follows that the second hypothesis cannot be rejected as the differences in augmented ferry service elements among ferry service providers in terms of Miles and Snow corporate culture type are clearly demonstrated.

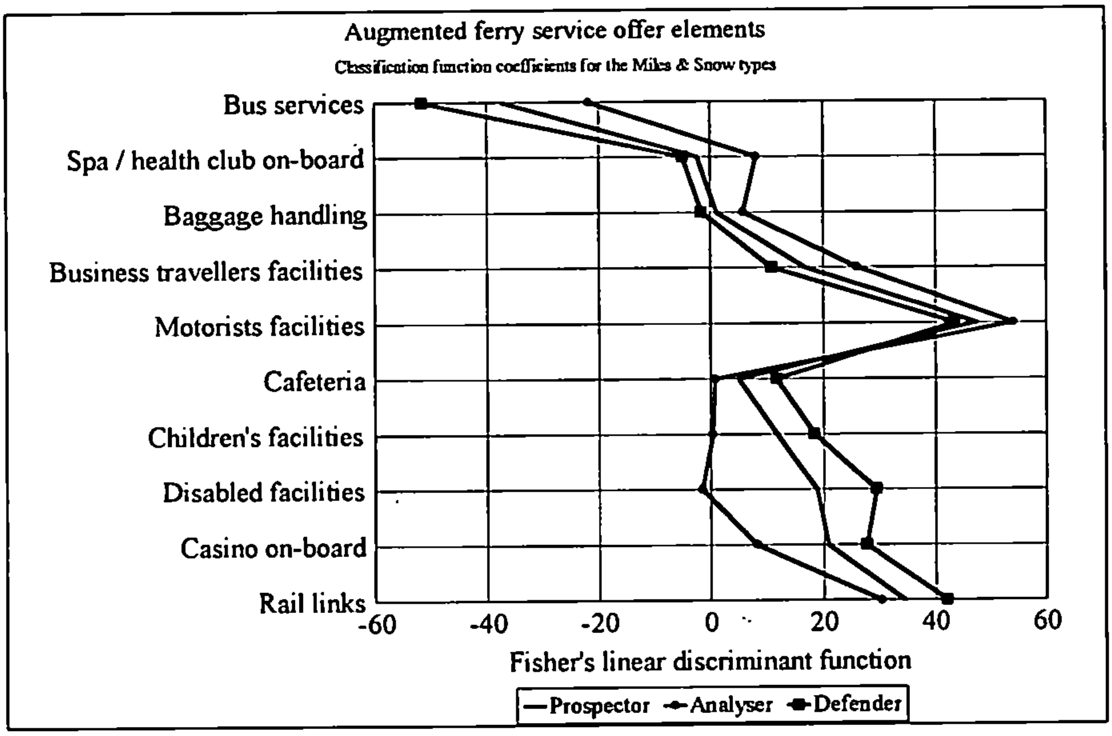


Figure 7-10 Augmented ferry service offer elements by Miles and Snow type by Fisher's linear discriminant function.

Table 7-33 shows the classification function coefficients of the augmented ferry service offer for the Miles and Snow corporate culture types in terms of the 'ferry customer experience'.

Classification function coefficients of the augmented ferry service offer for the Miles and Snow corporate culture type						
Ferry service elements		Ferry service offer level				
Category	Description	Core	Inter	Augmented — Classification function coefficients (Fisher's linear discriminant functions) — Miles & Snow Type		
				Prospector	Analyser	Defender
Pre-booking	Advertising	*				
	Route information	*				
Booking	Reservations	*				
	Issuing tickets	*				
	Passenger lists		*			
Access/Exit	Road links	*				
	Rail links			34.5	30.4	42.1
	Bus services			- 37.2	-21.8	- 51.2
	Signposting	*				
Terminal	Buildings	*				
	Linkspans	*				
	Lorry drivers		*			
	Waiting area		*			
	Security		*			
	Baggage handling			1.0	5.8	- 1.6
Special facilities for:	Cafeteria			4.9	0.7	11.7
	Children			11.8	0.3	18.5
	Disabled			18.9	-1.6	29.5
	Business travellers			16.8	26.1	10.9
	Motorists			47.6	54.1	43.5
	Restaurant			not selected		
On-board ferry	Restaurant	*				
	Bar		*			
	Shop		*			
	Spa/health club			- 2.4	8.1	- 5.0
	Casino			20.9	8.2	27.7
	Cinema			not selected		
	Swimmingpool			not selected		
			Constant	-217	-197	-250

Table 7-33 Classification function coefficients of the augmented ferry service offer for Miles & Snow type

Chapter 8

Conclusions

8. Conclusions

The objective of this study has been to investigate the market offer of passenger-car ferry services within and from the United Kingdom. The market offer (or product) is claimed to be the most important element of the marketing mix (Kotler, 1994). The underlying assumption of this research is that a clear understanding of the ferry service offer is central to the marketing and, thus, to the success of the ferry industry.

The study has concentrated on the ferry service offer and its relationship to services marketing and corporate culture. The study has combined the main practical areas of shipping, land transport and associated infrastructure with concepts from marketing and strategic management, approached from the point of view of the provider of the ferry service offer. Initially, it sought to analyse the existing ferry services offered within and from the United Kingdom by the various operators, and subsequently undertook an empirical investigation based on the underlying theory. The role of the consumer is, of course, crucial to an understanding of the marketing of ferry services. However, this particular study focused on the supply of the ferry offer, and may be seen as complementary to earlier studies of ferry consumers, in particular, Rich (1980), Matear and Rich (1989), Matear (1987, 1991), and Matear, Gray and Cowell (1991).

The main objective of this research was to determine the ferry service offer or 'product' in both practical and theoretical terms. Product has been identified (Kotler, 1984) as the most important element of the marketing mix, as without the product (good or service) there would be nothing to offer the customer, and the other marketing mix elements, price, place, promotion, physical evidence, people, and process, would play no role. Attempts to define product go back to the beginning of this century when Copeland (1923) classified products as convenience, shopping and specialty goods. This classification, and others which followed, concentrated on goods only in both consumer and industrial (business-to-business) markets. Because of the increasing importance of services in terms of employment in modern economies (Economist, 1990), the classification of services became of interest to academics such Levitt (1960), Cowell (1972), Grönroos(1980), and Eiglier and Langeard (1981). This study has shown that their classifications (see tables 3-1, 3-2, and 3-3), which in summary can be stated as core, inter-product and augmented service offer, can successfully be applied to the ferry service offer, and therefore, contributes to the body of academic marketing knowledge by testing these general theories on the classification of services in the particular area of ferry services provided within and from the United Kingdom. A special aspect of the total ferry service offer is that it is provided by a number of different service providers. These were identified as the ferry operator, the port authority, the port operator, the government (local, regional, and national), private third parties and combinations. As such the ferry service offer is similar to other services, for example bus services, air and rail links where the total service also depends on a number of independently operating or co-operating providers of parts of the service. Marketing theory, however, has not yet provided an adequate product classification of this 'integrated' product, where the total product is provided by different organisations and this study is a contribution to the development of such a classification while building on existing knowledge.

Ferry services are provided all over the world. For practical reasons, however, the study was limited to ferry services offered in the United Kingdom, including both domestic (see table 2-1) and international routes (table 2-2). Concentrating on the United Kingdom ferry services did not excessively limited the scope of the investigation as it still enabled the comparison of a wide variety of routes, ferries, ports and operators while maintaining a common base of potential customers.

Ferry travel in the UK is of considerable importance, because it provided the only international surface transport link to Continental Europe (before the opening of the Channel Tunnel) and provides an international link to Eire. It also provides the main, if not the only, domestic link between various parts of the UK, for the transport of cars, buses, trailers and lorries and their drivers and passengers. In 1994 there were 21 domestic ferry routes with services offered by 9 different operators and 43 international ferry routes operated by 19 different ferry companies. Ferries carried in 1994 a total number of over 52 million passengers, over 10 million cars, almost 3 million trailers, and a quarter of a million buses (Cruise & ferry Info, 1995).

The analysis of ferries services in the UK is based on a database developed specifically for this research by the author. All the ferries included in the database can be described on the basis of on-board ferry facilities and services, a central focus of this study, in addition to all other data which was considered relevant. The total number of available categories for analysis of the 70 ferries/routes combinations included is 125.

8.1 Ferry services in operation in 1994 in the UK

The main objective of ferries operating within the UK and between other European countries is to carry passengers and vehicles safely and profitably by sea. Ferries are designed to achieve this objective, based on customer demand and the expectations of the ferry company influenced by the economic, technical, social, cultural, political, and natural environment. The actual ferry in service by a particular operator, whether acquired as a newbuilding or as a second-hand vessel, can be described by a number of different variables, such as physical dimensions, technical data, construction, capacities, on-board facilities, on-board services, on-board provisions for disabled customers, on-board financial facilities, and consumer organisation rating. Most international ferry routes are provided on the basis of commercial viability. Some international and domestic routes are provided as a social necessity; these routes are frequently subsidised. The main reason is to ensure reliable transport links for the population usually in remote areas or scarcely populated regions or islands. For example most of the Scottish services are provided with the support of a subsidy from the Scottish Office. The main international ferry routes involved 18 UK ports. From some of these ports only one ferry service is being offered, others have two or more ferry services (see table 2-4). Ports often compete among each other to attract ferry services, however in some cases competition is not encouraged and only one operator is favoured to maintain the ferry link.

The physical dimensions of a ferry determine the suitability for a particular route in a commercial sense (carrying capacities) and in an operational sense (limitations of port entry and ferry terminal configuration). The length and the draught of the ferry is determined by these limitations as evidenced by the differences observed by area of operation. The beam shows no significant difference based on a single criterion, nor do deadweight, nett register tonnage, gross register tonnage, and free height access.

It has been shown that passenger carrying capacity, car carrying capacity, and lanemetres capacity differs significantly between routes and operators and within operators. It is reasonable to expect that ferry operators vary their capacity, and hence match the supply to the demand on a particular route. The difference within operators is easily explained by the fact that 15 out of the 35 UK ferry routes included are served by one ferry only.

The date of newbuilding of the ferries in operation differs significantly between ferry operators, with some operating relatively old vessels and others fairly new ones. The age of the vessel has an immediate impact on the voyage cost as the average specific fuel consumption is significantly lower for newer ferries.

8.2 Baseline models

A comparison of on-board facilities and services on 70 ferries operating in the UK in 1994 resulted in the development of a baseline model. Each baseline model stated the number (and percentage) of a wide range of ferry service elements available to the customer (see section 2.3.3.6 and figure 2-20). The result of this analysis was of practical value, as it enabled the use of baseline models to compare the ferry service offer on the basis of a number of different criteria. These criteria were the area of operation, ferry routes, ferry operator, port of departure, AA star rating, voyage time, country of registry, and year of newbuilding. However, such analysis was unable to explain the ferry service offer in terms of a general model.

8.3 The service offer

Chapter 2 has shown that the UK ferry service offer could only partially be explained by looking at route characteristics, ships' particulars, technical ferry data, and on-board facilities and services (see table 2-23). Therefore, in order to investigate the concept of the ferry service offer further, an appropriate theoretical basis was needed. As this study concentrates on the ferry service offer, and the companies which provide the service, it was appropriate to identify the underlying theory relating to services marketing, and to review the theory which may explain the corporate culture of the service providers in relation to the service offer (see also figure 1-1). This led to the development of a conceptual model and the formulation of two research hypotheses.

The conceptual model identified the two levels of the core ferry service offer and the augmented ferry service offer. It was assumed, based on the literature review, that the latter are the result of a reaction of management towards changes in the environment, mainly influenced by the prevailing and distinct corporate culture of each of the ferry providers.

The research hypotheses developed were:

H1.: There is a core level in the ferry service offer which must be provided by all service providers, irrespective of any changes in the environment. This core ferry service offer is similar for all ferry services and comprises the minimal acceptable service elements.

and

H2: The core service offer is augmented, depending on the ferry service provider's reaction to changes in the environment, and is influenced by the dominant corporate culture type of the service provider.

In order to test these hypotheses an appropriate analytical methodology was identified, see figure 6-1, and the analysis was undertaken.

The results of the analysis were that both hypotheses could not be rejected and the following conclusions were made:

1. The ferry service offer comprises two main levels, the core level and the augmented level. The core ferry service offer comprises those elements which are considered important by all respondents. The augmented ferry service offer contains the elements which were considered less important by respondents. In between these two levels is the inter-product level, where respondents did not agree on the importance of the ferry service elements. In

addition to these three levels the preferred provider of each particular ferry service element has been identified. The results of this analysis can be seen in table 7-14 in chapter 7.

2. The augmented ferry service offer can be explained by the Miles & Snow corporate culture types. Differences among prospectors, analysers, and defenders have been demonstrated and expressed in terms of their respective discriminant function. The results of this is shown in table 7-29 in chapter 7.

Combining these results it can therefore be concluded, that this study has provided a description of the ferry service offer in terms of product level, preferred provider, and dominant corporate culture.

The three levels of ferry service offer - core, inter-product and augmented - are now discussed separately.

8.3.1 The core ferry service offer

The core ferry service elements are advertising, route information, reservations, issuing tickets, road links and signposting, terminal building and linkspans, and a restaurant on board of the ferry. All these elements are perceived important for every ferry service offer. The result may prove to be a useful practical management decision tool which enables ferry service providers to assess whether the core ferry service elements are in place, in general or in a particular situation. However, it needs to be reviewed in conjunction with the other findings regarding preferred providers (see below section 8.4).

As an illustration of the appropriateness of the research findings let us consider a development since the research was initiated. The setting up of a new route by Irish Ferries in 1995 between Cork and Brest, in direct competition with existing Brittany Ferries' ferry route between Cork and Roscoff, focused entirely on the provision of an appropriate linkspan, identified as a core element in this study. The route did not get established since Irish Ferries would not go ahead without having a linkspan in place and the relevant authorities of the city of Brest were prevented by the national French government from purchasing a suitable linkspan, after complaints from Brittany Ferries. This development confirmed the findings of the current research where the preferred provider of linkspans was identified as the port authority, but requires the co-operation of other categories of providers.

8.3.2 The inter-product ferry service offer

The inter-product ferry service elements are considered important by some of the respondents and less so by others. It can be argued that in practice these elements, keeping passenger and cargo lists, waiting area at terminal, lorry driver facilities at the terminal, security at the terminal, and shops and bars on board of the ferry are to be considered 'core' or are close to becoming so.

For example, a shop and bar during the sea voyage are already available on 98.6 % of the UK ferries included in this research (see chapter 2). Also waiting areas and facilities for lorry drivers are desirable ferry service elements at the ports of arrival and departure. However, they are not 'core' or essential, although potentially so. Where they do not exist, they could be assumed to have priority over the augmented service elements (see next section).

8.3.3 The augmented ferry service offer

Augmented ferry service elements were identified as the ferry service elements in addition or augmentation to the core ferry service elements, but not essential for the provision of the ferry service. Rail links and bus services are important for passengers travelling without a vehicle, but represent a very small proportion of the ferry customers. Special facilities at the port of departure and arrival to satisfy the needs of different customer (market) segments, such as children, disabled people, business travellers and motorists and the provision of a cafeteria and baggage handling services are not available at every ferry service, but may be required to satisfy particular market segments depending on various criteria, including the size of the segment. On-board facilities such as spa, casino, cinema and swimming pool can be seen in the same light.

8.4 Providers of ferry service elements

In the ferry service system different operators provide the various goods and services, therefore overall control of the total service offering on a specific route is not always easy to achieve. Parties involved are the ferry operators, the ferry terminal operators, the port operators, and governments at local, regional and national level (and increasingly European level). In a situation where the ferry company also operates the ferry terminal and the port they are still dependent on the providers of the port access infrastructure (roads and railways).

8.4.1 Ferry operator

The ferry operator plays a role at the core, inter-product and augmented level. All of the described providers, apart from third parties, are involved at the core level, not just the ferry operator. This means that it is essential for these providers to work together. In practice this may mean that the initiative to set up a new route may come from any of these providers, but requires the co-operation of the other two to ensure the development of the actual service.

This may have severe implications in the 'product development' process of a new ferry service. Problems which can be foreseen are the different objectives of the parties and the possible differences in corporate culture of the partners. A refusal to provide one of the essential aspects of the ferry service offer, see the example in section 8.3.1 where the French government refused to provide a linkspan in Brest, may result in the failure to provide the ferry service at all. Of course, it is often possible by one of the providers to control the total service sequence in order to see the new ferry service established. The acquisition of one or both ports could be the sensible step for the ferry operators, for example Stena Sealink (Ports) owns the ports of Fishguard and Holyhead and the port of Newhaven is owned by Newhaven Port & Properties (Sea Containers). This strategy of vertical integration, forward or backward, is one which could be pursued over the entire service encounter sequence (or service supply chain).

At the inter-product level the ferry operator is the preferred provider at the booking elements and the sea voyage. At the augmented level the ferry operator is identified only as the preferred provider for the sea voyage, or on-board service elements. These results show that the providers of the ferry service offer see the role of the ferry operator as a fairly limited. This role could, of course, be limited even further. On the basis of the findings of this research, one could for example, argue whether the provision of shops and other retail outlets on board of the ferry during the sea voyage should be left to the ferry operator as the preferred provider and not made available to third party specialist (shop)operators under a franchising or concessionary scheme

A further difficulty is the communication process between the preferred providers of the ferry service offer regarding the operation of the service encounter sequence. The requirements of one provider, for example the road access route provided by the local government to the Associated British Ports (ABP) ferry terminal of (sole user) Brittany Ferries in Plymouth has received criticism from ferry bosses as being unsuitable for families and children. The presence of a 'red light district' immediately at the entrance of the terminal is seen by the ferry operator as a nuisance if not worse, a fact denied by the responsible city councillor (Western Evening Herald, 1997)

8.4.2 Ports

The ports are the preferred provider at the core and inter-product level of the ferry service elements at the port of departure and the port of arrival. Ownership of ferry ports varies in the United Kingdom. For example, the port of Dover is owned by a 'trust' - the Dover Harbour Board, the port of Hull is under 'private' ownership - Associated British Ports, and Portsmouth is owned by the 'municipal' government. Past government initiatives to privatise ports, such as with ABP, has moved the ownership of ferry ports away from government and public funding towards private companies and shareholders. The role of the port does not necessarily change dramatically, but the objectives - particularly in terms of profits, may have change for the better for the ferry users as customer needs may be given more attention. Furthermore, private ownership of ports may enable the development of the ferry port more rapidly .

8.4.3 Government

Government is the preferred provider of the access and exit service elements of the ferry service offer at the core level. The provision of road links and signposting cannot easily be undertaken by other parties. The main problem, for the port operators and the ferry operators, is to ensure the appropriate infrastructure. Road links, in particular, are causing more and more public resistance for both upgrades or the construction of new one. On these difficulties in providing road links Steven Norris, former British Minister of Transport, addressing a meeting of the Institution of Highways and Transportation in May 1998, commented that his advisors told him to forget about fighting the 'NIMBY - not in my back yard' attitude and adopt instead the 'BANANA - build absolutely nothing anywhere near anybody' approach to see him successfully through his period of office. Failure by the government to upgrade, over years, the road to Weymouth ferry port was the main reason for ferry operator Condor to move their ferry service to Poole in 1997 (Cruise & Ferry Info, 1997)

At the augmented level the government is the preferred provider of rail links. The history of railways shows mixed ownership, starting out as private companies, and being put under government control later, followed by widespread privatisation. The results of the privatisation are only slowly emerging but expectations for a more customer oriented approach are becoming more and more evident. Of course, the ferry service offer, relies heavily on the car user, so that improvements in public transport and less competition from air links are the only factors likely to encourage the foot traveller to use the ferry more frequently.

8.4.4 Third parties

Third parties are only seen as the preferred provider at the augmented service offer level. The services identified are the bus services, restaurant and cafeteria at the ferry terminal. Provision of the bus service by third parties is now current practice, with the exception of North Sea Ferries, who put on a special bus service for their ferry customers from the central railway stations to their ferry terminals. Again, the bus services were deregulated about ten years ago in the UK, were mainly operated by municipal governments and bus routes would include a stop at or near the ferry terminals as appropriate.

8.4.5 Combination

A combination of preferred providers is the situation where port and ferry operators decide jointly to provide this part of the service. There are two types of combinations. The first one is the ferry/port combination where the ferry 'leads' as the preferred provider, for example the provision of baggage handling services. The second one is the port/ferry combination where the port 'leads' the combination mainly in the provision of terminal facilities such as those for business travellers, children, and lorry drivers and the provision of security. Combinations are only identified at the inter-product and augmented level.

8.5 Corporate culture

Corporate decision making and the firm's activities are assumed to be influenced by the cultural structure of the organisation identified as the corporate culture. The theoretical basis of this assumption as evidenced by existing literature was explored in detail in section 3.3. The first part of the analysis, therefore, concentrated on establishing which corporate culture elements (see section 5.8) were perceived as important. The main aspects of the corporate culture were described by the concepts of target customers (market), price base for ferry terminals, reasons for growth, external environmental factors, competition and commitment. Detailed tables of the resulting crosstabulations can be seen in appendix F. The first part of the analysis also identified which dominant corporate culture types in terms of Miles and Snow typology existed among respondents. The second part of the analysis attempted to describe the augmented ferry service offer in terms of these typologies (see also figure 6-1 in chapter 6).

It was found that for target customers driver accompanied lorries, independent holidaymakers, package holidaymakers and unaccompanied trailers were ranked highest in perceived importance. This confirms the hybrid, or dual, role of the ferry service offer, see also chapter 2, which is aimed at both the consumer (holidaymakers) and industrial market (lorries and trailers) by most of the ferry companies. A recent example of the hybrid nature of the ferry market can be illustrated by an article in the Financial Times by Jones (1997) which states that the sole operator of the ferry service between Douglas (IoM) and Heysham defends its policy of freight revenues subsidising passenger routes as necessary, because in the summer period they carry a large number of passengers, but very few in the winter.

Ferry operators derive their income directly from paying ferry users. The providers of the ferry port terminal facilities and services may also derive income from ferry users, but additionally charge the ferry operators for the use of their facilities and services. Whereas there is a straight link between the charge and the service used, for example a pilot's time on board when entering and leaving port, other links are not so easily justified, for example, charges for cargo carried. The price bases of ports identified were marine charges - service elements such as pilots and tugs, berthing and quays, and the number of vehicles and passengers. Responses indicated that charges for cargo per tonne, the size of the vessel, and a consolidated vehicle and passenger handling charge could also be used as a price base. All identified price bases were acceptable to the majority of ferry operators, and, as can be expected, by the majority of port respondents. Profit is the main motive for growth, followed by utilisation of existing space and diversification.

The external environment can be described as those factors which influence a business organisation, but which cannot, unlike internal factors, be controlled by management. The external environmental factors which influence the ferry service providers have been identified as financial, social, political, technical, and natural factors (such as deep water access).

The financial environment, see table 7-18, which includes the economic and financial factors is perceived of highest importance by all respondents. Respondents commented that the financial soundness of the parties involved is very important. The possibility of attracting grants and subsidies for infrastructure and the general need to provide a viable ferry service were also included as comments by respondents. Respondents also mentioned that when the government was setting the requirements of the service, for example to ensure an essential sea transport link, the ports and ferry operators who provide the service were expected to be financially supported by the government to make the ferry service viable. So when the traffic numbers do not cover the total operating cost of the service, an operating subsidy (such as the one provide by the Scottish Office) is part of the operating agreement.

The natural environment ranked second in perceived importance. Specifically mentioned by respondents was the need for twenty-four hours access a day. This means that only a small number of natural ferry ports, most of which are currently in use, can seriously be considered potential ferry ports, unless large investments are made, for example, dredging an entry channel.

Technological factors are ranked next in importance, but were considered less important by the ferry respondents (see table F-3, appendix F). A possible explanation is that conventional ferry services rely on proven methods of ship construction and technologically well tested marine equipment. Technological factors of importance mentioned by respondents was related to fast ferries and related technology. These recently developed, technologically more advanced high speed systems, are less reliable or in some instance untested in all operational conditions. This may explain the concern expressed by respondents about the availability of professional (technical) services to repair and maintain existing and future vessels and equipment. Respondents also mentioned that, in order to maintain the advantage of fast craft, the appropriate infrastructure in terms of good road links and port access is important.

The social (and cultural) environment ranked fourth in perceived importance. This indicates that respondents do not consider the social and cultural environment, as an external factor, to be a primary influence on management decision making. However,

the social and cultural environment, as an internal factor - in the form of corporate culture, plays a significant role in the results of management decisions in particular in terms of the augmented ferry service offer. It seems that no systematic analysis of the natural and cultural environment is undertaken, as opposed to a possibly very detailed analysis financial, natural, and technical factors. These is perhaps a reflection of the background of the respondents who tend to have a technical background or professional qualifications. The fact, however, that no specific analysis is undertaken of the social and cultural environment does not mean that it has no influence. This research found that it does influence the augmented ferry service offer and that differences between different types of corporate culture are statistically significant (see figure 7-10 and table 7-33).

Fifth and least important was the political / legal environment to respondents. This is perhaps somewhat surprising when one considers the importance of political and legal aspects to the provision of the total ferry service offer and to specific elements of the ferry service offer. For example, the imminent abolition of tax / duty - free shops (see chapter 1) has an enormous impact on the financial viability of existing routes and the number of associated jobs. The political environment, largely determined by the government in power, includes the legal and regulatory environment at local, regional, national and European level. Respondents did however, express the need for a stable and consistent government, and the importance it could have on employment. It can be seen from table F-3, appendix F, that the respondents from the ferry operators considered the political environment less important than the respondents from the regions (i.e. those working in the political environment). This was perhaps to be expected, because the governmental regions are almost always involved in planning regional transport infrastructure, which requires a large input from regulators, legislators and politicians.

Competition among ferry service providers takes the form of ports competing among themselves, often supported by regional governments for selection by ferry operators, and ferry operators competing between routes or on the same route. In general, competition may take the form of one ferry operator on one route, two or more competing operators on one route, or two or more collaborating operators on one route. Ferry operators preferred full competition with two or more ferry operators competing on one route, whereas the port respondents (but not the regional governments) favoured one operator on one route and failing that two or more collaborating ferry operators on one route. Various reasons were given for favouring no competition, which were the current operator having an established track record, the reliability of the service provider and the threat to economic viability of all ferry operators in case of full competition.

The commitment of ferry service providers can take various forms; the elements which have been identified are a guaranteed operating period, a guaranteed schedule, financial commitment, financial investments, priority berthing, allocation of open space, allocation of sheds and buildings and dedicated labour. A crosstabulation of these elements and their perceived importance according to port, region and ferry operator respondents can be seen in table F-4 of appendix F (crosstabulations: corporate culture). As could be expected priority berthing ranks first in perceived importance for all respondent groups, without which it would be very difficult to maintain the second ranking element, guaranteed schedule.

The Miles & Snow types of corporate culture as identified in chapter 3 and as further discussed in section 5.8.7 comprises four types: reactor, analyser, prospector and defender. Of these four types none of the respondents considered themselves to be a reactor. This was not unexpected as in the literature (see Walther and Ruekert, 1987) the reactor is, unlike the other three types, not seen as a permanent type, but rather for companies in the process of moving from one of the other three types.

The Miles and Snow classification illustrates two fundamentally different positions with respect to, among other things, growth (Harrison and St.John, 1998). Of the two extremes prospectors aggressively pursue growth, while defenders tend to pursue stability. Organisations labelled analysers and reactors are somewhere between these two extremes.

Attitude toward growth is critical in guiding the allocating of the organisation's resources and also affects any change in mission or scope of the organisation over time.

This study has shown that by means of discriminant analysis the difference in augmented ferry service offer can be explained on the basis of the stated different Miles and Snow corporate culture types, be it defender, prospector or analyser, of each provider. This suggests that, regardless whether the provider is a ferry operator, port, or regional government, whether they are small or large, located in one part of the country or in another, that the main element what makes them similar and different in terms of the perceived importance of the augmented ferry service elements, or augmented ferry service offer, is the corporate culture type they identified as being dominant in their particular organisation. This also means that when a particular corporate culture exists, that changes in the environment will cause a reaction in terms of managerial decisions regarding the augmented ferry service offer, consistent with the dominant Miles and Snow type identified.

As a result of these findings a more systematic analysis of management decision making may reveal how consistent the decisions taken, for example as a reaction to the Channel Tunnel, or the technical feasibility of introducing fast ferries, are with the ferry provider's own corporate culture type. Further analysis of these management decisions may establish how consistent they are with other ferry service providers of the same type of corporate culture, or how different they are from those with other types of corporate cultures.

It may also give rise to the desire of one type of ferry service provider to offer ferry routes with other providers whose organisations are of the same cultural type, or to investigate difficulties in the service provision in terms of organisations of different corporate culture types. These areas, however, need to be researched in more detail in further studies, as this research only established that different augmented service offers could be explained on the basis of organisations with corporate cultures identified as defender, analyser or prospector.

8.6 Contribution to knowledge

Members of the ferry industry in Europe, together with national policy makers and those within the European Commission, have shown a keen interest over the last few years in what should be provided by ferry services (Heijveld and Gray, 1993, 1996a, 1996b; Gray et al., 1995). The user of the ferry is also interested in a clear definition of the offer, as that will enable a better choice of the ferry services to be made (see among others: the annual AA guides to Ferries, the monthly Cruise & Ferry Info magazines and the bi-monthly ABC Cruise & Ferry Guides). Governments have also shown an interest in defining what the ferry service offer is and whether legislation or regulations to ensure minimum levels of service provision presently in force are adequate and desirable, in particular with regard to overall safety (Fenton, 1995). One of the main decisions of the management of ferry companies is what service offer is to be provided and the reasons for doing so. Therefore a more precisely defined description of the ferry service offer, based on marketing theory and practice, should important in assisting such decision making.

In essence a ferry service offer consists of different elements, some more central or important than others, varying from one company to the next and with differences in the service offer also existing within one company (see chapter 2). The central elements are sometimes called 'core' elements and the others are known as 'augmented' elements of the service offer.

This research contributes to the body of knowledge on marketing of services in general by supporting the validity of the 'product' classification models based on descriptives such as 'core' and 'augmented' service offer. This simple, but effective, classification initially designed for products and later extended to 'single' services holds its validity for the ferry service offer. The ferry service offer is a 'multiple' service offer comprising service elements which are usually not under the control of one provider, but are instead provided by a number of different organisations, who independently provide the joint service. Despite this aspect of multiplicity, the need to provide the minimal product or 'core' requirements and the augmented service elements as perceived by the different providers of the service encounter sequence, this study shows that the use of the 'simple' product classification is still valid.

The contribution to the study of marketing of ferry services, in particular, is through an investigation of the 'product' aspects of the ferry service offer, both in terms of importance and the service provider. The importance of the ferry service elements considered 'core' are the key for success in starting a new ferry service or attempts to modify an existing one.

This research shows that the basic or core service offer is practically identical for each ferry operation, and this similarity is also what ferry users in general perceive the ferry service offer to be. The consumer, upon initial examination of ferry services offered, is likely to perceive an image of similarity of ferry operators, route and schedule details, and on board ferry facilities. Customer perception of ferry services based on company brochures reinforces this image. A more detailed examination in this research, however, has revealed differences in augmented service offerings between routes, among competing ferry operators, within the same company, their various ships, and on board facilities.

This study makes a contribution to practical and theoretical knowledge by identifying the preferred provider of the ferry service elements. A practical advantage for the ferry industry is that the importance and the preferred provider of each ferry service element can be used for guidance when assessing the current operation of a ferry service, as well as for strategic decisions to modify the existing service, or indeed, to start a completely new service. Details of the results have already been discussed in section 8.4 (and chapter 7).

The theoretical advantages of the results of this study are that they provide a means for further analysis. For example, it could be argued that rather than the government providing road access, ferry operators (or private third parties) could build private road links to the ferry terminal, and the economic and customer benefits could be quantified for a government keen to privatise public transport. The inter-product and augmented ferry service offer in particular, enables management to make strategic and tactical marketing decisions, in terms of appropriate ferry service elements and their associated provider on the grounds of a suitable baseline model as identified in chapter 2, and it enables better decision making in terms of product positioning.

A further contribution of this research is to explain the augmented ferry service offer in terms of the Miles and Snow corporate culture type of each provider.

The methodology adopted in this study may also be applied in other areas of transport, for example the provision of bus services and rail services. In particular, it is relevant in those areas of the world where, as a result of privatisation, the total control of the service offer is no longer with one authority or organisation.

8.7 Scope of the research

As with any study constraints in terms of time and cost affect the scope of research. In this study these constraints were taken into account and resulted in the collection of primary data at the same time when another study, covering a similar area of research was conducted by the author. This approach was deliberate and considered in advance but, inevitably, some compromises were required between the two studies, such as in the questionnaire design.

Another constraint of this study was the sample size. There is a limited number of ferry operators, ferry ports, and relevant regional governments operating in the United Kingdom to provide sample sizes of statistical significance. Given this, the response rate for a competitive industrial sector was considered quite good for this type of data collection. The response to the special Miles and Snow corporate culture questionnaire resulted in a little over half of the original respondents to the first and very detailed questionnaires. A possible reason for the lower response rate was that this questionnaire was obviously designed to test a theoretical construct. This did not affect the subsequent analysis and validation of the results to show that the second hypothesis could not be rejected. However, extending the results to other ferry service providers needs to be done with extreme care.

The issue of non-response was addressed in detail and was not seen to be a significant problem (see sections 5.11 and 7.7.1). As mentioned in chapter 1, the ferry service provider was the subject of the investigation for the reasons given. This approach does not mean that consumer preferences are not important, and, given the limited research in this area (e.g. Matear, 1991), there is clearly scope for more ferry consumer research. In particular a parallel study including the ferry customers, outside the scope of this research, is currently being investigated by the author.

8.8 Recommendations for further work

This work has attempted to make a contribution to both the theory of the marketing of services and the practical provision of the ferry service offer in the United Kingdom. However, this research has also served to highlight the need for further work. Of immediate concern is a parallel study involving the perception and preferences of customers in relation to the structured ferry service offer as identified in this study, followed by research into the definition, setting and maintenance of ferry service offer quality levels.

In a wider context, it appears that ferry services are becoming more and more integrated into the general transport system, not just in the United Kingdom, where holiday makers, business travellers and people visiting friends and relatives use the ferry, but also in the rest of the world. Congestion of roads in densely populated areas may lead to an increased importance of urban ferry transport systems. The role of the ferry and the service offer required from ferry operators into these highly complex systems needs further research.

Technological developments in terms of comfortable high speed craft means that travel times are being halved and greater reductions may be practically possible in the years to come. Travelling by ferry at speeds which exceed motorway speed limits may bring further incentives for motorist and lorry drivers to select this mode of transport and prefer to be 'driven'. These developments are already underway and further research into the wider area of services marketing such as ferry service offer pricing, and ferry service offer promotion is required.

Threats to UK ferry services in the form of the Channel Tunnel, air liberalisation, and the imminent abolition of tax / duty free sales also require further study into the possible effects these may have on the ferry industry and on the ferry service offer in particular.

Appendix A

Crosstabulations of ferry service elements

Appendix A Crosstabulations of ferry service elements

Perceived importance and preferred provider by respondent

Advertising
Preferred providers and perceived importance
according to Ports, Regions and Ferry Operators

According to (number of)	To be provided by	Very Important number (%)	Important number (%)	Neutral number (%)	Unimportant number (%)	Very Unimportant number (%)	Total number (%)
	Port Authority						
	Port Operator						
13	Ferry Operator	**11 (84.6)**	**1 (7.7)**				**12 (92.3)**
Ports	Government						
	Private Third Party						
	Combination	**1 (7.7)**					**1 (7.7)**
	Total	**12 (92.3)**	**1 (7.7)**				**13 (100.0)**
	Port Authority						
	Port Operator						
4	Ferry Operator	**1 (25.0)**	**2 (50.0)**				**3 (75.0)**
Regions	Government						
	Private Third Party						
	Combination	**1 (25.0)**					**1 (25.0)**
	Total	**2 (50.0)**	**2 (50.0)**				**4 (100.0)**
	Port Authority						
	Port Operator						
7	Ferry Operator	**7 (100.0)**					**7 (100.0)**
Ferry	Government						
Operators	Private Third Party						
	Combination						
	Total	**7 (100.0)**					**7 (100.0)**
	Port Authority						
	Port Operator						
All	Ferry Operator	**19 (79.2)**	**3 (12.5)**				**22 (91.7)**
24	Government						
Respondents	Private Third Party						
	Combination	**2 (8.3)**					**2 (8.3)**
	Total	**21 (87.5**	**3 (12.5)**				**24 (100.0)**

Table A-1 Advertising the service

Baggage Handling Preferred providers and perceived importance according to Ports, Regions and Ferry Operators							
According to (number of)	To be provided by	Very Important number (%)	Important number (%)	Neutral number (%)	Unimportant number (%)	Very Unimportant number (%)	Total number (%)
12 Ports	Port Authority	1 (8.3)	1 (8.3)		1 (8.3)	1 (8.3)	4 (33.3)
	Port Operator		2 (16.7)				2 (16.7)
	Ferry Operator	1 (8.3)	2 (16.7)	1 (8.3)	1 (8.3)		5 (41.7)
	Government						
	Private Third Party						
	Combination		1 (8.3)				1 (8.3)
	Total	2 (16.7)	6 (50.0)	1 (8.3)	2 (16.7)	1 (8.3)	12 (100.0)
2 Regions	Port Authority						
	Port Operator						
	Ferry Operator		1 (50.0)				1 (50.0)
	Government						
	Private Third Party						
	Combination	1 (50.0)					1 (50.0)
	Total	1 (50.0)	1 (50.0)				2 (100.0)
7 Ferry Operators	Port Authority						
	Port Operator	1 (14.3)					1 (14.3)
	Ferry Operator		2 (28.6)	3 (42.9)	1 (14.3)		6 (85.7)
	Government						
	Private Third Party						
	Combination						
	Total	1 (14.3)	2 (28.6)	3 (42.9)	1 (14.3)		7 (100.0)
All 21 Respondents	Port Authority	1 (4.8)	1 (4.8)		1 (4.8)	1 (4.8)	4 (19.0)
	Port Operator	1 (4.8)	2 (9.5)				3 (14.3)
	Ferry Operator	1 (4.8)	5 (23.8)	4 (19.0)	2 (9.5)		12 (57.1)
	Government						
	Private Third Party						
	Combination	1 (4.8)	1 (4.8)				2 (9.5)
	Total	4 (19.0)	9 (42.9)	4 (19.0)	3 (14.3)	1 (4.8)	21 (100.0)

Table A-2 Baggage handling

Bus services to/from the ferry terminal Preferred providers and perceived importance according to Ports, Regions and Ferry Operators							
According to (number of)	To be provided by	Very Important number (%)	Important number (%)	Neutral number (%)	Unimportant number (%)	Very Unimportant number (%)	Total number (%)
12 Ports	Port Authority	1 (8.3)					1 (8.3)
	Port Operator				1 (8.3)		1 (8.3)
	Ferry Operator						
	Government						
	Private Third Party	4 (33.3)	4 (33.3)			1 (8.3)	9 (75.0)
	Combination	1 (8.3)					1 (8.3)
	Total	6 (50.0)	4 (33.3)		1 (8.3)	1 (8.3)	12 (100.0)
4 Regions	Port Authority						
	Port Operator						
	Ferry Operator						
	Government	1 (25.0)					1 (25.0)
	Private Third Party	1 (25.0)					1 (25.0)
	Combination	2 (50.0)					2 (50.0)
	Total	4 (100.0)					4 (100.0)
7 Ferry Operators	Port Authority		1 (14.3)				1 (14.3)
	Port Operator						
	Ferry Operator						
	Government	1 (14.3)			1 (14.3)		2 (28.6)
	Private Third Party	1 (14.3)	2 (28.6)				3 (42.9)
	Combination		1 (14.3)				1 (14.3)
	Total	2 (28.6)	4 (57.2)		1 (14.3)		7 (100.0)
All 23 Respondents	Port Authority	1 (4.3)	1 (4.3)				2 (8.7)
	Port Operator				1 (4.3)		1 (4.3)
	Ferry Operator						
	Government	2 (8.7)			1 (4.3)		3 (13.0)
	Private Third Party	6 (26.1)	6 (26.1)			1 (4.3)	13 (56.5)
	Combination	3 (13.0)	1 (4.3)				4 (17.4)
	Total	12 (52.2)	8 (34.8)		2 (8.7)	1 (4.3)	23 (100.0)

Table A-3 Bus services to/from the ferry terminal

Providing route information

Preferred providers and perceived importance according to Ports, Regions and Ferry Operators

According to (number of)	To be provided by	Very Important number (%)	Important number (%)	Neutral number (%)	Unimportant number (%)	Very Unimportant number (%)	Total number (%)
	Port Authority						
	Port Operator	1 (7.7)					1 (7.7)
13 Ports	Ferry Operator	8 (61.5)	3 (23.1)				11 (84.6)
	Government						
	Private Third Party						
	Combination	1 (7.7)					1 (7.7)
	Total	10 (76.9)	3 (23.1)				13 (100.0)
	Port Authority						
	Port Operator						
4 Regions	Ferry Operator	1 (25.0)	1 (25.0)				2 (50.0)
	Government						
	Private Third Party						
	Combination	1 (25.0)	1 (25.0)				2 (50.0)
	Total	2 (50.0)	2 (50.0)				4 (100.0)
	Port Authority						
	Port Operator						
7 Ferry Operators	Ferry Operator	4 (57.1)	2 (28.6)	1 (14.3)			7 (100.0)
	Government						
	Private Third Party						
	Combination						
	Total	4 (57.1)	2 (28.6)	1 (14.3)			7 (100.0)
	Port Authority						
	Port Operator	1 (4.2)					1 (4.2)
All 24 Respondents	Ferry Operator	13 (54.2)	6 (25.0)	1 (4.2)			20 (83.3)
	Government						
	Private Third Party						
	Combination	2 (8.3)	1 (4.2)				3 (12.5)
	Total	16 (66.7)	7 (29.2)	1 (4.2)			24 (100.0)

Table A-4 Providing route information

Keeping Passengers / Cargo Lists

Preferred providers and perceived importance according to Ports, Regions and Ferry Operators

According to (number of)	To be provided by	Very Important number (%)	Important number (%)	Neutral number (%)	Unimportant number (%)	Very Unimportant number (%)	Total number (%)
12 Ports	Port Authority						
	Port Operator	1 (8.3)					1 (8.3)
	Ferry Operator	10 (83.3)					10 (83.3)
	Government						
	Private Third Party						
	Combination	1 (8.3)					1 (8.3)
	Total	12 (100.0)					12 (100.0)
4 Regions	Port Authority						
	Port Operator						
	Ferry Operator	1 (25.0)	2 (50.0)				3 (75.0)
	Government						
	Private Third Party						
	Combination			1 (25.0)			1 (25.0)
	Total	1 (25.0)	2 (50.0)	1 (25.0)			4 (100.0)
7 Ferry Operators	Port Authority						
	Port Operator						
	Ferry Operator	4 (57.1)	3 (42.9)				7 (100.0)
	Government						
	Private Third Party						
	Combination						
	Total	4 (57.1)	3 (42.9)				7 (100.0)
All 23 Respondents	Port Authority						
	Port Operator	1 (4.3)					1 (4.3)
	Ferry Operator	15 (65.2)	5 (21.7)				20 (87.0)
	Government						
	Private Third Party						
	Combination	1 (4.3)		1 (4.3)			2 (8.7)
	Total	17 (73.9)	5 (21.7)	1 (4.3)			23 (100.0)

Table A-5 Keeping passengers / cargo lists

According to (number of)	To be provided by	Very Important number (%)	Important number (%)	Neutral number (%)	Unimportant number (%)	Very Unimportant number (%)	Total number (%)
11 Ports	Port Authority	1 (9.1)					1 (9.1)
	Port Operator				1 (9.1)		1 (9.1)
	Ferry Operator						
	Government	3 (27.3)	1 (9.1)	1 (9.1)			5 (45.5)
	Private Third Party	1 (9.1)		2 (18.3)			3 (27.3)
	Combination	1 (9.1)					1 (9.1)
	Total	6 (54.5)	1 (9.1)	3 (27.3)	1 (9.1)		11 (100.0)
4 Regions	Port Authority						
	Port Operator						
	Ferry Operator						
	Government	2 (50.0)					2 (50.0)
	Private Third Party						
	Combination	1 (25.0)	1 (25.0)				2 (50.0)
	Total	3 (75.0)	1 (25.0)				4 (100.0)
7 Ferry Operators	Port Authority			1 (14.3)			1 (14.3)
	Port Operator						
	Ferry Operator						
	Government	1 (14.3)	3 (42.9)				4 (57.1)
	Private Third Party		1 (14.3)	1 (14.3)			2 (28.6)
	Combination						
	Total	1 (14.3)	4 (57.1)	2 (28.6)			7 (100.0)
All 22 Respondents	Port Authority	1 (4.5)		1 (4.5)			2 (9.1)
	Port Operator				1 (4.5)		1 (4.5)
	Ferry Operator						
	Government		4 (18.2)	1 (4.5)			11 (50.0)
	Private Third Party	1 (4.5)	1 (4.5)	3 (13.6)			5 (22.7)
	Combination	2 (9.1)	1 (4.5)				3 (13.6)
	Total	10 (45.5)	6 (27.3)	5 (22.7)	1 (4.5)		22 (100.0)

Train links to / from the ferry terminal
Preferred providers and perceived importance
according to Ports, Regions and Ferry Operators

Table A-6 Train links to / from the ferry terminal

Road links to / from the ferry terminal Preferred providers and perceived importance according to Ports, Regions and Ferry Operators							
According to (number of)	To be provided by	Very Important number (%)	Important number (%)	Neutral number (%)	Unimportant number (%)	Very Unimportant number (%)	Total number (%)
13 Ports	Port Authority	3 (23.1)	1 (7.7)				4 (30.8)
	Port Operator		1 (7.7)				1 (7.7)
	Ferry Operator						
	Government	6 (46.2)					6 (46.2)
	Private Third Party						
	Combination	2 (15.4)					2 (15.4)
	Total	11 (84.6)	2 (15.4)				13 (100.0)
4 Regions	Port Authority						
	Port Operator						
	Ferry Operator						
	Government	2 (50.0)					2 (50.0)
	Private Third Party						
	Combination	2 (50.0)					2 (50.0)
	Total	4 (100.0)					4 (100.0)
7 Ferry Operators	Port Authority	1 (14.3)					1 (14.3)
	Port Operator						
	Ferry Operator						
	Government	5 (71.4)	1 (14.3)				6 (85.7)
	Private Third Party						
	Combination						
	Total	6 (85.7)	1 (14.3)				7 (100.0)
All 24 Respondents	Port Authority	4 (16.7)	1 (4.2)				5 (20.8)
	Port Operator		1 (4.2)				1 (4.2)
	Ferry Operator						
	Government	13 (54.2)	1 (4.2)				14 (58.3)
	Private Third Party						
	Combination	4 (16.7)					4 (16.7)
	Total	21 (87.5)	3 (12.5)				24 (100.0)

Table A-7 Road links to / from the ferry terminal

Taking reservations

Preferred providers and perceived importance according to Ports, Regions and Ferry Operators

According to (number of)	To be provided by	Very Important number (%)	Important number (%)	Neutral number (%)	Unimportant number (%)	Very Unimportant number (%)	Total number (%)
11 Ports	Port Authority	1 (9.1)					1 (9.1)
	Port Operator						
	Ferry Operator	9 (81.8)					9 (81.8)
	Government						
	Private Third Party						
	Combination	1 (9.1)					1 (9.1)
	Total	11 (100.0)					11 (100.0)
4 Regions	Port Authority						
	Port Operator						
	Ferry Operator	2 (50.0)	2 (50.0)				4 (100.0)
	Government						
	Private Third Party						
	Combination						
	Total	2 (50.0)	2 (50.0)				4 (100.0)
7 Ferry Operators	Port Authority						
	Port Operator						
	Ferry Operator	5 (71.4)	1 (14.3)				6 (85.7)
	Government						
	Private Third Party						
	Combination	1 (14.3)					1 (14.3)
	Total	6 (85.7)	1 (14.3)				7 (100.0)
All 22 Respondents	Port Authority	1 (4.5)					1 (4.5)
	Port Operator						
	Ferry Operator	16 (72.7)	3 (13.6)				19 (86.4)
	Government						
	Private Third Party						
	Combination	2 (9.1)					2 (9.1)
	Total	19 (86.4)	3 (13.6)				22 (100.0)

Table A-8 Taking reservations

Signposting to / from the ferry terminal Preferred providers and perceived importance according to Ports, Regions and Ferry Operators							
According to (number of)	To be provided by	Very Important number (%)	Important number (%)	Neutral number (%)	Unimportant number (%)	Very Unimportant number (%)	Total number (%)
13 Ports	Port Authority	4 (30.8)					4 (30.8)
	Port Operator	1 (7.7)					1 (7.7)
	Ferry Operator	1 (7.7)					1 (7.7)
	Government	3 (23.1)	1 (7.7)				4 (30.8)
	Private Third Party						
	Combination	3 (23.1)					3 (23.1)
	Total	12 (92.3)	1 (7.7)				13 (100.0)
4 Regions	Port Authority						
	Port Operator						
	Ferry Operator						
	Government						
	Private Third Party						
	Combination	3 (75.0)	1 (25.0)				4 (100.0)
	Total	3 (75.0)	1 (25.0)				4 (100.0)
7 Ferry Operators	Port Authority	2 (28.6)	1 (14.3)				3 (42.9)
	Port Operator						
	Ferry Operator						
	Government	3 (42.9) ·	1 (14.3)				4 (56.1)
	Private Third Party						
	Combination						
	Total	5 (71.4)	2 (28.6)				7 (100.0)
All 24 Respondents	Port Authority	6 (25.0)	1 (4.2)				7 (29.2)
	Port Operator	1 (4.2)					1 (4.2)
	Ferry Operator	1 (4.2)					1 (4.2)
	Government	6 (25.0)	2 (8.3)				8 (33.3)
	Private Third Party						
	Combination	6 (25.0)	1 (4.2)				7 (29.2)
	Total	20 (83.3)	4 (16.7)				24 (100.0)

Table A-9 Signposting to / from the ferry terminal

Terminal buildings at ferry port of arrival and departure Preferred providers and perceived importance according to Ports, Regions and Ferry Operators							
According to (number of)	To be provided by	Very Important number (%)	Important number (%)	Neutral number (%)	Unimportant number (%)	Very Unimportant number (%)	Total number (%)
13 Ports	Port Authority	9 (69.2)	2 (15.4)				11 (84.6)
	Port Operator			1 (7.7)			1 (7.7)
	Ferry Operator		1 (7.7)				1 (7.7)
	Government						
	Private Third Party						
	Combination						
	Total	9 (69.2)	3 (23.1)	1 (7.7)			13 (100.0)
4 Regions	Port Authority		2 (50.0)				2 (50.0)
	Port Operator	1 (25.0)	1 (25.0)				2 (50.0)
	Ferry Operator						
	Government						
	Private Third Party						
	Combination						
	Total	1 (25.0)	3 (75.0)				4 (100.0)
7 Ferry Operators	Port Authority	3 (42.9)	1 (14.3)	1 (14.3)			5 (71.4)
	Port Operator	1 (14.3)	1 (14.3)				2 (28.6)
	Ferry Operator						
	Government						
	Private Third Party						
	Combination						
	Total	4 (57.1)	2 (28.6)	1 (14.3)			7 (100.0)
All 24 Respondents	Port Authority	12 (50.0)	5 (20.8)	1 (4.2)			18 (75.0)
	Port Operator	2 (8.3)	2 (8.3)	1 (4.2)			5 (20.8)
	Ferry Operator		1 (4.2)				1 (4.2)
	Government						
	Private Third Party						
	Combination						
	Total	14 (58.3)	8 (33.3)	2 (8.3)			24 (100.0)

Table A-10 Terminal buildings at ferry port of arrival and departure

Special facilities for business travellers at ferry terminal
Preferred providers and perceived importance according to Ports, Regions and Ferry Operators

According to (number of)	To be provided by	Very Important number (%)	Important number (%)	Neutral number (%)	Unimportant number (%)	Very Unimportant number (%)	Total number (%)
13 Ports	Port Authority	2 (15.4)		1 (7.7)	1 (7.7)		4 (30.8)
	Port Operator			1 (7.7)			1 (7.7)
	Ferry Operator		4 (30.8)	3 (23.1)	1 (7.7)		8 (61.5)
	Government						
	Private Third Party						
	Combination						
	Total	2 (15.4)	4 (30.8)	5 (38.5)	2 (15.4)		13 (100.0)
2 Regions	Port Authority						
	Port Operator		1 (50.0)				1 (50.0)
	Ferry Operator			1 (50.0)			1 (50.0)
	Government						
	Private Third Party						
	Combination						
	Total		1 (50.0)	1 (50.0)			2 (100.0)
7 Ferry Operators	Port Authority				1 (14.3)		1 (14.3)
	Port Operator		2 (28.6)				2 (28.6)
	Ferry Operator		1 (14.3)	2 (28.6)			3 (42.9)
	Government						
	Private Third Party			1 (14.3)			1 (14.3)
	Combination						
	Total		3 (42.9)	3 (42.9)	1 (14.3)		7 (100.0)
All 22 Respondents	Port Authority	2 (9.1)		1 (4.5)	2 (9.1)		5 (22.7)
	Port Operator		3 (13.6)	1 (4.5)			4 (18.2)
	Ferry Operator		5 (22.7)	6 (27.3)	1 (4.5)		12 (54.5)
	Government						
	Private Third Party			1 (4.5)			1 (4.5)
	Combination						
	Total	2 (9.1)	8 (36.4)	9 (40.9)	3 (13.6)		22 (100.0)

Table A-11 Special facilities for business travellers at ferry terminal

Cafeteria at ferry terminal

Preferred providers and perceived importance
according to Ports, Regions and Ferry Operators

According to (number of)	To be provided by	Very Important number (%)	Important number (%)	Neutral number (%)	Unimportant number (%)	Very Unimportant number (%)	Total number (%)
12 Ports	Port Authority	2 (16.7)	3 (25.0)	1 (8.3)			6 (50.0)
	Port Operator			1 (8.3)			1 (8.3)
	Ferry Operator			1 (8.3)			1 (8.3)
	Government		1 (8.3)				1 (8.3)
	Private Third Party		2 (16.7)	1 (8.3)			3 (25.0)
	Combination						
	Total	2 (16.7)	6 (50.0)	4 (33.3)			12 (100.0)
2 Regions	Port Authority						
	Port Operator			1 (50.0)			1 (50.0)
	Ferry Operator						
	Government						
	Private Third Party						
	Combination		1 (50.0)				1 (50.0)
	Total		1 (50.0)	1 (50.0)			2 (100.0)
7 Ferry Operators	Port Authority						
	Port Operator		1 (14.3)	1 (14.3)			2 (28.6)
	Ferry Operator						
	Government						
	Private Third Party		3 (42.9)	1 (14.3)	1 (14.3)		5 (71.4)
	Combination						
	Total		4 (57.1)	2 (28.6)	1 (14.3)		7 (100.0)
All 21 Respondents	Port Authority	2 (9.5)	3 (14.3)	1 (4.8)			6 (28.6)
	Port Operator		1 (4.8)	3 (14.3)			4 (19.0)
	Ferry Operator			1 (4.8)			1 (4.8)
	Government		1 (4.8)				1 (4.8)
	Private Third Party		5 (23.8)	2 (9.5)	1 (4.8)		8 (38.1)
	Combination		1 (4.8)				1 (4.8)
	Total	2 (9.5)	11 (52.4)	7 (33.3)	1 (4.8)		21 (100.0)

Table A-12 Cafeteria at ferry terminal

Special facilities for children at ferry terminal Preferred providers and perceived importance according to Ports, Regions and Ferry Operators							
According to (number of)	To be provided by	Very Important number (%)	Important number (%)	Neutral number (%)	Unimportant number (%)	Very Unimportant number (%)	Total number (%)
13 Ports	Port Authority	1 (7.7)	4 (30.8)	1 (7.7)			6 (46.2)
	Port Operator		1 (7.7)	1 (7.7)			2 (15.4)
	Ferry Operator		1 (7.7)	2 (15.4)			3 (23.1)
	Government						
	Private Third Party			1 (7.7)			1 (7.7)
	Combination			1 (7.7)			1 (7.7)
	Total	1 (7.7)	6 (46.2)	6 (46.2)			13 (100.0)
2 Regions	Port Authority						
	Port Operator	1 (50.0)	1 (50.0)				2 (100.0)
	Ferry Operator						
	Government						
	Private Third Party						
	Combination						
	Total	1 (50.0)	1 (50.0)				2 (100.0)
7 Ferry Operators	Port Authority		1 (14.3)	1 (14.3)			2 (28.6)
	Port Operator		2 (28.6)				2 (28.6)
	Ferry Operator			1 (14.3)	2 (28.6)		3 (42.9)
	Government						
	Private Third Party						
	Combination						
	Total		3 (42.9)	2 (28.6)	2 (28.6)		7 (100.0)
All 22 Respondents	Port Authority	1 (4.5)	5 (22.7)	2 (9.1)			8 (36.4)
	Port Operator	1 (4.5)	4 (18.2)	1 (4.5)			6 (27.3)
	Ferry Operator		1 (4.5)	3 (13.6)	2 (9.1)		6 (27.3)
	Government						
	Private Third Party			1 (4.5)			1 (4.5)
	Combination			1 (4.5)			1 (4.5)
	Total	2 (9.1)	10 (45.5)	8 (36.4)	2 (9.1)		22 (100.0)

Table A-13 Special facilities for children at ferry terminal

Special facilities for disabled at ferry terminal
Preferred providers and perceived importance
according to Ports, Regions and Ferry Operators

According to (number of)	To be provided by	Very Important number (%)	Important number (%)	Neutral number (%)	Unimportant number (%)	Very Unimportant number (%)	Total number (%)
13 Ports	Port Authority	3 (23.1)	3 (23.1)	1 (7.7)			7 (53.8)
	Port Operator		2 (15.4)				2 (15.4)
	Ferry Operator	1 (7.7)	1 (7.7)	1 (7.7)			3 (23.1)
	Government						
	Private Third Party						
	Combination		1 (7.7)				1 (7.7)
	Total	4 (30.8)	7 (53.8)	2 (15.4)			13 (100.0)
2 Regions	Port Authority						
	Port Operator	2 (100.0)					2 (100.0)
	Ferry Operator						
	Government						
	Private Third Party						
	Combination						
	Total	2 (100.0)					2 (100.0)
7 Ferry Operators	Port Authority		3 (42.9)				3 (42.9)
	Port Operator		2 (28.6)				2 (28.6)
	Ferry Operator		1 (14.3)	1 (14.3)			2 (28.6)
	Government						
	Private Third Party						
	Combination						
	Total		6 (85.7)	1 (14.3)			7 (100.0)
All 22 Respondents	Port Authority	3 (13.6)	6 (27.3)	1 (4.5)			10 (45.5)
	Port Operator	2 (9.1)	4 (18.2)				6 (27.3)
	Ferry Operator	1 (4.5)	2 (9.1)	2 (9.1)			5 (22.7)
	Government		1 (4.5)				1 (4.5)
	Private Third Party						
	Combination						
	Total	6 (27.3)	13 (59.1)	3 (13.6)			22 (100.0)

Table A-14 Special facilities for disabled at ferry terminal

Issuing tickets Preferred providers and perceived importance according to Ports, Regions and Ferry Operators							
According to (number of)	To be provided by	Very Important number (%)	Important number (%)	Neutral number (%)	Unimportant number (%)	Very Unimportant number (%)	Total number (%)
12 Ports	Port Authority						
	Port Operator	1 (8.3)					1 (8.3)
	Ferry Operator	9 (75.0)	1 (8.3)				10 (83.3)
	Government						
	Private Third Party						
	Combination	1 (8.3)					1 (8.3)
	Total	11 (91.7)	1 (8.3)				12 (100.0)
4 Regions	Port Authority						
	Port Operator						
	Ferry Operator		3 (75.0)				3 (75.0)
	Government						
	Private Third Party						
	Combination	1 (25.0)					1 (25.0)
	Total	1 (25.0)	3 (75.0)				4 (100.0)
7 Ferry Operators	Port Authority						
	Port Operator						
	Ferry Operator	5 (71.4)	1 (14.3)				6 (85.7)
	Government						
	Private Third Party						
	Combination	1 (14.3)					1 (14.3)
	Total	6 (85.7)	1 (14.3)				7 (100.0)
All 23 Respondents	Port Authority						
	Port Operator	1 (4.3)					1 (4.3)
	Ferry Operator	14 (60.9)	5 (21.7)				19 (82.6)
	Government						
	Private Third Party						
	Combination	3 (13.0)					3 (13.0)
	Total	18 (78.3)	5 (21.7)				23 (100.0)

Table A-15 Issuing tickets

According to (number of)	To be provided by	Very Important number (%)	Important number (%)	Neutral number (%)	Unimportant number (%)	Very Unimportant number (%)	Total number (%)
Linkspans at ferry terminal Preferred providers and perceived importance according to Ports, Regions and Ferry Operators							
13 Ports	Port Authority	10 (76.9)					10 (76.9)
	Port Operator	2 (15.4)					2 (15.4)
	Ferry Operator	1 (7.7)					1 (7.7)
	Government						
	Private Third Party						
	Combination						
	Total	13 (100.0)					13 (100.0)
3 Regions	Port Authority						
	Port Operator	1 (33.3)					1 (33.3)
	Ferry Operator						
	Government						
	Private Third Party						
	Combination	2 (66.7)					2 (66.7)
	Total	3 (100.0)					3 (100.0)
7 Ferry Operators	Port Authority	5 (71.4)					5 (71.4)
	Port Operator	1 (14.3)					1 (14.3)
	Ferry Operator	1 (14.3)					1 (14.3)
	Government						
	Private Third Party						
	Combination						
	Total	7 (100.0)					7 (100.0)
All 23 Respondents	Port Authority	15 (65.2)					15 (65.2)
	Port Operator	4(17.4)					4(17.4)
	Ferry Operator	2 (8.7)					2 (8.7)
	Government						
	Private Third Party						
	Combination	2 (8.7)					2 (8.7)
	Total	23 (100.0)					23 (100.0)

Table A-16 Linkspans at ferry terminal

Special facilities for lorry drivers at ferry terminal

Preferred providers and perceived importance
according to Ports, Regions and Ferry Operators

According to (number of)	To be provided by	Very Important number (%)	Important number (%)	Neutral number (%)	Unimportant number (%)	Very Unimportant number (%)	Total number (%)
13 Ports	Port Authority	4 (30.8)	2 (15.4)				6 (46.2)
	Port Operator	1 (7.7)	1 (7.7)				2 (15.4)
	Ferry Operator	1 (7.7)	2 (15.4)	2 (15.4)			5 (38.5)
	Government						
	Private Third Party						
	Combination						
	Total	6 (46.2)	5 (38.5)	2 (15.4)			13 (100.0)
2 Regions	Port Authority						
	Port Operator		1 (50.0)				1 (50.0)
	Ferry Operator	1 (50.0)					1 (50.0)
	Government						
	Private Third Party						
	Combination						
	Total	1 (50.0)	1 (50.0)				2 (100.0)
6 Ferry Operators	Port Authority		1 (16.7)				1 (16.7)
	Port Operator	1 (16.7)	1 (16.7)				2 (33.3)
	Ferry Operator	2 (33.3)		1 (16.7)			3 (50.0)
	Government						
	Private Third Party						
	Combination						
	Total	3 (50.0)	2 (33.3)	1 (16.7)			6 (100.0)
All 21 Respondents	Port Authority	4 (19.0)	3 (14.3)				7 (33.3)
	Port Operator	2 (9.5)	3 (14.3)				5 (23.8)
	Ferry Operator	4 (19.0)	2 (9.5)	3 (14.3)			9 (42.9)
	Government						
	Private Third Party						
	Combination						
	Total	10 (47.6)	8 (38.1)	3 (14.3)			21 (100.0)

Table A-17 Special facilities for lorry drivers at ferry terminal

Special facilities for motorists at ferry terminal

Preferred providers and perceived importance according to Ports, Regions and Ferry Operators

According to (number of)	To be provided by	Very Important number (%)	Important number (%)	Neutral number (%)	Unimportant number (%)	Very Unimportant number (%)	Total number (%)
12 Ports	Port Authority	6 (50.0)	1 (8.3)				7 (58.3)
	Port Operator	1 (8.3)	1 (8.3)				2 (16.7)
	Ferry Operator		3 (25.0)				3 (25.0)
	Government						
	Private Third Party						
	Combination						
	Total	7 (58.3)	5 (41.7)				12 (100.0)
2 Regions	Port Authority						
	Port Operator		1 (50.0)				1 (50.0)
	Ferry Operator	1 (50.0)					1 (50.0)
	Government						
	Private Third Party						
	Combination						
	Total	1 (50.0)	1 (50.0)				2 (100.0)
7 Ferry Operators	Port Authority	1 (14.3)					1 (14.3)
	Port Operator		3 (42.9)				3 (42.9)
	Ferry Operator	1 (14.3)	1 (14.3)	1 (14.3)			3 (42.9)
	Government						
	Private Third Party						
	Combination						
	Total	2 (28.6)	4 (57.1)	1 (14.3)			7 (100.0)
All 21 Respondents	Port Authority	7 (33.3)	1 (4.8)				8 (38.1)
	Port Operator	1 (4.8)	5 (23.8)				6 (28.6)
	Ferry Operator	2 (9.5)	4 (19.0)	1 (4.8)			7 (33.3)
	Government						
	Private Third Party						
	Combination						
	Total	10 (47.6)	10 (47.6)	1 (4.8)			21 (100.0)

Table A-18 Special facilities for motorists at ferry terminal

Restaurants at ferry terminal

Preferred providers and perceived importance
according to Ports, Regions and Ferry Operators

According to (number of)	To be provided by	Very Important number (%)	Important number (%)	Neutral number (%)	Unimportant number (%)	Very Unimportant number (%)	Total number (%)
12 Ports	Port Authority	1 (8.3)	2 (16.70	1 (8.3)	1 (8.3)		5 (41.7)
	Port Operator				1 (8.3)		1 (8.3)
	Ferry Operator		1 (8.3)		1 (8.3)		2 (16.7)
	Government						
	Private Third Party			3 (25.0)		1 (8.3)	4 (33.3)
	Combination						
	Total	1 (8.3)	3 (25.0)	4 (33.3)	3 (25.0)	1 (8.3)	12 (100.0)
2 Regions	Port Authority						
	Port Operator			1 (50.0)			1 (50.0)
	Ferry Operator						
	Government						
	Private Third Party						
	Combination			1 (50.0)			1 (50.0)
	Total			2 (100.0)			2 (100.0)
7 Ferry Operators	Port Authority						
	Port Operator		1 (14.3)	1 (14.3)			2 (28.6)
	Ferry Operator						
	Government						
	Private Third Party		2 (28.6)		2 (28.6)	1 (14.3)	5 (71.4)
	Combination						
	Total		3 (42.9)	1 (14.3)	2 (28.6)	1 (14.3)	7 (100.0)
All 21 Respondents	Port Authority	1 (4.8)	2 (9.5)	1 (4.8)	1 (4.80		5 (23.8)
	Port Operator		1 (4.8)	2 (9.5)	1 (4.8)		4 (19.0)
	Ferry Operator		1 (4.8)		1 (4.8)		2 (9.5)
	Government						
	Private Third Party		2 (9.5)	3 (14.3)	2 (9.5)	2 (9.5)	9 (42.9)
	Combination			1 (4.8)			1 (4.8)
	Total	1 (4.8)	6 (28.6)	7 (33.3)	5 (23.8)	2 (9.5)	21 (100.0)

Table A-19 Restaurants at ferry terminal

Security at ferry terminal Preferred providers and perceived importance according to Ports, Regions and Ferry Operators							
According to (number of)	To be provided by	Very Important number (%)	Important number (%)	Neutral number (%)	Unimportant number (%)	Very Unimportant number (%)	Total number (%)
	Port Authority	2 (15.4)		1 (7.7)			3 (23.1)
	Port Operator	2 (15.4)	1 (7.7)				3 (23.1)
13	Ferry Operator		1 (7.7)				1 (7.7)
Ports	Government	1 (7.7)			1 (7.7)		2 (15.4)
	Private Third Party						
	Combination	1 (7.7)	3 (23.1)				4 (30.8)
	Total	6 (46.2)	5 (38.5)	1 (7.7)	1 (7.7)		13 (100.0)
	Port Authority		1 (33.3)				1 (33.3)
	Port Operator	1 (33.3)					1 (33.3)
3	Ferry Operator						
Regions	Government			1 (33.3)			1 (33.3)
	Private Third Party						
	Combination						
	Total	1 (33.3)	1 (33.3)	1 (33.3)			3 (100.0)
	Port Authority	1 (14.3)		1 (14.3)			2 (28.6)
	Port Operator	2 (28.6)					2 (28.6)
7	Ferry Operator	1 (14.3)	2 (28.6)				3 (42.9)
Ferry	Government						
Operators	Private Third Party						
	Combination						
	Total	4 (57.1)	2 (28.6)	1 (14.3)			7 (100.0)
	Port Authority	3 (13.0)	1 (4.3)	2 (8.7)			6 (26.1)
	Port Operator	5 (21.7)	1 (4.3)				6 (26.1)
All	Ferry Operator	1 (4.3)	3 (13.0)				4 (17.4)
23	Government	1 (4.3)		1 (4.3)	1 (4.3)		3 (13.0)
Respondents	Private Third Party						
	Combination	1 (4.3)					4 (17.4)
	Total	11 (47.8)	8 (34.8)	3 (13.0)	1 (4.3)		23 (100.0)

Table A-20 Security at ferry terminal

Ferry terminal waiting area Preferred providers and perceived importance according to Ports, Regions and Ferry Operators							
According to (number of)	To be provided by	Very Important number (%)	Important number (%)	Neutral number (%)	Unimportant number (%)	Very Unimportant number (%)	Total number (%)
13 Ports	Port Authority	4 (30.8)	6 (46.2)				10 (76.9)
	Port Operator	1 (7.7)		1 (7.7)			2 (15.4)
	Ferry Operator		1 (7.7)				1 (7.7)
	Government						
	Private Third Party						
	Combination						
	Total	5 (38.5)	7 (53.8)	1 (7.7)			13 (100.0)
4 Regions	Port Authority	1 (25.0)	1 (25.0)				2 (50.0)
	Port Operator	1 (25.0)	1 (25.0)				2 (50.0)
	Ferry Operator						
	Government						
	Private Third Party						
	Combination						
	Total	2 (50.0)	2 (50.0)				4 (100.0)
7 Ferry Operators	Port Authority	2 (28.6)	3 (42.9)	1 (14.3)			6 (85.7)
	Port Operator	1 (14.3)					1 (14.3)
	Ferry Operator						
	Government						
	Private Third Party						
	Combination						
	Total	3 (42.9)	3 (42.9)	1 (14.3)			7 (100.0)
All 24 Respondents	Port Authority	7 (29.2)	10 (41.7)	1 (4.2)			18 (75.0)
	Port Operator	3 (12.5)	1 (4.2)	1 (4.2)			5 (20.8)
	Ferry Operator		1 (4.2)				1 (4.2)
	Government						
	Private Third Party						
	Combination						
	Total	10 (41.7)	12 (50.0)	2 (8.3)			24 (100.0)

Table A-21 Ferry terminal waiting area

Bar on-board ferry

Preferred providers and perceived importance according to Ports, Regions and Ferry Operators

According to (number of)	To be provided by	Very Important number (%)	Important number (%)	Neutral number (%)	Unimportant number (%)	Very Unimportant number (%)	Total number (%)
13 Ports	Port Authority						
	Port Operator						
	Ferry Operator	7 (53.8)	5 (38.5)	1 (7.7)			13 (100.0)
	Government						
	Private Third Party						
	Combination						
	Total	7 (53.8)	5 (38.5)	1 (7.7)			13 (100.0)
4 Regions	Port Authority						
	Port Operator						
	Ferry Operator	2 (50.0)	2 (50.0)				4 (100.0)
	Government						
	Private Third Party						
	Combination						
	Total	2 (50.0)	2 (50.0)				4 (100.0)
7 Ferry Operators	Port Authority						
	Port Operator						
	Ferry Operator	4 (57.1)	2 (28.6)	1 (14.3)			7 (100.0)
	Government						
	Private Third Party						
	Combination						
	Total	4 (57.1)	2 (28.6)	1 (14.3)			7 (100.0)
All 24 Respondents	Port Authority						
	Port Operator						
	Ferry Operator	13 (54.2)	7 (29.2)	4 (16.7)			24 (100.0)
	Government						
	Private Third Party						
	Combination						
	Total	13 (54.2)	7 (29.2)	4 (16.7)			24 (100.0)

Table A-22 Bar on-board ferry

Casino on-board ferry

Preferred providers and perceived importance according to Ports, Regions and Ferry Operators

According to (number of)	To be provided by	Very Important number (%)	Important number (%)	Neutral number (%)	Unimportant number (%)	Very Unimportant number (%)	Total number (%)
12 Ports	Port Authority						
	Port Operator						
	Ferry Operator	1 (8.3)		4 (33.3)	3 (25.0)	2 (16.7)	10 (83.3)
	Government						
	Private Third Party					2 (16.7)	2 (16.7)
	Combination						
	Total	1 (8.3)		4 (33.3)	3 (25.0)	4 (33.3)	12 (100.0)
4 Regions	Port Authority						
	Port Operator						
	Ferry Operator		1 (25.0)	1 (25.0)	1 (25.0)		3 (75.0)
	Government						
	Private Third Party						
	Combination					1 (25.0)	1 (25.0)
	Total		1 (25.0)	1 (25.0)	1 (25.0)	1 (25.0)	4 (100.0)
7 Ferry Operators	Port Authority						
	Port Operator						
	Ferry Operator		2 (28.6)		3 (42.9)		5 (71.4)
	Government						
	Private Third Party			1 (14.3)		1 (14.3)	2 (28.6)
	Combination						
	Total		2 (28.6)	1 (14.3)	3 (42.9)	1 (14.3)	7 (100.0)
All 23 Respondents	Port Authority						
	Port Operator						
	Ferry Operator	1 (4.3)	3 (13.0)	5 (21.7)	7 (30.4)	2 (8.7)	18(78.3)
	Government						
	Private Third Party			1 (4.3)		3 (13.0)	4 (17.4)
	Combination					1 (4.3)	1 (4.3)
	Total	1 (4.3)	3 (13.0)	6 (26.1)	7 (30.4)	6 (26.1)	23 (100.0)

Table A-23 Casino on-board ferry

Cinema on-board ferry

Preferred providers and perceived importance according to Ports, Regions and Ferry Operators

According to (number of)	To be provided by	Very Important number (%)	Important number (%)	Neutral number (%)	Unimportant number (%)	Very Unimportant number (%)	Total number (%)
12 Ports	Port Authority						
	Port Operator						
	Ferry Operator	1 (8.3)	6 (50.0)	2 (16.7)	1 (8.3)		10 (83.3)
	Government						
	Private Third Party		1 (8.3)			1 (8.3)	2 (16.7)
	Combination						
	Total	1 (8.3)	7 (58.3)	2 (16.7)	1 (8.3)	1 (8.3)	12 (100.0)
3 Regions	Port Authority						
	Port Operator						
	Ferry Operator			2 (66.7)			2 (66.7)
	Government						
	Private Third Party						
	Combination		1 (33.3)				1 (33.3)
	Total		1 (33.3)	2 (66.7)			3 (100.0)
6 Ferry Operators	Port Authority						
	Port Operator						
	Ferry Operator		1 (16.7)	1 (16.7)	1 (16.7)	1 (16.7)	4 (66.7)
	Government						
	Private Third Party		1 (16.7)	1 (16.7)			2 (33.3)
	Combination						
	Total		2 (33.3)	2 (33.3)	1 (16.7)	1 (16.7)	6 (100.0)
All 21 Respondents	Port Authority						
	Port Operator						
	Ferry Operator	1 (4.8)	7 (33.3)	5 (23.8)	2 (9.5)	1 (4.8)	16 (76.2)
	Government						
	Private Third Party		2 (9.5)	1 (4.8)		1 (4.8)	4 (19.0)
	Combination		1 (4.8)				1 (4.8)
	Total	1 (4.8)	10 (47.6)	6 (28.6)	2 (9.5)	2 (9.5)	21 (100.0)

Table A-24 Cinema on-board ferry

Restaurants on-board ferry Preferred providers and perceived importance according to Ports, Regions and Ferry Operators							
According to (number of)	To be provided by	Very Important number (%)	Important number (%)	Neutral number (%)	Unimportant number (%)	Very Unimportant number (%)	Total number (%)
13 Ports	Port Authority						
	Port Operator						
	Ferry Operator	9 (69.2)	2 (15.4)	2 (15.4)			13 (100.0)
	Government						
	Private Third Party						
	Combination						
	Total	9 (69.2)	2 (15.4)	2 (15.4)			13 (100.0)
4 Regions	Port Authority						
	Port Operator						
	Ferry Operator	3 (75.0)	1 (25.0)				4 (100.0)
	Government						
	Private Third Party						
	Combination						
	Total	3 (75.0)	1 (25.0)				4 (100.0)
7 Ferry Operators	Port Authority						
	Port Operator						
	Ferry Operator	3 (42.9)	2 (28.6)	2 (28.6)			7 (100.0)
	Government						
	Private Third Party						
	Combination						
	Total	3 (42.9)	2 (28.6)	2 (28.6)			7 (100.0)
All 24 Respondents	Port Authority						
	Port Operator						
	Ferry Operator	15 (62.5)	5 (20.8)	4 (16.7)			24 (100.0)
	Government						
	Private Third Party						
	Combination						
	Total	15 (62.5)	5 (20.8)	4 (16.7)			24 (100.0)

Table A-25 Restaurants on-board ferry

Shop on-board ferry

Preferred providers and perceived importance according to Ports, Regions and Ferry Operators

According to (number of)	To be provided by	Very Important number (%)	Important number (%)	Neutral number (%)	Unimportant number (%)	Very Unimportant number (%)	Total number (%)
13 Ports	Port Authority						
	Port Operator						
	Ferry Operator	6 (46.2)	5 (38.5)	2 (15.4)			13 (100.0)
	Government						
	Private Third Party						
	Combination						
	Total	6 (46.2)	5 (38.5)	2 (15.4)			13 (100.0)
4 Regions	Port Authority						
	Port Operator						
	Ferry Operator	3 (75.0)	1 (25.0)				4 (100.0)
	Government						
	Private Third Party						
	Combination						
	Total	3 (75.0)	1 (25.0)				4 (100.0)
7 Ferry Operators	Port Authority						
	Port Operator						
	Ferry Operator	4 (57.1)	1 (14.3)	1 (14.3)	1 (14.3)		7 (100.0)
	Government						
	Private Third Party						
	Combination						
	Total	4 (57.1)	1 (14.3)	1 (14.3)	1 (14.3)		7 (100.0)
All 24 Respondents	Port Authority						
	Port Operator						
	Ferry Operator	13 (54.2)	7 (29.2)	3 (12.5)	1 (4.2)		24 (100.0)
	Government						
	Private Third Party						
	Combination						
	Total	13 (54.2)	7 (29.2)	3 (12.5)	1 (4.2)		24 (100.0)

Table A-26 Shop on-board ferry

Health club - spa on-board ferry Preferred providers and perceived importance according to Ports, Regions and Ferry Operators							
According to (number of)	To be provided by	Very Important number (%)	Important number (%)	Neutral number (%)	Unimportant number (%)	Very Unimportant number (%)	Total number (%)
12 Ports	Port Authority						
	Port Operator						
	Ferry Operator		**1 (8.3)**	**5 (41.7)**	**2 (16.7)**	**2 (16.7)**	**10 (83.3)**
	Government						
	Private Third Party					**2 (16.7)**	**2 (16.7)**
	Combination						
	Total		**1 (8.3)**	**5 (41.7)**	**2 (16.7)**	**4 (33.3)**	**12 (100.0)**
3 Regions	Port Authority						
	Port Operator						
	Ferry Operator			**1 (33.3)**	**1 (33.3)**		**2 (66.7)**
	Government						
	Private Third Party						
	Combination			**1 (33.3)**			**1 (33.3)**
	Total			**2 (66.7)**	**1 (33.3)**		**3 (100.0)**
6 Ferry Operators	Port Authority						
	Port Operator						
	Ferry Operator				**4 (66.7)**		**4 (66.7)**
	Government						
	Private Third Party					**2 (33.3)**	**2 (33.3)**
	Combination						
	Total				**4 (66.7)**	**2 (33.3)**	**6 (100.0)**
All 21 Respondents	Port Authority						
	Port Operator						
	Ferry Operator		**1 (4.8)**	**6 (28.6)**	**7 (33.3)**	**2 (9.5)**	**16 (76.2)**
	Government						
	Private Third Party					**4 (19.0)**	**4 (19.0)**
	Combination			**1 (4.8)**			**1 (4.8)**
	Total		**1 (4.8)**	**7 (33.3)**	**7 (33.3)**	**6 (28.6)**	**21 (100.0)**

Table A-27 Health club - spa on-board ferry

Swimmingpool on-board ferry Preferred providers and perceived importance according to Ports, Regions and Ferry Operators							
According to (number of)	To be provided by	Very Important number (%)	Important number (%)	Neutral number (%)	Unimportant number (%)	Very Unimportant number (%)	Total number (%)
12 Ports	Port Authority						
	Port Operator						
	Ferry Operator			4 (33.3)	2 (16.7)	4 (33.3)	10 (83.3)
	Government						
	Private Third Party					2 (16.7)	2 (16.7)
	Combination						
	Total			4 (33.3)	2 (16.7)	6 (50.0)	12 (100.0)
3 Regions	Port Authority						
	Port Operator						
	Ferry Operator			2 (66.7)		1 (33.3)	3 (100.0)
	Government						
	Private Third Party						
	Combination						
	Total			2 (66.7)		1 (33.3)	3 (100.0)
6 Ferry Operators	Port Authority						
	Port Operator						
	Ferry Operator				4 (66.7		4 (66.7
	Government						
	Private Third Party					2 (33.3)	2 (33.3)
	Combination						
	Total				4 (66.7	2 (33.3)	6 (100.0)
All 21 Respondents	Port Authority						
	Port Operator						
	Ferry Operator			6 (28.6)	6 (28.6)	5 (23.8)	17 (81.0)
	Government						
	Private Third Party					4 (19.0)	4 (19.0)
	Combination						
	Total			6 (28.6)	6 (28.6)	9 (42.9)	21 (100.0)

Table A-28 Swimmingpool on-board ferry

Appendix B

Questionnaire ferry service offer and corporate culture

University of Plymouth
Drake Circus, Plymouth PL4 8AA
United Kingdom

Att.: H. Heijveld
Institute of Marine Studies

Code Number ....

Confidential

Questionnaire

Roll on Roll off passenger and freight
and
Ferry Services
in the
Atlantic Arc

Please use this page and enclosed envelope to return completed questionnaire

The main service elements of a ferry service are *pre-booking, booking, access, port of departure, sea voyage, port of arrival, exit, and after-sales.* Please indicate how important these service elements are perceived by you and which organisation should provide these service elements?	Using the scale below, please circle each statement as appropriate. Rating Scale: 1.Very Important 2. Important 3. Neutral 4. Unimportant 5. Very Unimportant	Using the scale below, please circle each statement as appropriate. Rating Scale: A. Port Authority B. Port Operator C. Ferry Operator D. Government E. Private Third Party
	Importance	To be provided by:

(Please circle)

	Importance	To be provided by:
Facilities at Port of departure/arrival		
Terminal Buildings	1 2 3 4 5	A B C D E
Terminal Waiting Area	1 2 3 4 5	A B C D E
Security	1 2 3 4 5	A B C D E
Baggage handling	1 2 3 4 5	A B C D E
Restaurants	1 2 3 4 5	A B C D E
Cafetaria	1 2 3 4 5	A B C D E
Linkspans	1 2 3 4 5	A B C D E
special facilities for		
children	1 2 3 4 5	A B C D E
disabled	1 2 3 4 5	A B C D E
business travellers	1 2 3 4 5	A B C D E
lorry drivers	1 2 3 4 5	A B C D E
motorists	1 2 3 4 5	A B C D E
Facilities during Ferry Crossing		
shops	1 2 3 4 5	A B C D E
restaurants	1 2 3 4 5	A B C D E
health club - spa	1 2 3 4 5	A B C D E
casino	1 2 3 4 5	A B C D E
bar	1 2 3 4 5	A B C D E
cinema	1 2 3 4 5	A B C D E
swimmingpool	1 2 3 4 5	A B C D E
	Importance	To be provided by:

		(Please circle)
Pre-booking		
Advertising the service	1 2 3 4 5	A B C D E
Providing Route Information	1 2 3 4 5	A B C D E
Booking		
Taking Reservations	1 2 3 4 5	A B C D E
Issuing Tickets	1 2 3 4 5	A B C D E
Keeping Passenger/Cargo lists	1 2 3 4 5	A B C D E
Access / Exit		
Road Links to/from Terminal	1 2 3 4 5	A B C D E
Train Links to/from Terminal	1 2 3 4 5	A B C D E
Bus Services to/from Terminal	1 2 3 4 5	A B C D E
Signposting to/from Terminal	1 2 3 4 5	A B C D E

Which ferry traffic does your company consider important?

	Importance *(Please circle)*
Independent Holiday makers	1 2 3 4 5
Package Tour Holiday makers	1 2 3 4 5
Business traveller	1 2 3 4 5
Students	1 2 3 4 5
Day Trippers (Short Stay)	1 2 3 4 5
Mini Cruise Passengers	1 2 3 4 5
Driver accompanied lorries	1 2 3 4 5
Unaccompanied Trailers	1 2 3 4 5
Coaches	1 2 3 4 5
Livestock /Animal Transport	1 2 3 4 5
Others (please specify)	1 2 3 4 5
....	1 2 3 4 5

What are the bases of the port charges (tariffs) on which you are currently charged?

	(Please circle)
Marine Charges (Pilots, tugs)	Yes No
Berthing / Quays	Yes No
Vehicles	Yes No
Passengers	Yes No
Others (please specify)	
....	

What port services and facilities are offered in return and how important are these to you?

	Importance *(Please circle)*
(please specify)	1 2 3 4 5
....	1 2 3 4 5
....	1 2 3 4 5
....	1 2 3 4 5

How important would you rate the reasons stated below for starting a new ferry service ?

	Importance *(Please circle)*
Diversification of present Ferry Services	1 2 3 4 5
Underutilisation of existing capacity	1 2 3 4 5
Public Relations	1 2 3 4 5
Increasing Profit	1 2 3 4 5
Increasing Employment	1 2 3 4 5
Others (please specify)	1 2 3 4 5
....	1 2 3 4 5

What would be the rating of the importance of the following factors in starting new ferry services ?

		Importance *(Please circle)*
Financial Factors		1 2 3 4 5
(Any comments ?)	....	
Social Factors		1 2 3 4 5
(Any comments ?)	....	
Political Factors		1 2 3 4 5
(Any comments ?)	....	
Technical Factors		1 2 3 4 5
(Any comments ?)	....	
Natural Factors (e.g. deepwater access)		1 2 3 4 5
(Any comments ?)	....	
Others (please specify)	....	1 2 3 4 5
	....	1 2 3 4 5

Please identify your main competitors (Ferry Operators) and rate their threat in degree of importance

		Importance *(Please circle)*
(Ferry Operator Name)	....	1 2 3 4 5
(Ferry Operator Name)	....	1 2 3 4 5
(Ferry Operator Name)	....	1 2 3 4 5
(Ferry Operator Name)	....	1 2 3 4 5

Which new ferry links would you consider important to your company ?

		Importance *(Please circle)*
From:......................	**To:**	1 2 3 4 5
(please specify)	**To:**	1 2 3 4 5
From:......................	**To:**	1 2 3 4 5
(please specify)	**To:**	1 2 3 4 5

Would you prefer a new ferry service to be operated by

	(Please circle)
ONE ferry operator only	Yes no
TWO or more competing ferry operators	Yes no
TWO or more collaborating ferry operators	Yes no

Reasons:
(please specify) ....

What commitment (and its importance) would you expect from ferry operators ?

	Importance *(Please circle)*
guaranteed operating period	1 2 3 4 5
guaranteed schedule	1 2 3 4 5
financial commitment	1 2 3 4 5
Others (please specify)	1 2 3 4 5
....	1 2 3 4 5

What commitment would be expected from the port by the ferry operators and how do you rate these in importance?

	Importance *(Please circle)*
Priority berthing	1 2 3 4 5
Allocation of a open space	1 2 3 4 5
Financial investments	1 2 3 4 5
Allocation of sheds or buildings	1 2 3 4 5
Dedicated labour	1 2 3 4 5
Others (please specify)	1 2 3 4 5
....	1 2 3 4 5

Which port would you <u>prefer MOST</u> to operate a new ferry service from?

(please specify) ....

Why ?

(please specify) ....

....

....

....

....

....

....

Which port would you <u>prefer LEAST</u> to operate a new ferry service from?

(please specify) ....

Why ?

(please specify) ....

....

....

....

....

....

....

How would you rate the importance of the following ports for the future development of new ferry services by your company?

	Importance *(Please circle)*
Algeciras	1 2 3 4 5
Bayonne	1 2 3 4 5
Belfast	1 2 3 4 5
Bilbao	1 2 3 4 5
Bordeaux	1 2 3 4 5
Brest	1 2 3 4 5
Cadiz	1 2 3 4 5
Caen	1 2 3 4 5
Cairnryan	1 2 3 4 5
Cherbourg	1 2 3 4 5
Cork	1 2 3 4 5
Douglas	1 2 3 4 5
Dublin	1 2 3 4 5
Dun Laoghaire	1 2 3 4 5
Dunoon	1 2 3 4 5
Fishguard	1 2 3 4 5
Fleetwood	1 2 3 4 5
Gijon	1 2 3 4 5
Gourock	1 2 3 4 5
Heysham	1 2 3 4 5
Holyhead	1 2 3 4 5
La Rochelle - Pallice	1 2 3 4 5
Larne	1 2 3 4 5
Le Havre	1 2 3 4 5
Le Verdon	1 2 3 4 5

	Importance *(Please circle)*
Lerwick	1 2 3 4 5
Lisbon	1 2 3 4 5
Liverpool	1 2 3 4 5
Lorient	1 2 3 4 5
Plymouth	1 2 3 4 5
Poole	1 2 3 4 5
Porto	1 2 3 4 5
Portsmouth	1 2 3 4 5
Roscoff	1 2 3 4 5
Rosslare	1 2 3 4 5
Royan	1 2 3 4 5
Santa Cruz de Tenerife	1 2 3 4 5
Santander	1 2 3 4 5
Southampton	1 2 3 4 5
St Helier	1 2 3 4 5
St Malo	1 2 3 4 5
St Peter Port	1 2 3 4 5
Stornoway	1 2 3 4 5
Stranraer	1 2 3 4 5
Tanger	1 2 3 4 5
Ullapool	1 2 3 4 5
Vigo	1 2 3 4 5
Weymouth	1 2 3 4 5
Others	
(please specify)	1 2 3 4 5
(please specify)	1 2 3 4 5
(please specify)	1 2 3 4 5

Corporate profile.

Please state the exact name of your organisation

....

Legal Ownership	Public	Private	Combination
Annual Turnover (value)	....	in	..................(Currency)

Number of employees

Full time ....
Part time ....

Individual profile.

Job title	....
Number of years in that position	....
Number of years with this organisation	....
Number of years in the industry	....
Nationality	....
Professional qualifications	....
Personal influence on decision making	....

Further comments:

....

....

....

If you wish to receive a copy of the results of this study, please complete details below:

Name: ....

Address ....

....

....

Appendix C

Description of Miles & Snow types

Type 1.

This ferry company attempts to locate and maintain a secure niche in a relatively stable ferry service area. The ferry company tends to offer a more limited range of products and services than its competitors, and it tries to protect its domain by offering higher quality, superior service, and lower prices. Often this ferry company is at the forefront of the developments of the industry - it tends to ignore industry changes that have no direct influence on current areas of operation and concentrates instead on doing the best job possible in a limited area.

Type 2.

This ferry company typically operates within a broad product-market domain that undergoes periodic redefinition. The ferry company values being 'first in' in new service (product) and market areas even if not all of these efforts prove to be highly profitable. The organization responds rapidly to early signals concerning areas of opportunity, and these responses often lead to a new round of competitive actions. However, this ferry company may not maintain market strength in all of the areas it enters.

Type 3.

This ferry company attempts to maintain a stable, limited line of products or services, while at the same time moving out quicly to follow a carefully selected set of the more promising new developments in the industry. The ferry company is seldom ' first in' with new products or services. However, by carefully monitoring actions of major competitiors in areas compatible with its stable product market base, the ferry company can frequently be 'second in' with a more cost-efficient product or service.

Type 4.

This ferry company does not appear to have a consistent product-market orientation. The ferry company is usually not aggressive in maintaining established products and markets as some of its competitors, nor is it willing to take as many risks as other competitors. Rather, the ferry company responds in those areas where it is forced to by environmental pressures.

Appendix D

Multiple discriminant analysis

Appendix D Multiple Discriminant Analysis

Predictor variables for Miles & Snow types			
Number	**Description**	**Name**	**Concept**
1	AFSBAG_1	Baggage handling at terminal	Augmented ferry service offer
2	AFSBUS_1	Bus services to/from terminal	
3	AFSCAS	Casino on-board	
4	AFSRAI_1	Raillinks to/from terminal	
5	AFSSPA	Spa / health club on-board	
6	AFSTBU_1	Facilities for business travellers	
7	AFSTCA_1	Cafeteria at terminal	
8	AFSTCH_1	Facilities for children at terminal	
9	AFSTDI_1	Facilities for disabled at terminal	
10	AFSTMO_1	Facilities for motorists at terminal	
11	AFSTRE_1	Restaurants on-board	
12	AFSWMP	Swimming pool on-board	
13	CMMTBE_1	Priority berthing	Commitment
14	CMMTFI_1	Financial commitment	
15	CMMTFI_2	Financial investments	
16	CMMTLA_1	Dedicated labour	
17	CMMTPE_1	Guaranteed operating period	
18	CMMTSC_1	Guaranteed schedule	
19	CMMTSH_1	Sheds and buildings	
20	CMMTSP_1	Allocation of open space	
21	CUSANI_1	Animals / livestock	Target customers
22	CUSBUS_1	Business travellers	
23	CUSCOA_1	Coaches	
24	CUSDAY_1	Day-trippers	
25	CUSIHO_1	Independent holiday makers	
26	CUSLOR_1	Driver accompanied lorries	
27	CUSMIN_1	Mini-cruises	
28	CUSPHO_1	Package holiday makers	
29	CUSTRA_1	Unaccompanied trailers	
30	CUSTUD_1	Students	
31	ENVFIN_1	Financial factors	External Environment
32	ENVNAT_1	Natural factors	
33	ENVPOL_1	Political factors	
34	ENVSOC_1	Social factors	
35	ENVTEC_1	Technical factors	
36	GROWCA_1	Underutilised existing capacity	Reasons for growth
37	GROWDI_1	Diversification	
38	GROWEM_1	Increase employment	
39	GROWPR_1	Public relations	
40	GROWPR_2	Increase profit	
41	OPER_1	Preferred competition	Competition

Table D-1 Predictor variables for Miles & Snow types

R E L I A B I L I T Y   A N A L Y S I S   -   S C A L E   (A L P H A)

Analysis of Variance

Source of Variation	Sum of Sq.	DF	Mean Square	F	Prob.
Between People	138.7033	23	6.0306		
Within People	1362.1951	960	1.4190		
Between Measures	552.5650	40	13.8141	15.6973	.0000
Residual	809.6301	920	.8800		
Nonadditivity	1.5737	1	1.5737	1.7898	.1813
Balance	808.0564	919	.8793		
Total	1500.8984	983	1.5269		
Grand Mean	3.7602				

Tukey estimate of power to which observations
must be raised to achieve additivity = 1.5345

Reliability Coefficients 41 items

Alpha = .8541 Standardized item alpha = .8482

Table D-2 Reliability of scale of predictor variables

- - - - - - - - D I S C R I M I N A N T   A N A L Y S I S - - - - - - - -

On groups defined by TYPEREC Miles & Snow type

24 (Unweighted) cases were processed.
11 of these were excluded from the analysis.
11 had missing or out-of-range group codes.
13 (Unweighted) cases will be used in the analysis.

Number of cases by group

	Number of cases		
TYPEREC	Unweighted	Weighted	Label
1	4	4.0	Prospector
2	5	5.0	Analyser
3	4	4.0	Defender
Total	13	13.0	

Table D-3 Case summary

Group means

TYPEREC	APSBAG_1	APSBUS_1	APSCAS	APSRAI_1
1	3.25000	4.25000	2.75000	3.75000
2	3.40000	4.40000	2.00000	4.00000
3	3.75000	3.25000	2.25000	3.75000
Total	3.46154	4.00000	2.30769	3.84615

TYPEREC	APSSPA	APSTBU_1	APSTCA_1	APSTCH_1
1	1.50000	3.25000	3.25000	3.25000
2	2.20000	3.40000	3.60000	3.00000
3	1.75000	3.00000	3.75000	3.75000
Total	1.84615	3.23077	3.53846	3.30769

TYPEREC	APSTDI_1	APSTMO_1	APSTRE_1	APSWMP
1	4.25000	4.50000	2.75000	1.25000
2	4.00000	4.20000	3.20000	1.80000
3	4.00000	4.50000	2.50000	1.25000
Total	4.07692	4.38462	2.84615	1.46154

TYPEREC	CMMTBE_1	CMMTFI_1	CMMTFI_2	CMMTLA_1
1	5.00000	4.75000	3.25000	3.50000
2	5.00000	4.00000	3.60000	3.80000
3	4.50000	4.50000	4.00000	3.00000
Total	4.84615	4.38462	3.61538	3.46154

TYPEREC	CMMTPE_1	CMMTSC_1	CMMTSH_1	CMMTSP_1
1	4.75000	4.25000	4.00000	4.25000
2	4.20000	4.20000	3.80000	4.60000
3	3.75000	4.50000	3.50000	4.00000
Total	4.23077	4.30769	3.76923	4.30769

TYPEREC	CUSANI_1	CUSBUS_1	CUSCOA_1	CUSDAY_1
1	1.75000	4.00000	3.50000	4.25000
2	2.20000	4.20000	4.40000	4.00000
3	3.25000	3.25000	3.50000	3.50000
Total	2.38462	3.84615	3.84615	3.92308

TYPEREC	CUSIHO_1	CUSLOR_1	CUSMIN_1	CUSPHO_1
1	5.00000	3.75000	3.87500	4.50000
2	4.60000	4.60000	3.40000	4.40000
3	3.75000	4.75000	2.62500	3.50000
Total	4.46154	4.38462	3.30769	4.15385

TYPEREC	CUSTRA_1	CUSTUD_1	ENVFIN_1	ENVNAT_1
1	3.00000	3.00000	5.00000	4.50000
2	3.80000	3.80000	5.00000	4.20000
3	5.00000	3.25000	4.75000	4.25000
Total	3.92308	3.38462	4.92308	4.30769

TYPEREC	ENVPOL_1	ENVSOC_1	ENVTEC_1	GROWCA_1
1	3.25000	2.00000	4.50000	4.00000
2	3.80000	4.00000	4.00000	3.80000
3	3.25000	3.75000	4.25000	4.25000
Total	3.46154	3.30769	4.23077	4.00000

TYPEREC	GROWDI_1	GROWEM_1	GROWPR_1	GROWPR_2
1	3.50000	2.75000	2.25000	4.50000
2	3.80000	3.40000	2.60000	4.20000
3	4.25000	3.75000	4.00000	4.25000
Total	3.84615	3.30769	2.92308	4.30769

TYPEREC	OPER_1
1	2.25000
2	2.20000
3	2.00000
Total	2.15385

Table D-4 Group means

Group standard deviations

TYPEREC	AFSBAG_1	AFSBUS_1	AFSCAS	AFSRAI_1
1	.95743	.50000	.95743	.95743
2	1.51658	.54772	.70711	.70711
3	.50000	2.06155	1.50000	1.50000
Total	1.05003	1.22474	1.03155	.98710

TYPEREC	AFSSPA	AFSTBU_1	AFSTCA_1	AFSTCH_1
1	.57735	.95743	.50000	.95743
2	.83666	.54772	.89443	.70711
3	.95743	.00000	.95743	.50000
Total	.80064	.59914	.77625	.75107

TYPEREC	AFSTDI_1	AFSTMO_1	AFSTRE_1	AFSWMP
1	.50000	.57735	.95743	.50000
2	.70711	.44721	.83666	.83666
3	.81650	.57735	.57735	.50000
Total	.64051	.50637	.80064	.66023

TYPEREC	CMMTBE_1	CMMTFI_1	CMMTFI_2	CMMTLA_1
1	.00000	.50000	.95743	1.00000
2	.00000	1.73205	1.67332	.83666
3	.57735	.57735	.00000	1.41421
Total	.37553	1.12090	1.12090	1.05003

TYPEREC	CMMTPE_1	CMMTSC_1	CMMTSH_1	CMMTSP_1
1	.50000	.95743	.00000	1.50000
2	1.78885	1.78885	.83666	.54772
3	.50000	.57735	.57735	.00000
Total	1.16575	1.18213	.59914	.85485

TYPEREC	CUSANI_1	CUSBUS_1	CUSCOA_1	CUSDAY_1
1	1.50000	.81650	.57735	.95743
2	1.64317	.44721	.54772	.70711
3	1.25831	2.06155	1.73205	1.73205
Total	1.50214	1.21423	1.06819	1.11516

TYPEREC	CUSIHO_1	CUSLOR_1	CUSMIN_1	CUSPHO_1
1	.00000	1.89297	1.31498	.57735
2	.54772	.54772	.89443	.89443
3	1.89297	.50000	1.25000	1.91485
Total	1.12660	1.12090	1.16438	1.21423

TYPEREC	CUSTRA_1	CUSTUD_1	ENVFIN_1	ENVNAT_1
1	1.41421	.81650	.00000	.57735
2	.83666	.44721	.00000	.44721
3	.00000	1.50000	.50000	.50000
Total	1.18754	.96077	.27735	.48038

TYPEREC	ENVPOL_1	ENVSOC_1	ENVTEC_1	GROWCA_1
1	1.25831	1.41421	.57735	1.41421
2	.44721	.70711	.70711	.44721
3	.50000	.95743	.95743	.50000
Total	.77625	1.31559	.72501	.81650

TYPEREC	GROWDI_1	GROWEM_1	GROWPR_1	GROWPR_2
1	1.29099	2.06155	.95743	.57735
2	.83666	1.34164	1.14018	.44721
3	.95743	.50000	.81650	.50000
Total	.98710	1.37747	1.18754	.48038

TYPEREC	OPER_1
1	.95743
2	.83666
3	.81650
Total	.80064

Table D-5 Group standard deviations

Wilks' Lambda (U-statistic) and univariate F-ratio
with 2 and 10 degrees of freedom

Variable	Wilks' Lambda	F	Significance
AFSBAG_1	.95988	.2090	.8149
AFSBUS_1	.81667	1.1224	.3633
AFSCAS	.90060	.5518	.5925
AFSRAI_1	.98355	.0836	.9204
AFSSPA	.85150	.8720	.4476
AFSTBU_1	.91696	.4528	.6483
AFSTCA_1	.92660	.3961	.6830
AFSTCH_1	.81250	1.1538	.3541
AFSTDI_1	.96484	.1822	.8362
AFSTMO_1	.91000	.4945	.6240
AFSTRE_1	.85150	.8720	.4476
AFSWMP	.82206	1.0823	.3754
CMMTBE_1	.59091	3.4615	.0720
CMMTFI_1	.91199	.4825	.6309
CMMTFI_2	.92526	.4039	.6781
CMMTLA_1	.89186	.6063	.5643
CMMTPE_1	.87689	.7020	.5185
CMMTSC_1	.98693	.0662	.9363
CMMTSH_1	.88214	.6680	.5342
CMMTSP_1	.90658	.5152	.6124
CUSANI_1	.82358	1.0711	.3789
CUSBUS_1	.87891	.6888	.5245
CUSCOA_1	.81798	1.1126	.3662
CUSDAY_1	.92139	.4266	.6641
CUSIHO_1	.78460	1.3727	.2973
CUSLOR_1	.84235	.9358	.4241
CUSMIN_1	.80366	1.2215	.3353
CUSPHO_1	.85913	.8198	.4681
CUSTRA_1	.52000	4.6154	.0380
CUSTUD_1	.86215	.7994	.4763
ENVFIN_1	.81250	1.1538	.3541
ENVNAT_1	.92083	.4299	.6621
ENVPOL_1	.87128	.7387	.5021
ENVSOC_1	.51759	4.6601	.0371
ENVTEC_1	.91159	.4849	.6295
GROWCA_1	.94375	.2980	.7487
GROWDI_1	.90230	.5414	.5981
GROWEM_1	.90912	.4998	.6210
GROWPR_1	.58795	3.5041	.0703
GROWPR_2	.92083	.4299	.6621
OPER_1	.98150	.0942	.9109

Table D-6 Test for univariate equality of group means

- - - - - O N E W A Y - - - - -

```
    Variable  CUSTRA_1    MEDIAN(CUSTRAIL,ALL)
 By Variable  TYPEREC     Miles & Snow type
```

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	2	8.1231	4.0615	4.6154	.0380
Within Groups	10	8.8000	.8800		
Total	12	16.9231			

- - - - - O N E W A Y - - - - -

```
    Variable  ENVSOC_1    MEDIAN(ENVSOCI,ALL)
 By Variable  TYPEREC     Miles & Snow type
```

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	2	10.0192	5.0096	4.6601	.0371
Within Groups	10	10.7500	1.0750		
Total	12	20.7692			

Table D-7 One-way analysis of variance for trailers and social factors

- - - - - - - - D I S C R I M I N A N T   A N A L Y S I S - - - - - - - -

```
On groups defined by TYPEREC   Miles & Snow type

Analysis number        1

Direct method:  all variables passing the tolerance test are entered.

     Minimum tolerance level..................  .00100

Canonical Discriminant Functions

     Maximum number of functions.............        2
     Minimum cumulative percent of variance...  100.00
     Maximum significance of Wilks' Lambda....  1.0000


Prior probabilities
```

Group	Prior	Label
1	.30769	Prospector
2	.38462	Analyser
3	.30769	Defender
Total	1.00000	

Table D-8 Discriminant analysis procedure statistics

The following 31 variables failed the tolerance test.

Variable	Within Groups Variance	Tolerance	Minimum Tolerance
AFSTRB_1	.655000	.0000000	.0000000
AFSWMP	.430000	.0000000	.0000000
CMMTBE_1	.100000	.0000000	.0000000
CMMTFI_1	1.375000	.0000000	.0000000
CMMTFI_2	1.395000	.0000000	.0000000
CMMTLA_1	1.180000	.0000000	.0000000
CMMTPE_1	1.430000	.0000000	.0000000
CMMTSC_1	1.655000	.0000000	.0000000
CMMTSH_1	.380000	.0000000	.0000000
CMMTSP_1	.795000	.0000000	.0000000
CUSANI_1	2.230000	.0000000	.0000000
CUSBUS_1	1.555000	.0000000	.0000000
CUSCOA_1	1.120000	.0000000	.0000000
CUSDAY_1	1.375000	.0000000	.0000000
CUSIHO_1	1.195000	.0000000	.0000000
CUSLOR_1	1.270000	.0000000	.0000000
CUSMIN_1	1.307500	.0000000	.0000000
CUSPHO_1	1.520000	.0000000	.0000000
CUSTRA_1	.880000	.0000000	.0000000
CUSTUD_1	.955000	.0000000	.0000000
ENVFIN_1	.075000	.0000000	.0000000
ENVNAT_1	.255000	.0000000	.0000000
ENVPOL_1	.630000	.0000000	.0000000
ENVSOC_1	1.075000	.0000000	.0000000
ENVTEC_1	.575000	.0000000	.0000000
GROWCA_1	.755000	.0000000	.0000000
GROWDI_1	1.055000	.0000000	.0000000
GROWEM_1	2.070000	.0000000	.0000000
GROWPR_1	.995000	.0000000	.0000000
GROWPR_2	.255000	.0000000	.0000000
OPER_1	.755000	.0000000	.0000000

Table D-9 Variables that failed the tolerance test

Classification function coefficients
(Fisher's linear discriminant functions)

TYPEREC =	1 Prospector	2 Analyser	3 Defender
AFSBAG_1	.9739645	5.7795266	-1.6333728
AFSBUS_1	-37.1902959	-21.7532781	-51.2421065
AFSCAS	20.9247337	8.2244497	27.6617041
AFSRAI_1	34.5034320	30.4204260	42.0580355
AFSSPA	-2.4106509	8.1179882	-4.9718343
AFSTBU_1	16.8165680	26.0875740	10.8739645
AFSTCA_1	4.9166864	.7144852	11.6532071
AFSTCH_1	11.7831953	.2786036	18.5475503
AFSTDI_1	18.8707692	-1.6070769	29.4870769
AFSTMO_1	47.5760947	54.0839290	43.4729941
(Constant)	-217.0002525	-197.3335351	-250.2012940

Table D-10 Fisher's linear discriminant functions

Canonical Discriminant Functions

Fcn	Eigenvalue	Pct of Variance	Cum Pct	Canonical Corr		After Fcn	Wilks' Lambda	Chi-square	df	Sig
					:	0	.031015	19.103	20	.5151
1*	13.1404	91.12	91.12	.9640	:	1	.438566	4.533	9	.8729
2*	1.2802	8.88	100.00	.7493	:					

* Marks the 2 canonical discriminant functions remaining in the analysis.

Standardized canonical discriminant function coefficients

	Func 1	Func 2
AFSBAG_1	-1.11312	.15250
AFSBUS_1	-4.64739	-1.38844
AFSCAS	2.78018	-.42942
AFSRAI_1	1.56591	1.47036
AFSSPA	-1.45479	.94981
AFSTBU_1	-1.26433	.00446
AFSTCA_1	1.13125	.91845
AFSTCH_1	1.79873	-.13244
AFSTDI_1	2.86125	-.49225
AFSTMO_1	-.74302	.01270

Table D-11 Canonical discrimant functions and standardized canonical discrimant function coefficients.

- - - - - O N E W A Y - - - - -

Variable DIS1_1 Function 1 for analysis 1
By Variable TYPEREC Miles & Snow type

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	2	131.4043	65.7021	65.7021	.0000
Within Groups	10	10.0000	1.0000		
Total	12	141.4043			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean		
Prospect	4	.8584	.8517	.4259	-.4968	TO	2.2137
Analyser	5	-3.7434	1.1835	.5293	-5.2128	TO	-2.2739
Defender	4	3.8208	.8605	.4303	2.4515	TO	5.1900
Total	13	.0000	3.4327	.9521	-2.0744	TO	2.0744

GROUP	MINIMUM	MAXIMUM
Prospect	.0054	1.7867
Analyser	-5.0067	-1.8330
Defender	2.5820	4.4327
TOTAL	-5.0067	4.4327

Levene Test for Homogeneity of Variances

Statistic	df1	df2	2-tail Sig.
.1582	2	10	.856

Variable DIS2_1 Function 2 for analysis 1
By Variable TYPEREC Miles & Snow type

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	2	12.8016	6.4008	6.4008	.0162
Within Groups	10	10.0000	1.0000		
Total	12	22.8016			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean		
Prospect	4	-1.4642	.6091	.3046	-2.4334	TO	-.4950
Analyser	5	.4587	1.3374	.5981	-1.2018	TO	2.1193
Defender	4	.8908	.7600	.3800	-.3186	TO	2.1001
Total	13	.0000	1.3785	.3823	-.8330	TO	.8330

GROUP	MINIMUM	MAXIMUM
Prospect	-1.9554	-.5774
Analyser	-.9964	2.5134
Defender	.2491	1.9525
TOTAL	-1.9554	2.5134

Levene Test for Homogeneity of Variances

Statistic	df1	df2	2-tail Sig.
1.4748	2	10	.275

Table D-12 Descriptive statistics for discriminant scores

Structure matrix:

Pooled within-groups correlations between discriminating variables
and canonical discriminant functions
(Variables ordered by size of correlation within function)

	Func 1	Func 2
GROWPR_1	.59055*	.06498
GROWDI_1	-.50614*	.42139
CMMTLA_1	-.48760*	-.02713
CMMTSP_1	-.38490*	.26693
ENVNAT_1	-.37789*	.22373
CMMTBE_1	.36878*	-.34200
AFSTRE_1	-.26848*	.10485
GROWPR_2	-.23918*	-.02579
CUSBUS_1	-.23102*	-.04023
CUSLOR_1	.21701*	.17571
CUSTRA_1	-.16811*	.05825
ENVSOC_1	-.16434*	.06275
CMMTFI_1	-.15034*	-.13429
AFSTBU_1	-.08026*	-.06795
CUSMIN_1	-.00678	-.57737*
OPER_1	.15572	-.49700*
ENVPOL_1	-.22892	.32911*
CUSANI_1	-.21214	-.28480*
AFSWMP	-.19339	-.26881*
CUSTUD_1	-.12835	-.25803*
AFSCAS	.04539	-.25508*
AFSTCA_1	.01014	.24663*
AFSSPA	-.08727	.24095*
CUSCOA_1	-.20613	-.23701*
GROWCA_1	-.06858	.23550*
ENVFIN_1	-.20239	.23432*
AFSBUS_1	-.11355	-.20740*
CUSDAY_1	.06089	-.20668*
CMMTSC_1	.00653	-.19178*
CMMTFI_2	-.03945	.17214*
CUSIHO_1	-.14172	-.16863*
AFSTDI_1	.00948	-.16595*
CUSPHO_1	.01239	-.14912*
AFSBAG_1	.03264	.14734*
ENVTEC_1	-.01393	.14287*
AFSTCH_1	.12643	.12725*
CMMTSH_1	.01726	-.12027*
AFSTMO_1	.08075	-.10158*
GROWEM_1	.02036	.09154*
CMMTPE_1	.01840	-.08543*
AFSRAI_1	-.03321	.04177*

* denotes largest absolute correlation between each variable and any discriminant function.

Table D-13 Structure matrix

```
Canonical discriminant functions evaluated at group means (group centroids)

  Group        Func  1    Func  2

     1          .85842   -1.46420
     2        -3.74335     .45874
     3         3.82077     .89077

Test of Equality of Group Covariance Matrices Using Box's M

  The ranks and natural logarithms of determinants printed are those
  of the group covariance matrices.

    Group Label                   Rank   Log Determinant
        1  Prospector              < 4   (Too few cases to be non-singular)
        2  Analyser                < 5   (Too few cases to be non-singular)
        3  Defender                < 4   (Too few cases to be non-singular)
     Pooled within-groups
     covariance matrix              10       -11.681344

  No test can be performed without at least two non-singular group
  covariance matrices.
```

Table D-14 Canonical discriminant functions evaluated at group means

Symbols used in territorial map

Symbol	Group	Label
1	1	Prospector
2	2	Analyser
3	3	Defender
*		Group centroids

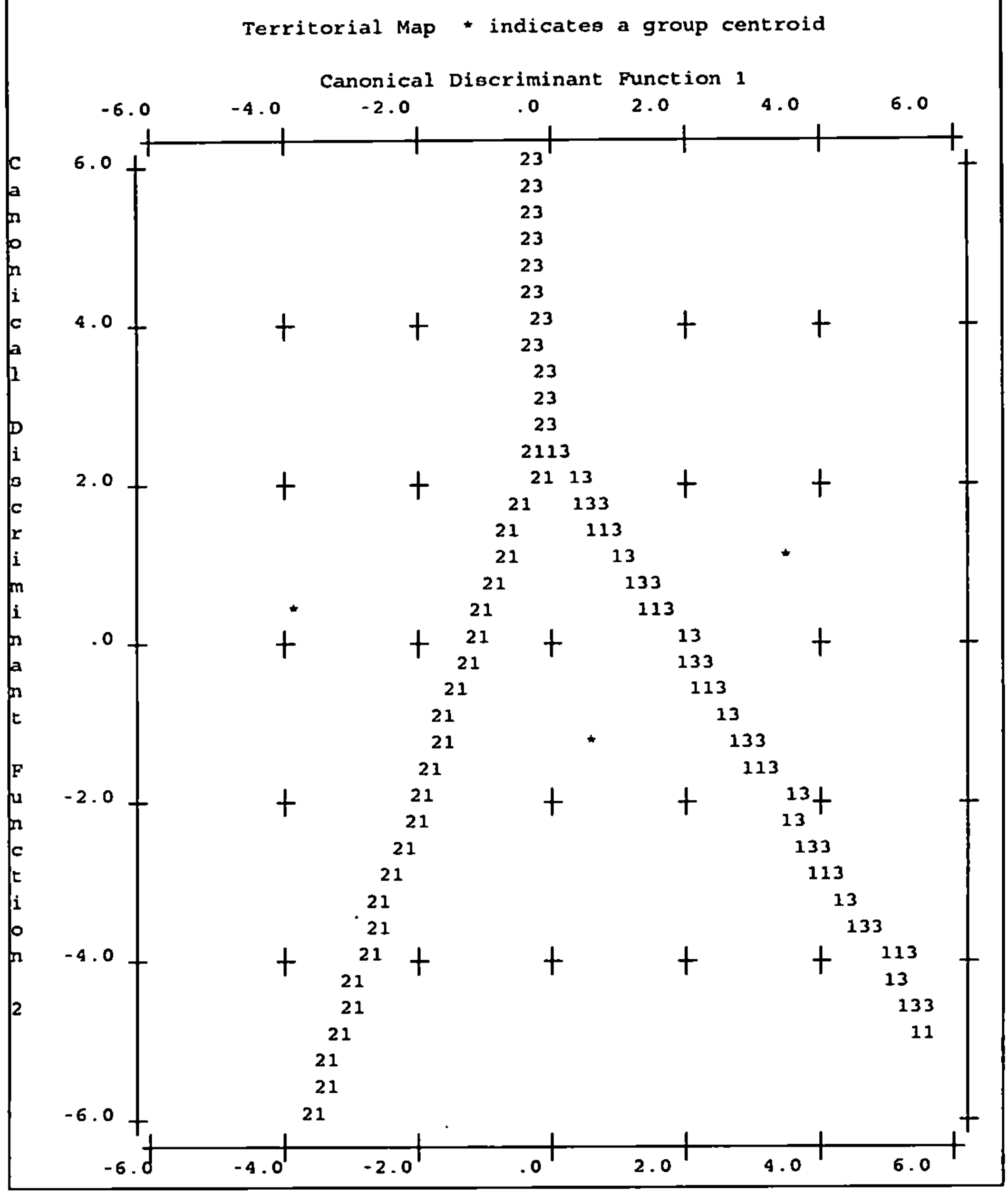


Figure D-1 Territorial map

Appendix E

Miles & Snow type questionnaire

Harry Heijveld
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Corporate Culture Question

Which one of the descriptions listed on the next page most closely fits your organisation ?

Please consider your organisation as a whole and note that none of the types listed are inherently 'good' or 'bad'.

(Please consult the listed descriptions and tick appropriate column)

Name Organisation	Type			
	1	2	3	4

After completion please used enclosed window envelope and return this page only.

Note: the descriptions on the next page were identical to those listed in appendix C.

Appendix F

Crosstabulations corporate culture

Appendix F Crosstabulations Corporate Culture

Target customers (market) Perceived importance according to Ports, Regions and Ferry Operators							
According to	Target customers	Very Important number (%)	Important number (%)	Neutral number (%)	Unimportant number (%)	Very Unimportant number (%)	Total number (%)
Ports	Animals / livestock	3 (27.3)	3 (27.3)		1 (9.1)	4 (36.4)	11 (52.4)
	Mini cruise passengers	2 (15.4)	4 (30.8)	3 (23.1)	1 (7.7)	3 (23.1)	13 (59.1)
	Students	1 (7.7)	7 (53.1)	2 (15.4)	1 (7.7)	2 (15.4)	13 (61.9)
	Day-trippers (short stay)	2 (15.4)	7 (53.8)	2 (15.4)		2 (15.4)	13 (59.1)
	Business travellers	4 (30.8)	4 (30.8)	2 (15.4)	1 (7.7)	2 (15.4)	13 (56.5)
	Coaches	6 (50.0)	3 (25.0)	1 (8.3)		2 (16.7)	12 (54.5)
	Package holidaymakers	8 (61.5)	1 (7.7)	2 (15.4)		2 (15.4)	13 (59.1)
	Independent holidaymakers	9 (69.2)	2 (15.4)			2 (15.4)	13 (56.5)
	Unaccompanied trailers	7 (53.8)	3 (23.1)	2 (15.4)		1 (7.7)	13 (56.5)
	Driver accompanied lorries	10 (76.9)	3 (23.1)				13 (54.2)
Regions	Animals / livestock	1 (33.3)	1 (33.3)	1 (33.3)			3 (14.3)
	Mini cruise passengers	1 (50.0)	1 (50.0)				2 (9.1)
	Students		1 (100.0)				1 (4.8)
	Day-trippers (short stay)	1 (50.0)		1 (50.0)			2 (9.1)
	Business travellers	2 (66.7)	1 (33.3)				3 (13.0)
	Coaches	2 (66.7)	1 (33.3)				3 (13.6)
	Package holidaymakers	2 (100.0)					2 (9.1)
	Independent holidaymakers	2 (66.7)	1 (33.3)				3 (13.0)
	Unaccompanied trailers	2 (66.7)	1 (33.3)				3 (13.0)
	Driver accompanied lorries	3 (75.0)	1 (25.0)				4 (16.7)
Ferry Operators	Animals / livestock	1 (14.3)	1 (14.3)			5 (71.4)	7 (33.3)
	Mini cruise passengers	2 (28.6)	2 (28.6)	1 (14.3)		2 (28.6)	7 (31.8)
	Students		2 (28.6)	4 (57.1)		1 (14.3)	7 (33.3)
	Day-trippers (short stay)	2 (28.6)	3 (42.9)		1 (14.3)	1 (14.3)	7 (31.8)
	Business travellers	1 (14.3)	3 (42.9)	2 (28.6)		1 (14.3)	7 (30.4)
	Coaches	2 (28.6)	3 (42.9)	1 (14.3)		1 (14.3)	7 (31.8)
	Package holidaymakers	2 (28.6)	4 (57.1)			1 (14.3)	7 (31.8)
	Independent holidaymakers	5 (71.4)	1 (14.3)			1 (14.3)	7 (30.4)
	Unaccompanied trailers	3 (41.9)	2 (28.6)	1 (14.3)		1 (14.8)	7 (30.4)
	Driver accompanied lorries	4 (57.1)	2 (28.6)			1 (14.3)	7 (29.2)
All Respondents	Animals / livestock	5 (23.8)	5 (23.8)	1 (4.8)	1 (4.8)	9 (41.9)	21 (100.0)
	Mini cruise passengers	5 (22.7)	6 (27.3)	4 (18.2)	2 (9.1)	5 (22.7)	22 (100.0)
	Students	1 (4.8)	10 (47.6)	6 (28.6)	1 (4.8)	3 (14.3)	21 (100.0)
	Day-trippers (short stay)	5 (22.7)	10 (45.5)	3 (13.6)	1 (4.5)	3 (13.6)	22 (100.0)
	Business travellers	7 (30.4)	8 (34.8)	4 (17.4)	1 (4.3)	3 (13.0)	23 (100.0)
	Coaches	10 (45.5)	7 (31.8)	2 (9.1)		3 (13.6)	22 (100.0)
	Package holidaymakers	12 (54.5)	5 (22.7)	2 (9.1)		3 (13.6)	22 (100.0)
	Independent holidaymakers	16 (69.6)	4 (17.4)			3 (13.6)	23 (100.0)
	Unaccompanied trailers	12 (52.2)	6 (26.1)	3 (13.0)		12(8.7)	23 (100.0)
	Driver accompanied lorries	17 (70.8)	6 (25.0)			1 (4.2)	24 (100.0)

Table F-1 Perceived importance of target customers by respondent type

Reasons for growth

Perceived importance according to Ports, Regions and Ferry Operators

According to	Reason for growth	Very Important number (%)	Important number (%)	Neutral number (%)	Unimportant number (%)	Very Unimportant number (%)	Total number (%)
Ports	Diversification	7 (35.0)		3 (15.0)	1 (5.0)		11 (55.0)
	Utilise spare capacity	6 (30.0)	5 (25.0)				11 (55.0)
	Public relations		6 (31.6)	3 (15.8)		1 (5.3)	10 (52.6)
	Profit	5 (25.0)	5 (25.0)	1 (5.0)			11 (55.0)
	Employment	3 (15.0)	5 (25.0)	2 (10.0)		1 (5.0)	11 (55.0)
Regions	Diversification	2 (10.0)	1 (5.0)				3 (15.0)
	Utilise spare capacity	2 (10.0)	1 (5.0)				3 (15.0)
	Public relations	2 (10.5)		1 (5.3)			3 (15.8)
	Profit		1 (5.0)	2 (10.0)			3 (15.0)
	Employment	3 (15.0)					3 (15.0)
Ferry Operators	Diversification	1 (5.0)		4 (20.0)	1 (5.0)		6 (30.0)
	Utilise spare capacity	2 (10.0)	1 (5.0)	1 (5.0)	1 (5.0)	1 (5.0)	6 (30.0)
	Public relations			2 (10.5)	2 (10.5)	2 (10.5)	6 (31.6)
	Profit	5 (25.0)	1 (5.0)				6 (30.0)
	Employment		4 (20.0)			2 (10.0)	6 (30.0)
All Respondents	Diversification	10 (50.0)	1 (5.0)	7 (35.0)	2 (10.0)		20 (100.0)
	Utilise spare capacity	10 (50.0)	7 (35.0)	1 (5.0)	1 (5.0)	1 (5.0)	20 (100.0)
	Public relations	2 (10.5)	6 (31.6)	6 (31.6)	2 (10.5)	3 (15.8)	19 (100.0)
	Profit	10 (50.0)	7 (35.0)	3 (15.0)			20 (100.0)
	Employment	6 (30.0)	9 (45.0)	2 (10.0)		3 (15.0)	20 (100.0)

Table F-2 Reasons for growth of ferry services provided

External environmental factors Perceived importance according to Ports, Regions and Ferry Operators							
According to (number of)	External factor	Very Important number (%)	Important number (%)	Neutral number (%)	Unimportant number (%)	Very Unimportant number (%)	Total number (%)
Ports	Financial environment	9 (42.9)	2 (9.5)				11 (52.4)
	Social environment	2 (9.1)	6 (27.3)	3 (13.6)	1 (4.5)		12 (54.5)
	Political environment	1 (4.5)	7 (31.8)	3 (13.6)	1 (4.5)		12 (54.5)
	Technical environment	4 (20.0)	5 (25.0)	1 (5.0)			10 (50.0)
	Natural environment	5 (25.0)	6 (30.0)				11 (55.0)
Regions	Financial environment	4 (19.0)					4 (19.0)
	Social environment	2 (9.1)	1 (4.5)	1 (4.5)			4 (18.2)
	Political environment	2 (9.1)		2 (9.1)			4 (18.2)
	Technical environment	3 (15.0)	1 (5.0)				4 (20.0)
	Natural environment	2 (10.0)	1 (5.0)				3 (15.0)
Ferry Operators	Financial environment	6 (28.6)					6 (28.6)
	Social environment	1 (4.5)	1 (4.5)	1 (4.5)	1 (4.5)	2 (9.1)	6 (27.3)
	Political environment		2 (9.1)	2 (9.1)	2 (9.1)		6 (27.3)
	Technical environment		5 (25.0)	1 (5.0)			6 (30.0)
	Natural environment	2 (10.0)	4 (20.0)				6 (30.0)
All Respondents	Financial environment	19 (90.5)	2 (9.5)				21 (100.0)
	Social environment	5 (22.7)	8 (36.4)	5 (22.7)	2 (9.1)	2 (9.1)	22 (100.0)
	Political environment	3 (13.6)	9 (40.9)	7 (31.8)	3 (13.6)		22 (100.0)
	Technical environment	7 (35.0)	11 (55.0)	2 (10.0)			20 (100.0)
	Natural environment	9 (45.0)	11 (55.0)				20 (100.0)

Table F-3 Perceived importance of external environmental factors

Commitment Perceived importance according to Ports, Regions and Ferry Operators							
According to	Commitment	Very Important number (%)	Important number (%)	Neutral number (%)	Unimportant number (%)	Very Unimportant number (%)	Total number (%)
Ports	Operating period guarantee	7 (36.8)	4 (21.1)	1 (5.3)		1 (5.3)	13 (68.4)
	Guaranteed schedule	7 (33.3)	5 (23.8)			1 (4.8)	13 (61.9)
	Financial commitment	5 (25.0)	6 (30.0)	1 (5.0)		1 (5.0)	13 (65.0)
	Financial investments	2 (9.5)	7 (33.3)	2 (9.5)		1 (4.8)	12 (57.1)
	Priority berthing	11 (61.1)	2 (11.1)				13 (72.2)
	Allocation of open space	7 (31.8)	5 (22.7)				12 (54.5)
	Allocation sheds / buildings	3 (13.6)	6 (27.3)	3 (13.6)			12 (54.5)
	Dedicated labour	2 (9.5)	5 (23.8)	3 (14.3)	1 (4.8)	1 (4.8)	12 (57.1)
Regions	Operating period guarantee	2 (10.5)	1 (5.3)				3 (15.8)
	Guaranteed schedule	3 (14.3)					3 (14.3)
	Financial commitment	2 (10.0)					2 (10.0)
	Financial investments	1 (4.8)	1 (4.8)				2 (9.5)
	Priority berthing	3 (16.7)					3 (16.7)
	Allocation of open space	1 (4.5)	2 (9.1)				3 (13.6)
	Allocation sheds / buildings	1 (4.5)	1 (4.5)	1 (4.5)			3 (13.6)
	Dedicated labour	1 (4.8)				1 (4.8)	2 (9.5)
Ferry Operators	Operating period guarantee	2 (10.5)	1 (5.3)				3 (15.8)
	Guaranteed schedule	4 (19.0)		1 (4.8)			5 (23.8)
	Financial commitment	5 (25.0)					5 (25.0)
	Financial investments	2 (9.5)	3 (14.3)	1 (4.8)	1 (4.8)		7 (33.3)
	Priority berthing	1 (5.6)	1 (5.6)				2 (11.1)
	Allocation of open space	5 (22.7)	1 (4.5)		1 (4.5)		7 (31.8)
	Allocation sheds / buildings	1 (4.5)	4 (18.2)	2 (9.1)			7 (31.8)
	Dedicated labour	1 (4.8)	5 (23.8)			1 (4.8)	7 (33.3)
All Respondents	Operating period guarantee	11 (57.9)	6 (31.6)	1 (5.3)		1 (5.3)	19 (100.0)
	Guaranteed schedule	14 (66.7)	5 (23.8)	1 (4.8)		1 (4.8)	21 (100.0)
	Financial commitment	12 (60.0)	6 (30.0)	1 (5.0)		1 (5.0)	20 (100.0)
	Financial investments	5 (23.8)	11 (52.4)	3 (14.3)	1 (4.8)	1 (4.8)	21 (100.0)
	Priority berthing	15 (83.3)	3 (16.7)				18 (100.0)
	Allocation of open space	13 (59.1)	8 (36.4)		1 (4.5)		22 (100.0)
	Allocation sheds / buildings	5 (22.7)	11 (50.0)	6 (27.3)			22 (100.0)
	Dedicated labour	4 (19.0)	10 (47.6)	3 (14.3)	1 (4.8)	3 (14.3)	21 (100.0)

Table F-4 Commitment elements for ferry services

Appendix G

Multivariate analysis

Appendix G Multivariate Analysis

Multivariate analysis comprises all statistical methods that simultaneously analyse multiple measurements on each individual or object under investigation. The specific building block of multivariate analysis is the 'variate', a linear combination of variables with empirically determined weights. This can be stated in mathematical terms as:

$$\text{Variate value} = w_1 X_1 + w_2 X_2 + \ldots\ldots + w_n X_n$$

where X_n is the observed variable and w_n is the weight determined by the multivariate technique. The result is a single value representing a combination of the entire set of variables, which best achieves the objective of a particular multivariate technique. For example in discriminant analysis the objective is to obtain a variate which maximises the differences between groups of observations.

In order to determine which multivariate technique is most appropriate three questions need to be answered: (1) can the variables be divided into independent and dependent classifications based on a particular theory ?, (2) if they can, how many variables are treated as dependent or independent in a single analysis - one or more ?, and (3) how are the variables measured - metric (ratio and interval) or non-metric (nominal and ordinal) ? Figure G-1 shows a selection model to determine which multivariate technique should be utilised.

The two main categories, dependence analysis and inter-dependence analysis, which result from answering the first question, can also clearly be identified in figure G-1. Dependence analysis enables the prediction of dependent variables by independent variables. Inter-dependence analysis, when no variable can be identified as dependent or independent, is used to identify the structure of the inter-relationship of all the variables.

Appendix H

Boxplots

Appendix H Boxplots

A boxplot provides useful information about the distribution and dispersion of the data. But, rather than plotting the actual data, a boxplot shows summary statistics for the distribution in the form of median, the 25th percentile, the 75th percentile, values that are between 1.5 and 3 boxlengths from the lower or upper end of the box - called outliers, and identified as a circle (o) in the boxplot, and values that are more than 3 boxlengths from the lower or upper end of the box - called extreme values, and identified as a star (*) in the boxplot.

The median determines the location or central tendency of the data; if the median is in the centre of the box the distribution is even, if it is not the distribution is skewed. Positively skewed when the median is closer to the bottom than to the top of the box and negatively skewed when it is positioned closer to the top of the box. The length of the tail is shown by the position of the whiskers (smallest and largest observed values that are not outliers), the outliers and the extreme values.

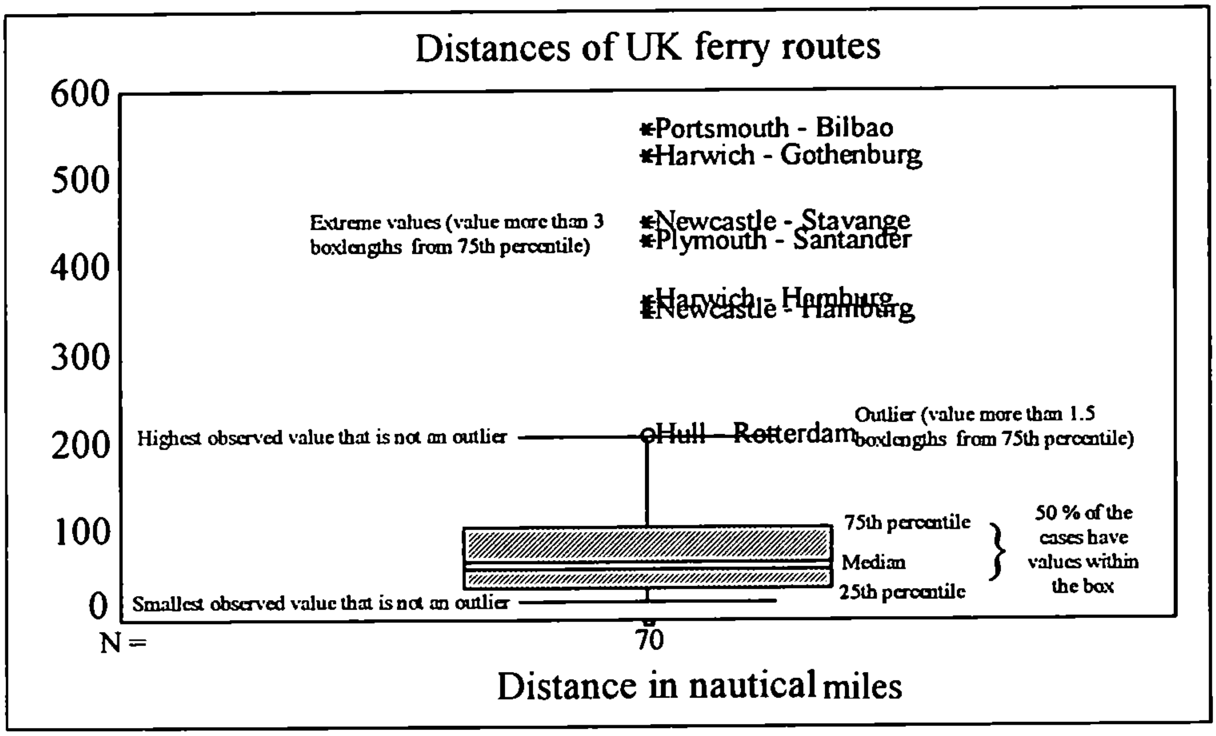

Figure H-1 Boxplot of distances of UK ferry routes

Figure H-1 shows an annotated boxplot of the distances of UK ferry routes. N is the number of ferry routes included, in this case 70 routes. The median (identified as a black bar) is 64 nautical miles (nm), which is identical to the 50th percentile. The 25th percentile is 38 nm, the 75th percentile is 106 nm; 50 % of the routes have values that fall within this range (the boxlength). The boxlength is 106 - 38 = 68 nm.

An outlier is a route with a value of more than 1.5 the boxlengths from the 75th percentile; in figure H-1 this the route Hull - Rotterdam (more than 1.5 x 68 + 106 = 208 nm), which has a distance of 210 nm. The highest observed value that is not an outlier is 207 nm (Hull - Zeebrugge) and the lowest observed value, not an outlier, is 22 nm (Dover - Calais).

Extreme values are identified for values of more than 3 boxlengths from the 75th percentile (3 x 68 + 106 = 310 nm). The extreme values are shown in the boxplot as 555 nm for the route Portsmouth - Bilbao, 525 nm (Harwich - Gothenburg), 450 nm (Newcastle - Stavanger), 430 nm (Plymouth - Santander), 362 nm (Harwich - Hamburg) and 350 nm (Newcastle - Hamburg.

Boxplots are particularly useful for comparing distributions of values of different groups as can be seen in figure 2-1, ferry route distances by area of operation.

Appendix I

Analysis of variance

Appendix I Analysis of variance (anova)

The statistical technique to test the null hypothesis that several population means are equal is called analysis of variance (anova). This technique examines the variability of the observations within each group as well as the variability between group means. For example, a ferry operator suspects that the length overall of ferries depends on the voyage time of the ferry crossing. Data of the length of all ferries and of the voyage time for their specific routes is collected, and the null hypothesis that all voyage times result in the same average length of the ferries.

Examining the data.

Before embarking on any statistical analysis, the distribution of the data values should be looked at to make sure that there is nothing unusual. This can be done easiest by use of a boxplot as shown in figure I-1. (see for detailed explanation of the boxplot appendix H).

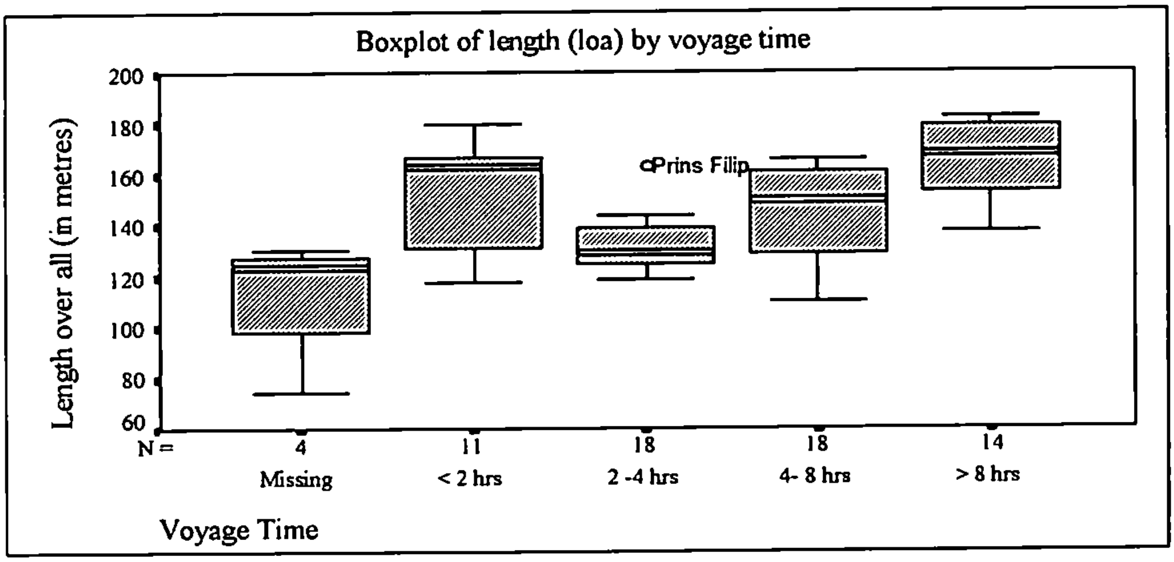

Figure I-1 Boxplot of length (loa) by voyage time

From the plots in the graph, it can be seen that the medians for the four groups of voyage time, < 2 hrs, 2-4 hrs 4-8 hrs, and > 8 hrs, differ (ignoring the four missing values). It appears that, apart from the short routes, as the voyage time increases so does the length of the ferries. The vertical length of the boxes, a measure of the spread or variability of the data values, also seems to differ for the voyage times, but not in any systematic fashion. There is one outlying value, the ferry 'Prins Filip' with a length of 163.4 metres. The extreme values divided in the five highest and five lowest for each group are shown in table I-1.

```
                              Extreme Values
                              ------- ------

   LOA       Length over all (in metres)

By  XTIME              .  Missing
Valid cases:          4.0    Missing cases:          .0   Percent missing:       .0

   2     Highest      SHIP                   2     Lowest      SHIP
         130.0          Stena Parisien              74.2          Stena Sea Lynx
         125.0          Stena Londoner             122.0          Isle of Innishm

 By  XTIME             1  < 2 hrs
Valid cases:         11.0    Missing cases:         5.0   Percent missing:     31.3

5    Highest      SHIP                   5     Lowest      SHIP
         179.7          Pride of Burgun            117.8          Pride of Hythe
         169.6          Pride of Calais            123.6          Pride of Canter
         169.6          Pride of Dover             130.0          Cote d'Azur
         163.5          Stena Fantasia             132.0          Pride of Bruges
         163.5          Stena Fiesta               134.0          Stena Invicta

By  XTIME              2  2 -4 hrs
Valid cases:         18.0    Missing cases:          .0   Percent missing:       .0

 5     Highest      SHIP                   5     Lowest      SHIP
         163.4          Prins Filip                118.9          Princesse Marie
         143.8          Sally Sky                  118.9          Prins Albert
         142.3          Stena Felicity             122.0          Leinster
         139.4          Pride of Ailsa             123.0          Reine Astrid
         139.4          Pride of Rathli            125.0          Versailles

By  XTIME              3  4- 8 hrs
Valid cases:         18.0    Missing cases:          .0   Percent missing:       .0

 5     Highest      SHIP                   5     Lowest      SHIP
         166.1          Stena Britannic            109.7          Havelet
         161.8          Koningin Beatri            118.2          Beauport
         161.4          Normandie                  122.0          Duchesse Anne
         161.0          Pride of Le Hav            128.7          Pride of Cherbo
         161.0          Pride of Portsm            128.7          Pride of Winche

By  XTIME              4  > 8 hrs
Valid cases:         14.0    Missing cases:         1.0   Percent missing:      6.7

 5     Highest      SHIP                   5     Lowest      SHIP
         182.3          Princess of Sca            137.8          Superferry
         182.3          Prince of Scand            140.6          Winston Churchi
         179.3          Norsun                     152.9          Dana Anglia
         179.0          Norsea                     153.0          Venus
         177.1          Pride of Bilbao            156.4          Hamburg
```

Table I-1 Extreme values

Sample means and confidence intervals.

The sample mean for a group provides the single best guess for the unknown population value μ_I. However, it is unlikely that the value of the sample mean is exactly equal to the population value. Instead, it is probably not too different. Based on the sample means one can calculate a range of values, that with a designated likelihood, includes the population value. Such a range is called **confidence interval**. For example, as shown in table I-2, the 95 % confidence interval for the average length over all for ferry crossing of less than two hours is 134.8178 to 164.5822 metres. This means that if the analysis is repeated under the same conditions with the same sample sizes in each group, and each time the 95 % confidence levels are calculated, 95 % of these confidence intervals will contain the unknown population parameter value. Since the parameter is not known, it is not known whether a particular interval contains the population value.

- -Variance of Groups - -
for

Summaries of	LOA	Length over all (in metres)			
By levels of	XTIME	Voyage Time			

Variable	Mean	Std Dev	Valid Cases	Missing Cases	95% CI for Mean	Variance
Total loa	144.2400	21.6438	65	6	(138.8769, 149.6031)	468.4552
of which:						
Total xtime	146.3016	19.8950	61	4	(141.2063, 151.3970)	395.8115
< 2 hrs	149.7000	22.1524	11	5	(134.8178, 164.5822)	490.7280
2 -4 hrs	132.4611	10.7983	18	0	(127.0913, 137.8310)	116.6025
4- 8 hrs	143.5389	17.5834	18	0	(134.7949, 152.2829)	309.1755
> 8 hrs	164.9786	15.2090	14	1	(156.1971, 173.7600)	231.3141

Table I-2 Variance of groups

Testing the hypothesis.

The boxplot in figure I-1 and the means in table I-2 suggest that the four different voyage time periods result in different length overall of ferries operating on these routes. It is now necessary to determine if the observed differences in the four sample means can be attributed to just natural variability among sample means from the same population or whether it is reasonable to believe that the four voyage time periods come from populations that have different means. It is therefore necessary to determine the probability of getting results as remote as the ones observed when, in fact, all population means are equal.

Analysing the variability.

In analysis of variance, the observed variability in the sample is divided into two parts: variability of the observations within a group (that is, the variability of the observations around their group mean) and the variability among the group means.

If the null hypothesis is true, the population means for the four groups are equal and the observed data can be considered to be four samples of the same population. In which case it should be estimated how much the sample means should vary. If the observed sample means vary more than expected, there will be evidence to reject the null hypothesis. The analysis of variance is shown in table I-3

- - - - - O N E W A Y - - - - -

Variable LOA Length over all (in metres)
By Variable XTIME Voyage Time

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	8596.1007	2865.3669	10.7787	.0000
Within Groups	57	15152.5891	265.8349		
Total	60	23748.6898			

Table I-3 One-way analysis-of-variance

Between -Groups Variability.

In table I-3 the row labelled *Between groups* contains an estimate of the variability of the observations based on the variability of the group means. To calculate the entry labelled *Sum of Squares*, start by subtracting the overall mean (the mean of all observations) from each group mean. Then square each difference and multiply the square by the number of observations in each group. Finally; add the results together. For the example, the between groups sum of squares is

$$11 \times (149.7000 - 146.3016)^2 + 18 \times (132.4611 - 146.3016)^2 + 18 \times (143.5389 - 146.3016)$$
$$+ 14 \times (164.9786 - 146.3016)^2 = 8596.1$$

The column labelled *D.F.* contains the degrees of freedom. To calculate the degrees of freedom for the between-groups sum of squares, subtract 1 from the number of groups. In our example there are four groups, so there are three degrees of freedom. To calculate the between groups mean square, divide the between-groups sum of squares by its degrees of freedom:

$$8596.1007 / 3 = 2865.3669$$

Within-Groups Variability.

The row labelled *Within Groups* contains an estimate of the variability of the observations based on how much the observations vary from their group means. The within-groups sum of squares is calculated by multiplying each of the group variances (the square of the standard deviation) by the number of cases in the group minus 1 and then adding up the results. In our example, the within-groups sum of squares is

$$10 \times 22.1524^2 + 17 \times 10.7983^2 + 17 \times 17.5834^2 + 13 \times 15.2090^2 = 15152.6$$

To calculate the degrees of freedom for the within-groups sum of squares, take the number of cases in all groups combined and subtract the number of groups. In the example, there are 61 cases and 4 groups, so there are 57 degrees of freedom. The mean square is then calculated by dividing the sum of squares by the degrees of freedom:

$$15152.6 / 57 = 265.8$$

Calculating the F-ratio

The two estimates of variability in the population are the within-groups mean square, based on how much the observations within each group vary, and the between-groups mean square, based on how much the group means vary among themselves. If the null hypothesis is true, the two numbers should be close to each other. If the one is divided by the other, the ratio should be close to 1.

The statistical test for the null hypothesis that all groups have the same mean in the population is based on this ratio, called an F statistic. It is calculated by dividing the between-groups mean square by the within-groups mean square. For the example,

$$F = 2865.4 / 265.8 = 10.78$$

This number appears in the table I-3 in the column labelled F ratio. Next, the observed significance level it is needed, which can be obtained by comparing the calculated F value to the ***F distribution*** (the distribution of the F statistic when the null hypothesis is true). The significance level is based on both the actual F value and the degrees of freedom for the two mean squares. In the example the significance level is 0.0000 so the null hypothesis can be rejected.

Multiple comparison procedures.

A significant F value tells only that the population are probably not all equal. It does not tell which pairs of groups appear to have different means. The null hypothesis that all population means are equal is rejected if *any two* means are unequal. Special tests to determine which means are significantly different from each other are called the **multiple comparison procedures**.

```
                      - - - - -  Multiple Comparison TEST - - - - -

     Variable  LOA        Length over all (in metres)
  By Variable  XTIME      Voyage Time

Multiple Range Tests:  LSD test with significance level .05
                       The difference between two means is significant if
                       MEAN(J)-MEAN(I)  >= 11.5290 * RANGE * SQRT(1/N(I) + 1/N(J))
                       with the following value(s) for RANGE: 2.83
   (*) Indicates significant differences which are shown in the lower triangle
                          2 4
                          - - < >
                          4 8 2 8
    Mean       XTIME
  132.4611     2 -4 hrs
  143.5389     4- 8 hrs   *
  149.7000     < 2 hrs    *
  164.9786     > 8 hrs    * * *

Multiple Range Tests:  Modified LSD (Bonferroni) test with significance level .05
                       with the following value(s) for RANGE: 3.87
  132.4611     2 -4 hrs
  143.5389     4- 8 hrs
  149.7000     < 2 hrs    *
  164.9786     > 8 hrs    * *

Multiple Range Tests:  Duncan test with significance level .05
                       with the following value(s) for RANGE:
                       Step       2      3      4
                       RANGE    2.83   2.98   3.08
  132.4611     2 -4 hrs
  143.5389     4- 8 hrs   *
  149.7000     < 2 hrs    *
  164.9786     > 8 hrs    * * *

Multiple Range Tests:  Student-Newman-Keuls test with significance level .050
                       with the following value(s) for RANGE:
                       Step       2      3      4
                       RANGE    2.84   3.40   3.74
  132.4611     2 -4 hrs
  143.5389     4- 8 hrs   *
  149.7000     < 2 hrs    *
  164.9786     > 8 hrs    * * *

Multiple Range Tests:  Tukey-HSD test with significance level .050
                       with the following value(s) for RANGE: 3.74
  132.4611     2 -4 hrs
  143.5389     4- 8 hrs
  149.7000     < 2 hrs    *
  164.9786     > 8 hrs    * *

Multiple Range Tests:  Tukey-B test with significance level .050
                       with the following value(s) for RANGE:
                       Step       2      3      4
                       RANGE    3.29   3.57   3.74
  132.4611     2 -4 hrs
  143.5389     4- 8 hrs
  149.7000     < 2 hrs    *
  164.9786     > 8 hrs    * *

Multiple Range Tests:  Scheffe test with significance level .05
                       with the following value(s) for RANGE: 4.07
  132.4611     2 -4 hrs
  143.5389     4- 8 hrs
  149.7000     < 2 hrs
  164.9786     > 8 hrs    * *
```

Table I-4   Multiple comparison test

One might wonder why one cannot just compare all possible pairs of means using a *t* test. The reason is that when you make any comparisons involving the same means, the probability that one comparison will turn out to be statistically significant increases. For example, with 5 groups and all pairs of means are compared, 10 comparisons are being made. When the null hypothesis is true, the probability that at least one of the 10 observed significance levels will be less than 0.05 is about 0.29. The more comparisons one makes, the more likely it is that one or two pairs are found to be statistically different, even if all population means are equal.

By adjusting for the number of comparisons to be made, multiple comparison procedures protects one from calling to many differences significant. The more comparisons are made, the larger the difference between the pairs of means must be for a multiple comparison procedure to find it significant. Using multiple comparison procedures enables one to be more confident in finding true differences.

The multiple comparison procedures available SPSS for Windows are the LSD-, Modified LSD (Bonferroni)-, Duncan-, Student-Newman-Keuls-, Tukey-HSD-, Tukey-B-, and the Scheffe-test. They differ in how they adjust the observed significance level (different values for 'range' in the formula). Table I-4 shows these values for each

One of the simplest is the Bonferroni test (Modified LSD). It adjusts the observed significance level based on the number of comparisons one makes. For example, if 5 comparisons are made, the observed significance level for the original comparison must be less than 0.05/5, or 0.01, for the difference to be significant at the 0.05 significance level. Further discussion of multiple comparison techniques, see Winer et al. (1991).

The results of the Bonferroni test, see table I-4, show a table (as do the others) that orders the group means from the smallest to the largest in both rows and columns. An asterisk marks a pair of means that are different at the 0.05 level after the Bonferroni correction is made. Differences are marked only once, in the lower diagonal of the table. If the significance level is greater than 0.05, the space is left blank. In our example, the asterisks in the first column indicate that the mean of ferry crossings with voyage times between two and four hours (2 - 4 hrs) is significantly different from the other groups of < 2 hrs and > 8 hrs. In the second column, the 4 - 8 hrs voyage time group is different from the > 8 hrs group, but not different from the 2 - 4 hrs group. There are no asterisks in the third column. Thus it can be seen that all pairs of means are significantly different from each other except for the < 2 hrs and 4 - 8 hrs voyage time groups

Table I-5 contains the length of ferries within and from the UK, subdivided by the four categories of voyage time and the four categories of (the most common) types of cabins on board. The table is similar to the summary table shown for the one-way analysis of variance. The difference here is that there are two independent (or grouping) variables: voyage time and type of cabins. The first mean displayed (146.30) is for the entire sample. The number of cases (61) is shown in parentheses. Then, for each of the independent variables, mean scores are displayed for each of the categories. The voyage time (xtime) categories are ordered from < 2 hrs (coded 1) to > 8 hrs (coded 4), and the types of cabins categories are ordered from 'no cabins' (coded 0) to 'luxury cabins' (coded 3). The possible combinations of the values of the two variables result in sixteen cells. The means are displayed in a table classified by both grouping variables. Voyage time is the row variable, and types of cabins is the column variable. Each mean has in parenthesis the number of cases which apply. For instance on the ferry crossings of < 2 hrs and those with 'no cabins' the mean of loa is 146.70 m based on 10 cases. There are four categories with no (0) cases. Some of which appear to make sense, such as, no ' luxury cabins' on the short ferry crossings of < 2 hrs and no 'no cabins' (or, ferries without any cabins) on the long routes of > 8 hrs.

* * * C E L L   M E A N S * * *

LOA	Length over all (in meters)
by XTIME	Voyage Time
CBNS	Cabin Type

Total Population

146.30
(61)

XTIME

1	2	3	4
149.70	132.46	143.54	164.98
(11)	(18)	(18)	(14)

CBNS

0	1	2	3
140.30	137.37	138.35	161.33
(18)	(10)	(13)	(20)

XTIME \ CBNS	0	1	2	3
1	146.70	179.70	.00	.00
	(10)	(1)	(0)	(0)
2	134.31	129.60	126.03	142.90
	(7)	(2)	(6)	(3)
3	118.20	133.54	139.20	159.01
	(1)	(7)	(3)	(7)
4	.00	.00	156.20	168.49
	(0)	(0)	(4)	(10)

Table I-5 Comparison of length of ferries by voyage time and cabin type

An extension of the one-way analysis of variance is used to evaluate a dependent variable, e.g. length over all (loa), and its relation to two or more independent variables, e.g. voyage time (xtime) and type of cabins (cbns).

*** A N A L Y S I S   O F   V A R I A N C E ***

LOA Length over all (in meters)
by XTIME Voyage Time
CBNS Cabin Type

EXPERIMENTAL sums of squares
Covariates entered FIRST

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig of F
Main Effects	11802.522	6	1967.087	9.599	.000
XTIME	5015.211	3	1671.737	8.158	.000
CBNS	3206.421	3	1068.807	5.216	.003
2-Way Interactions	1904.751	5	380.950	1.859	.119
XTIME CBNS	1904.751	5	380.950	1.859	.119
Explained	13707.273	11	1246.116	6.081	.000
Residual	10041.417	49	204.927		
Total	23748.690	60	395.811		

71 cases were processed.
10 cases (14.1 pct) were missing.

Table I-6 Analysis of variance length by voyage time by cabin type

The total observed variation in the length (of UK ferries) is subdivided into four components: the sum of squares due to voyage time, type of cabins, their interaction, and the residual. This can be expressed (see table I-6) as:

Total SS = Xtime SS + Cbns SS + Interaction SS + Residual SS

The first column lists the sources of variation. the sums of squares attributable to each of the components are given in the second column. The sums of squares for each independent variable alone are termed the **main effect** sums of squares. The **explained** sum of squares is the total sum of squares for the main effect and interaction in terms of the model. The degrees of freedom for xtime and cbns, listed in the third column, are one fewer than the number of categories. In our example, both xtime and cbns have four categories and therefore both have three degrees of freedom. Five degrees of freedom are associated with the interaction term (the product of the degrees of freedom of each of the individual variables) . The degrees of freedom for the residual are $N - 1 - k$, where N equals the total valid cases (61) and k equals the degrees of freedom for the explained sum of squares, resulting in (61 - 1 - 11 =) 49. The mean squares of the fourth column are obtained by dividing each sum of squares by its degrees of freedom. Hypothesis test are based on the ratios of the mean squares of each source of variation to the mean square for the residual.

Testing for interaction.

The F value associated with the xtime and cbns interaction is 1.859, as shown in table I-6. The observed significance level is 0.119. Therefore, it appears that there is no interaction between the variables.

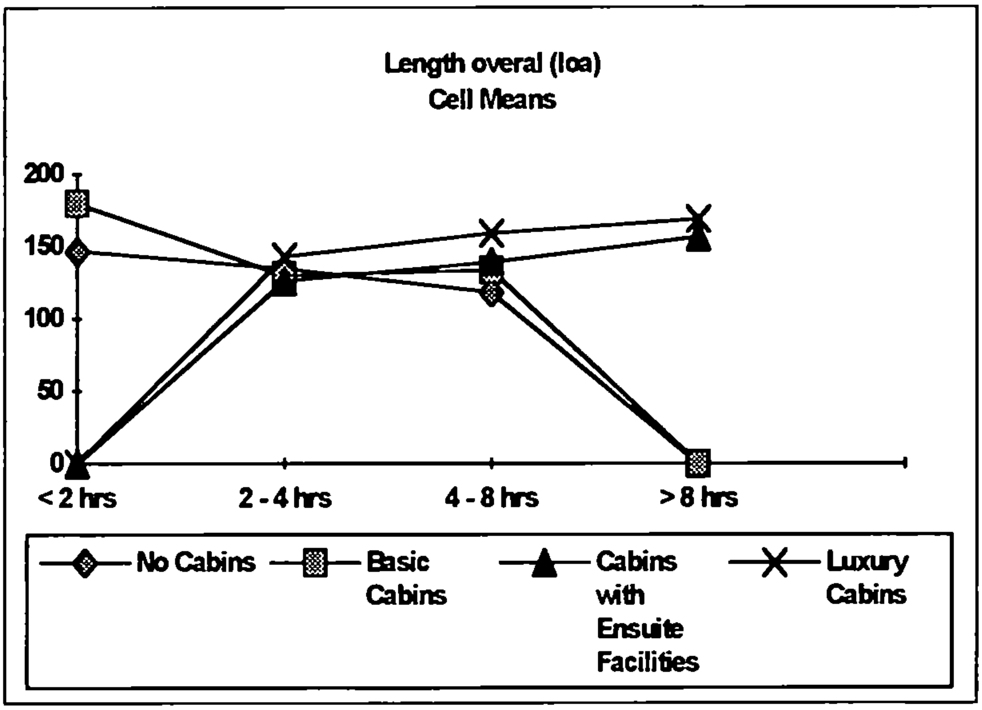

Figure I-2 Plot of length by voyage time by cabin type

Consider figure I-2, which is a plot of the cell, or group, means in table I-5. The means of the length does not only relate to the voyage time and the type of cabins on board of the ferry, but also to the particular combination of the values of the variables. It shows that no interaction between variables exists (ignoring the 0-values).

* * * A N A L Y S I S   O F   V A R I A N C E * * *

```
             LOA     Length over all (in meters)
          by XTIME   Voyage Time
             SAU     Sauna
             CLUB    Club Class
             CBNS    Cabin Type

             EXPERIMENTAL sums of squares
             Covariates entered FIRST
```

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig of F
Main Effects	11862.435	8	1482.804	6.762	.000
XTIME	4861.282	3	1620.427	7.390	.000
SAU	23.404	1	23.404	.107	.745
CLUB	167.653	1	167.653	.765	.386
CBNS	2188.908	3	729.636	3.327	.027
Explained	11862.435	8	1482.804	6.762	.000
Residual	10964.115	50	219.282		
Total	22826.549	58	393.561		

71 cases were processed.
12 cases (16.9 pct) were missing.

Due to empty cells or a singular matrix,
higher order interactions have been suppressed.

Table I-7 Analysis of variance - multiple comparisons of group means

Tests for voyage time and type of cabins.

Once the presence of interaction has been established, (not here), it is not particularly useful to continue hypothesis testing, since the two variables jointly affect the dependent variable. If there is no significant interaction, the grouping variables can be tested individually. The *F* value associated with voyage time (F = 8.158; sign.: 0.000) would provide a test of the hypothesis that voyage time does not affect the length overall. Similarly, the *F* value associated with type of cabins (F = 5.126; sign.: 0.003) would test the hypothesis that this variable would have no main effect on the evaluation.

Extensions.

Analysis-of-variance techniques can be used with a number of grouping variables. A larger number of factors can be used (see table I-7). This is called an analysis with a 4 x 4 x 2 x 2 ANOVA table (the numbers indicate how many categories each grouping variable has). The conclusions from the simplified analysis are more or less the same as those from the more elaborate one. When each of the cells has the same number of cases, it greatly simplifies the analysis and its interpretation. When unequal sample sizes occur in the cells, the total sum of squares cannot be partitioned into nice components that sum the total. Various techniques are available for calculating sums of squares in such **non-orthogonal designs**. The methods differ in the way they adjust the sums of squares to account for other effects in the model. Each method results in different sums of squares and test different hypotheses. However, when all cell frequencies are equal, the methods yield the same results. For discussion of the various procedures for analysing designs with unequal cell frequencies, see Kleinbaum and Kupper (1978) and Overall and Klett (1972).

```
                         - - Analysis of Variance - -

Dependent Variable    LOA        Length over all (m)
   By levels of       PORTORIG   Area of Port of Departure


   Value  Label                        Mean     Std Dev  Sum of Sq     Cases

       1  Channel & South-West     143.1730     19.6212 13859.6330        37
       2  Irish Sea                127.5308     17.2465  3569.3077        13
       3  North Sea                164.4357     13.8461  2492.2721        14
                                ----------------------------------------------
Within Groups Total                144.6469     18.0714 19921.2128        64




                            Sum of                      Mean
Source                      Squares         d.f.       Square          F        Sig.

Between Groups              9371.2466          2     4685.6233    14.3477      .0000

Within Groups              19921.2128         61      326.5773

                        Eta =   .5656    Eta Squared =   .3199
```

Table I-8 Analysis of variance length (loa) by area of port of departure

Appendix J

SPSS® for Windows™ - database

Appendix J SPSS® for Windows™ - Database

SPSS is a comprehensive and flexible statistical analysis and data management system. The files created or imported into SPSS can be used to generate tables, charts and plots. These files also form the basis for descriptive statistics and complex statistical analysis (see for details: Norusis, 1993). This study started with data entry and analysis on the SPSS main frame system, but as SPSS improved its product, the PC version, which has the same capabilities now as the main frame six years ago, was used throughout. For this study the SPSS base system was used with the enhancement option of SPSS Professional Statistics™ to allow the procedures for reliability, cluster analysis and discriminant analysis to be undertaken.

Two main files were created in SPSS. The first file comprises all data relating to the existing ferries operating in 1994 within and from the United Kingdom. The main results of the analysis of data file 1 are reported mainly in chapter 2. The second file comprises the primary data collected for the ferry service offer and the corporate culture. The results of data file 2 are shown in chapter 7.

Appendix K

The chi-square (χ^2) test of independence

Appendix K The chi-square test of independence (χ^2).

To establish whether two variables in a cross tabulation are independent of each other the chi-square (χ^2) test of independence can be used. By definition, two variables are independent of each other, if the probability that a case falls into a given cell is simply the product of the marginal probabilities (Norusis, 1993)

CBNSREC Cabin Type by XTIME Ferry crossing time

CBNSREC	Count / Exp Val / Residual	XTIME <= 2 hrs (1)	> 2 - <= 4 hrs (2)	> 4 - <= 8 hrs (3)	> 8 hrs (4)	Row Total
1 No cabins	Count	15	7	0	0	22
	Exp Val	5.3	6.0	5.7	5.0	33.3%
	Residual	9.7	1.0	-5.7	-5.0	
2 Basic cabins	Count	1	2	7	1	11
	Exp Val	2.7	3.0	2.8	2.5	16.7%
	Residual	-1.7	-1.0	4.2	-1.5	
3 Cabins with show	Count	0	6	3	4	13
	Exp Val	3.2	3.5	3.3	3.0	19.7%
	Residual	-3.2	2.5	-.3	1.0	
4 Luxury cabins	Count	0	3	7	10	20
	Exp Val	4.8	5.5	5.2	4.5	30.3%
	Residual	-4.8	-2.5	1.8	5.5	
Column Total		16	18	17	15	66
		24.2%	27.3%	25.8%	22.7%	100.0%

Chi-Square	Value	DF	Significance
Pearson	55.17540	9	.00000
Likelihood Ratio	64.97874	9	.00000
Mantel-Haenszel test for linear association	35.33081	1	.00000

Minimum Expected Frequency - 2.500
Cells with Expected Frequency < 5 - 10 OF 16 (62.5%)

Table K-1 The chi-square (χ^2) test of independence

In table K-1, for example, if the cabin type and the ferry crossing time are independent the probability of a ferry crossing time of $\leq$ 2 hours with no cabins is the product of the cabin type being 'no cabins' (33.3 %) and the probability of the ferry crossing time being less or equal to two hours (24.2 %) which results to P = 0.333 x 0.242 = 0.0805. The total number of ferries included is 66 (4 missing values) therefore the expected number of cases would be 0.0805 x 66 = 5.318 (or 5.3 as shown in the cell). The expected value can also be calculated from the observed variables by multiplying the row value and the column value of a cell and divide this by the total number of observations. In case of our example the expected value for the top-left cell = 22 x 16 / 66 = 5.3. From the table it can be seen that the difference between the expected value and the observed value (count) is expressed by the residual value (9.7). The Pearson chi-square test is often used to test the hypothesis that the row and column variables are independent. It is calculated by summing over all cells the squared residuals divided by the expected frequencies. In the example:

$$\chi^2 = 9.7^2 / 5.3 + 1.0^2 / 6.0 + -5.7^2 / 5.7 + -5.0^2 / 5.0 + -1.7^2 / 2.7 + -1.0^2 / 3.0 + 4.2^2 / 2.8 + -1.5^2 / 2.5 + -3.2^2 / 3.2 + 2.5^2 / 3.5 + -0.3^2 / 3.3 + 1.0^2 / 3.0 + -4.8^2 / 4.8 + -2.5^2 / 5.5 + 1.8^2 / 5.2 + 5.5^2 / 4.5 = 55.17540 \text{ (see table K-1)}$$

Degrees of freedom (df)

The term degrees of freedom (df) refers to the number of values that are free to vary after certain restrictions are placed on the data. In the example the degrees of freedom can be seen as the number of cells of the table that can be arbitrarily filled when the row and column totals (marginals) are fixed. For an r x c table, in our example three rows (r = 4) and two columns (c = 4), the degrees of freedom are (r - 1) x (c - 1), because when (r - 1) x (c - 1) cells of the table are filled, the remaining cells must have frequencies which maintain the marginal totals. So in the example the degrees of freedom are (4 - 1) x (4 - 1) = 9 df

Significance level.

The significance level is the cut-off point for inferring the operation of nonchance factors, which means, that if an event or one more deviant would occur 5 % or 1 % of the time or less, by chance, it is asserted that the results are due to nonchance factors and term these cut-off points respectively as the 0.05 (or 5 %) and 0.01 (or 1 %) significance level. For instance, when flipping a coin it is expected that a 50-50 chance of heads coming up would occur. If in 10 tosses heads would come up 6 times no serious doubt would be cast on this outcome, if however heads would have come up 9 times, it would be considered such a rare occasion, that another reason, other than chance, would explain this result. The level of significance set for research purposes for inferring the operation of nonchance factors is known as the alpha (α) level. Thus when employing the 0.05 level of significance: $\alpha = 0.05$. In the example the significance level of the pearson chi-square test is 0.0000 which means that there is a 0.00 % probability that an independent relationship exists between the variables and therefore the hypothesis that the two variables are independent is not rejected.

An other test as an alternative to the Pearson chi-square is the likelyhood ratio chi-square, which in the example in table K-1 shows a value of 64.97874 and a significance level of 0.00000 The value of the observed chi-square also depends on the sample size. Other conditions which must be met to ensure that the chi-square value gives a good approximation of the distribution are that random samples are of multinomial distributions and the expected values must not be too small (in the example 0.25). It is recommended that all expected frequencies are at least 5, studies indicate (see Everitt, 1977) that this probably too stringent and can be relaxed (in th example 62.5 % is < 5). The chi-square test is a test of independence; it provides little information about the strength or form of the association between two variables

The Mantel-Haenszel chi-square is another measure of linear association between the row and column variables in a crosstabulation. It is computed by multiplying the square of the Pearson correlation coefficient by the number of cases minus 1. The resulting statistic has one degree of freedom. The Mantel-Haenszel statistic should not be used for nominal data, even when the chi-square has been requested.

The Eta coefficient is the appropriate one for data in which the dependent variable is measured on an interval scale and the independent variable on a nominal or ordinal scale. When squared, Eta can be interpreted as the proportion of the total variability in the dependent variable that can be accounted for by knowing the values of the independent variable. The measure is asymmetric and does not assume a linear relationship between the variables.

```
                                - - Analysis of Variance - -
Dependent Variable    BEDS        Beds (incl. couchettes)
      By levels of    XTIME       Ferry crossing time

     Value  Label                             Mean     Std Dev  Sum of Sq     Cases

         1  <= 2 hrs                        89.4286    67.6926 27493.7143         7
         2  > 2 - <= 4 hrs                 169.9412   265.3847 1126864.94        17
         3  > 4 - <= 8 hrs                 758.5882   566.8069 5140320.12        17
         4  > 8 hrs                       1265.8571   521.8461 3540203.71        14
                                          ---------------------------------------
Within Groups Total                        620.6000   439.1365 9834882.49        55


                                    Sum of                         Mean
Source                             Squares        d.f.            Square          F         Sig.
Between Groups                 11580276.713          3     3860092.2375     20.0170      .0000
  Linearity                    10834680.223          1     10834680.223     56.1846      .0000
  Dev. from Linearity            745596.4896         2       372798.2448      1.9332      .1551
                                  R =   .7113     R Squared =   .5059
Within Groups                   9834882.4874        51     192840.8331
                                Eta =   .7354   Eta Squared =   .5408
 Total Cases = 70
Missing Cases = 15 or  21.4 Pct
```

Table K-2 Analysis of variance of beds (include couchettes) by crossing time

Appendix L

Cluster analysis

Appendix L Cluster Analysis

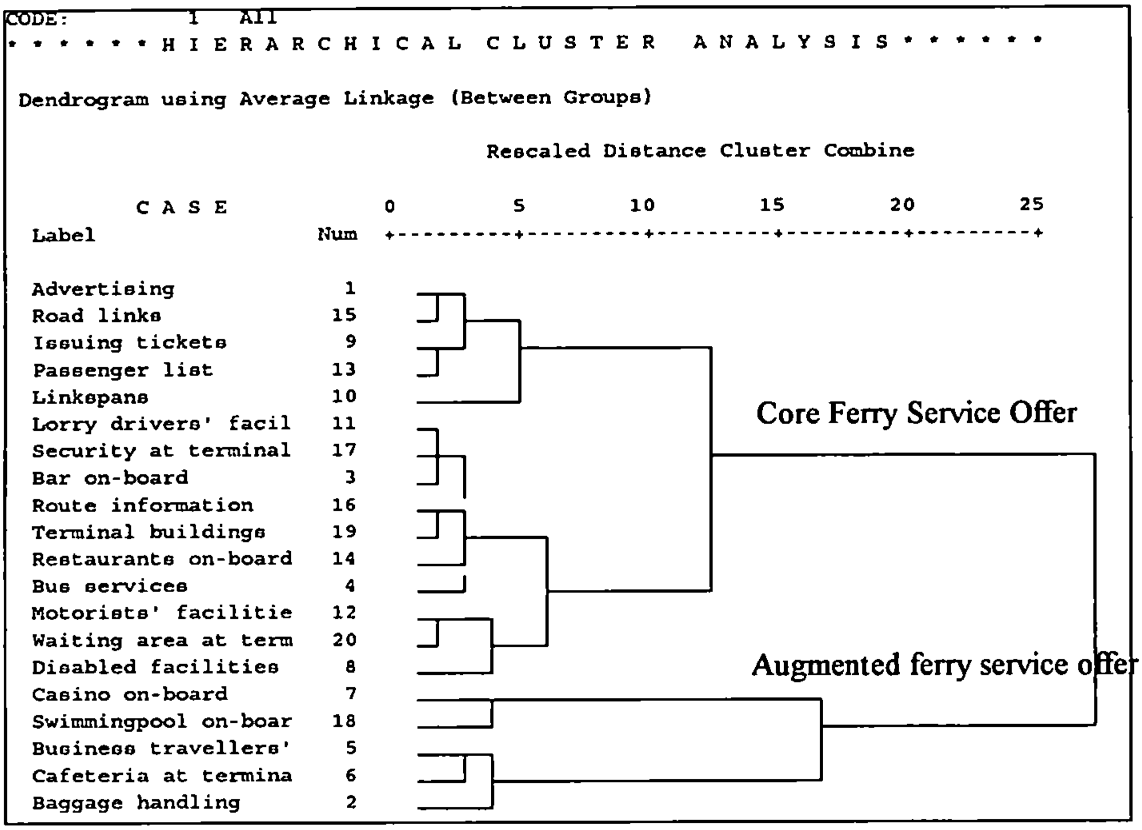

Figure L-1 Random cluster analysis number 1

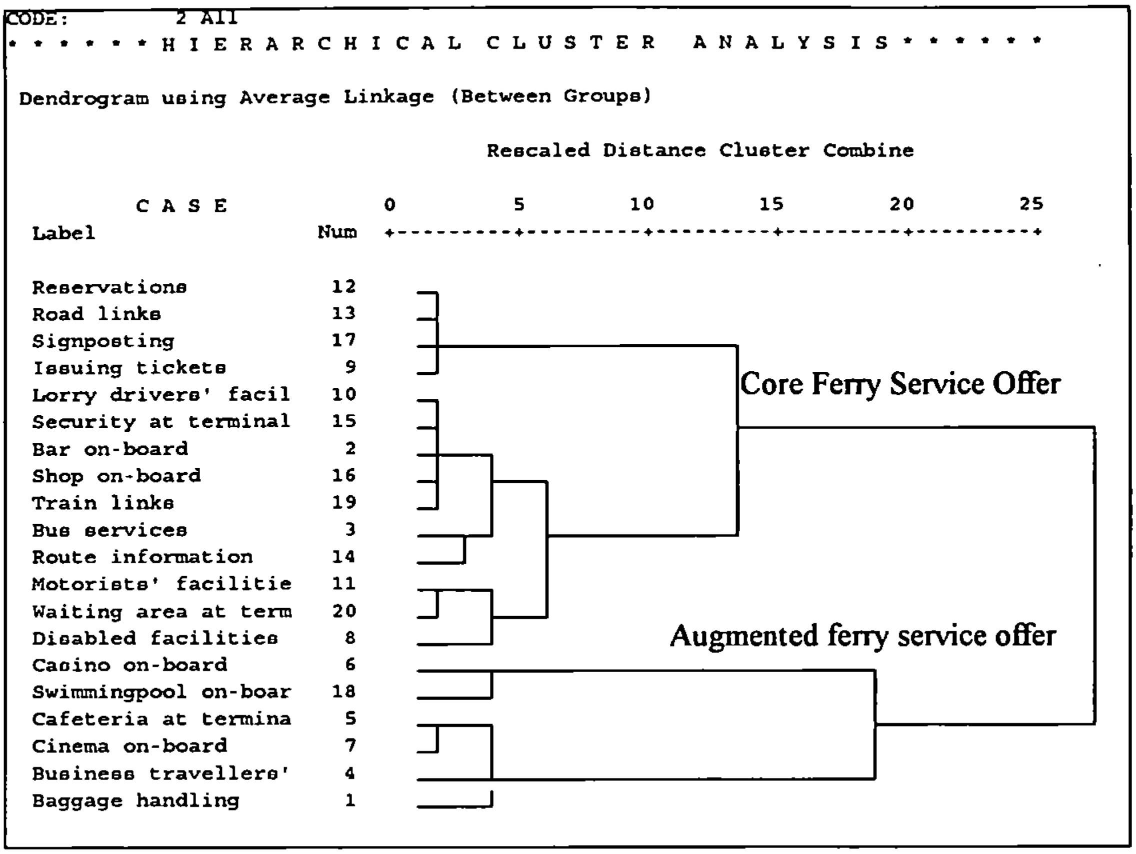

Figure L-2 Random cluster analysis number 2

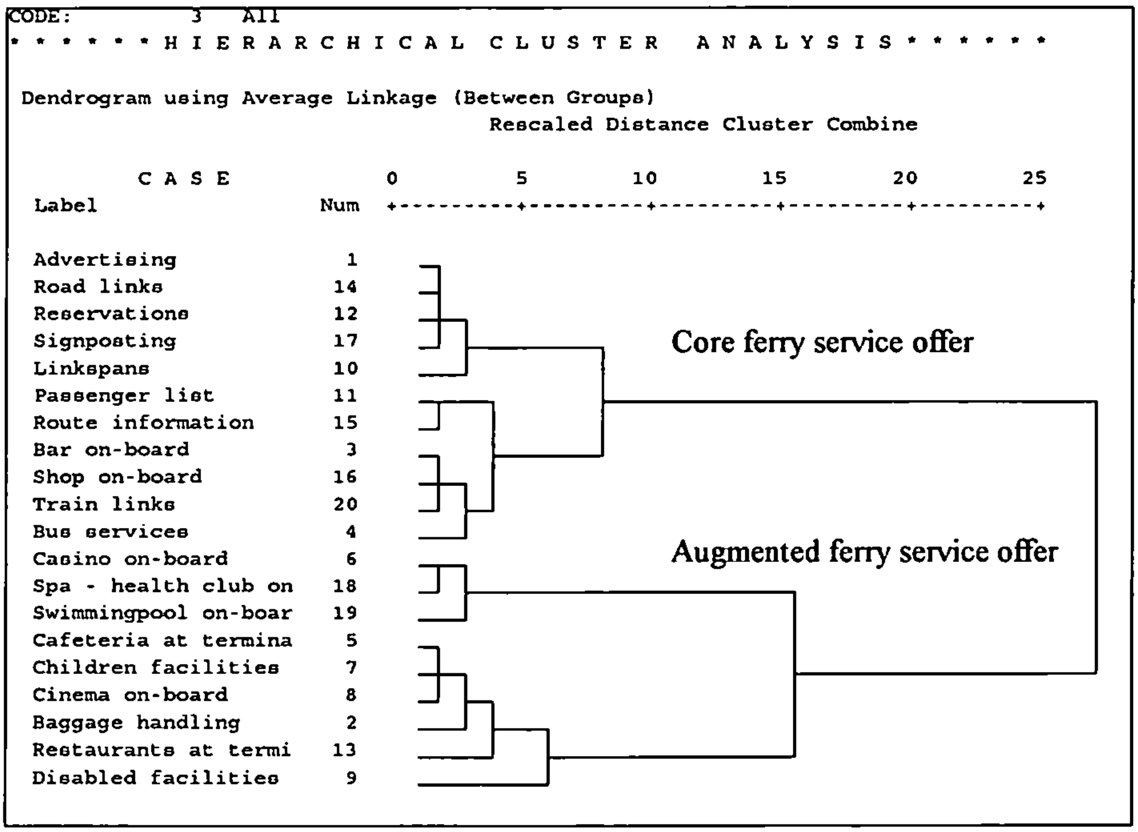

Figure L-3 Random cluster analysis number 3

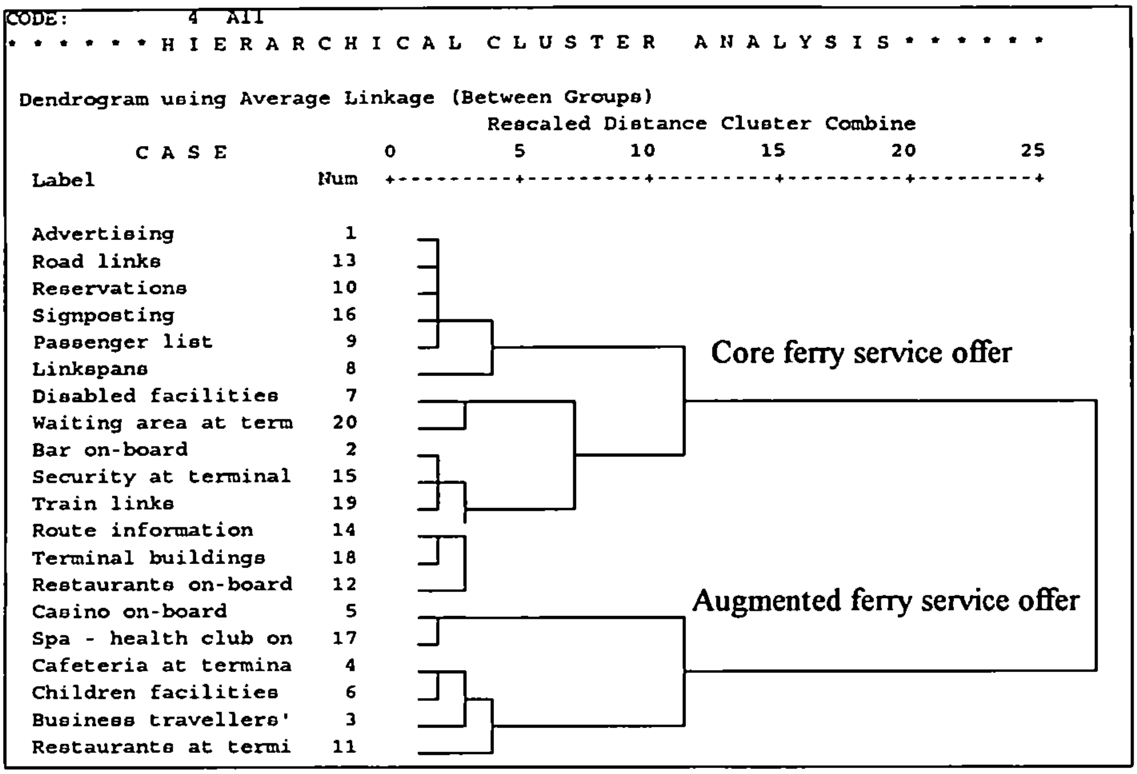

Figure L-4 Random cluster analysis number 4

Importance of Ferry Service Element (Ferry respondents in percentages)					
Ferry Service Elements	Importance				
	Very Important	Important	Neutral	Unimportan	Very Unimportant
Linkspans	100.0	.0	.0	.0	.0
Advertising	100.0	.0	.0	.0	.0
Road links	85.7	14.3	.0	.0	.0
Reservations	85.7	14.3	.0	.0	.0
Issuing tickets	85.7	14.3	.0	.0	.0
Signposting	71.4	28.6	.0	.0	.0
Passenger list	57.1	42.9	.0	.0	.0
Route information	57.1	28.6	14.3	.0	.0
Terminal buildings	57.1	28.6	14.3	.0	.0
Bar on-board	57.1	28.6	14.3	.0	.0
Security at terminal	57.1	28.6	14.3	.0	.0
Shop on-board	57.1	14.3	14,3	14.3	.0
Lorry drivers' facilities term	50.0	33.3	16.7	.0	.0
Waiting area at terminal	42.9	42.9	14.2	.0	.0
Restaurants on-board	42.8	28.6	28.6	.0	.0
Motorists' facilities terminal	28.6	57.1	14.3	.0	.0
Bus services	28.6	57.1	.0	14.3	.0
Rail links	14.3	57.1	28.6	.0	.0
Baggage handling	14.3	28.6	42.9	14.2	.0
Disabled facilities at terminal	.0	85.7	14.3	.0	.0
Cafeteria at terminal	.0	57.1	28.6	14.3	.0
Business travellers' facilities	.0	42.9	42.9	14.2	.0
Restaurants at terminal	.0	42.9	14.3	28.5	14.3
Children facilities at terminal	.0	42.8	28.6	28.6	.0
Cinema on-board	.0	33.3	33.3	16.7	16.7
Casino on-board	.0	28.6	14.2	42.9	14.3
Spa - health club on-board	.0	.0	.0	66.7	33.3
Swimming pool on-board	.0	.0	.0	66.7	33.3

Table L-1 Importance of ferry service elements (ferry respondents)

* * * * * * H I E R A R C H I C A L   C L U S T E R   A N A L Y S I S * * * * * * *

Agglomeration Schedule using Average Linkage (Between Groups)

Stage	Clusters Combined Cluster 1	Cluster 2	Coefficient	Stage Cluster 1st Appears Cluster 1	Cluster 2	Next Stage
1	22	26	.000000	0	0	3
2	16	25	.000000	0	0	27
3	3	22	.000000	0	1	4
4	3	21	.000000	3	0	8
5	17	20	.000000	0	0	6
6	11	17	.000000	0	5	13
7	1	12	.000000	0	0	19
8	3	13	78.260002	4	0	9
9	3	28	354.676025	8	0	10
10	3	18	377.220001	9	0	15
11	5	6	406.140015	0	0	18
12	14	27	408.980011	0	0	20
13	11	24	408.980011	6	0	19
14	8	19	409.000000	0	0	16
15	3	15	526.799988	10	0	17
16	8	9	565.500000	14	0	18
17	3	23	690.822510	15	0	24
18	5	8	700.446716	11	16	21
19	1	11	715.715027	7	13	24
20	4	14	817.959961	0	12	23
21	2	5	937.599976	0	18	22
22	2	7	1410.619995	21	0	25
23	4	10	1635.919922	20	0	25
24	1	3	2148.931152	19	17	26
25	2	4	2327.870605	22	23	26
26	1	2	5985.153809	24	25	27
27	1	16	9473.458984	26	2	0

Table L-2 Agglomeration schedule (ferry respondents)

Clusters of Ferry Service Elements according to all ferry respondents (by Importance)						
Ferry Service Element	Number of Clusters					
	2	3	4	5	6	7
Advertising	1	1	1	1	1	1
Issuing tickets	1	1	1	1	1	1
Linkspans	1	1	1	1	1	1
Reservations	1	1	1	1	1	1
Road links	1	1	1	1	1	1
Signposting	1	1	1	1	1	1
Lorry drivers' facilities at terminal	1	1	1	3	3	3
Bar on-board	1	1	1	3	3	3
Keeping passengers /cargo lists	1	1	1	3	3	3
Restaurants on-board	1	1	1	3	3	3
Providing route information	1	1	1	3	3	3
Security at terminal	1	1	1	3	3	3
Shop on-board	1	1	1	3	3	3
Terminal buildings	1	1	1	3	3	3
Terminal waiting area	1	1	1	3	3	3
Baggage handling	1	2	2	2	2	2
Business travellers' facilities terminal	1	2	2	2	2	2
Cafeteria at terminal	1	2	2	2	2	2
Restaurants at terminal	1	2	2	2	2	2
Children's' facilities at terminal	1	2	2	2	2	2
Cinema on-board	1	2	2	2	2	2
Casino on-board	1	2	2	2	2	5
Motorists' facilities at terminal	1	2	3	4	4	4
Bus services	1	2	3	4	4	4
Rail links	1	2	3	4	4	4
Disabled facilities at terminal	1	2	3	4	5	6
Swimming pool on-board	2	3	4	5	6	7
Spa - health club on-board	2	3	4	5	6	7

Table L-3 Clusters of importance of ferry service elements (ferry respondents)

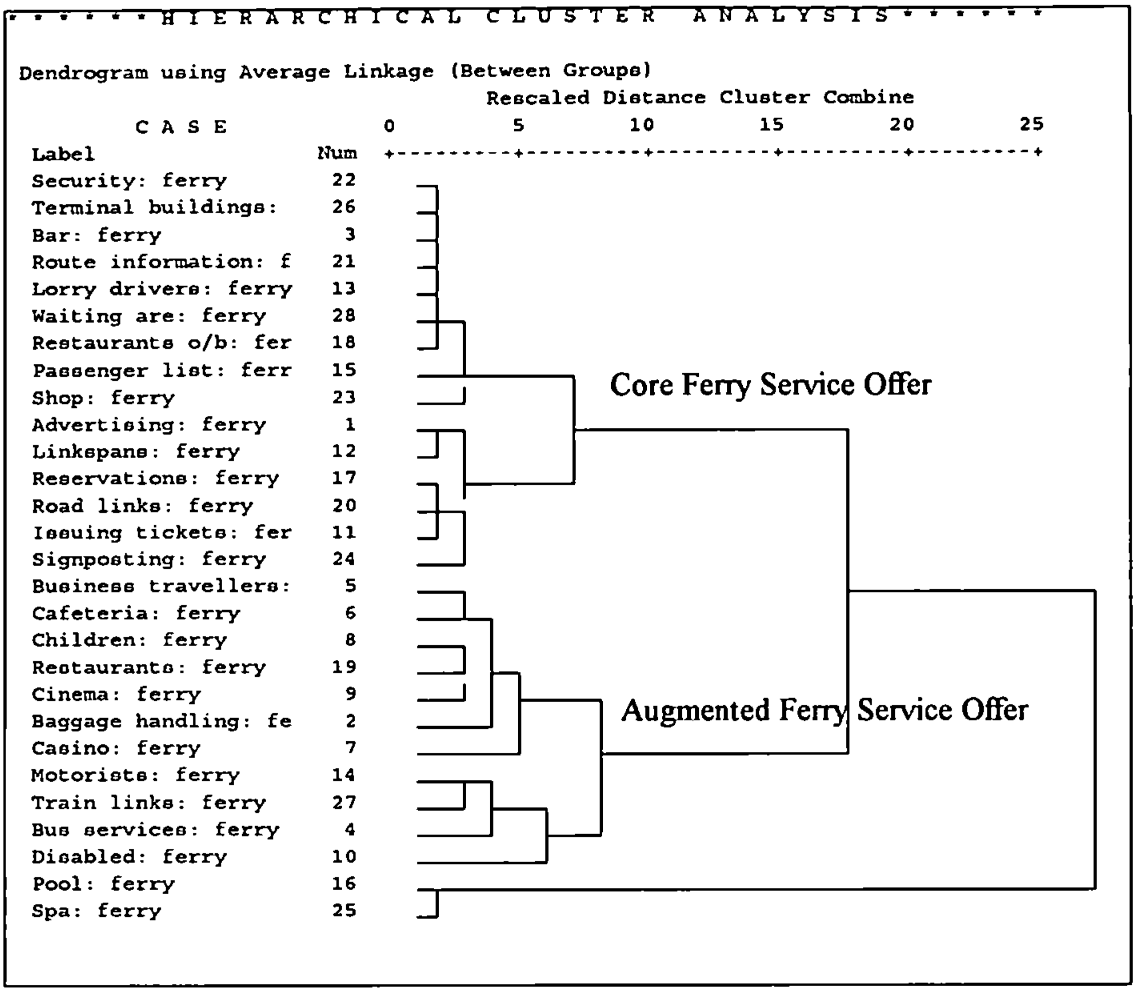

Figure L-5 Dendogram of importance of ferry service elements (ferry respondents)

Importance of Ferry Service Element by Regions (in percentages)					
Ferry Service Elements	Importance				
	Very Important	Important	Neutral	Unimportant	Very Unimportant
Bus services	100.0	.0	.0	.0	.0
Disabled facilities at terminal	100.0	.0	.0	.0	.0
Linkspans	100.0	.0	.0	.0	.0
Road links	100.0	.0	.0	.0	.0
Restaurants on-board	75.0	25.0	.0	.0	.0
Shop on-board	75.0	25.0	.0	.0	.0
Signposting	75.0	25.0	.0	.0	.0
Rail links	75.0	25.0	.0	.0	.0
Advertising	50.0	50.0	.0	.0	.0
Baggage handling	50.0	50.0	.0	.0	.0
Bar on-board	50.0	50.0	.0	.0	.0
Children's facilities at terminal	50.0	50.0	.0	.0	.0
Lorry drivers' facilities terminal	50.0	50.0	.0	.0	.0
Motorists' facilities at terminal	50.0	50.0	.0	.0	.0
Route information	50.0	50.0	.0	.0	.0
Terminal waiting area	50.0	50.0	.0	.0	.0
Security at terminal	33.3	33.3	33.3	.0	.0
Issuing tickets	25.0	75.0	.0	.0	.0
Terminal buildings	25.0	75.0	.0	.0	.0
Keeping passengers / cargo list	25.0	50.0	25.0	.0	.0
Business travellers' facilities terminal	.0	50.0	50.0	.0	.0
Cafeteria at terminal	.0	50.0	50.0	.0	.0
Cinema on-board	.0	33.3	66.7	.0	.0
Casino on-board	.0	25.0	25.0	25.0	25.0
Restaurant at terminal	.0	.0	100.0	.0	.0
Swimming pool on-board	.0	.0	66.7	.0	33.3
Spa / health club on-board	.0	.0	66.7	33.3	.0

Table L-4 Importance of ferry service elements by regions

* * * * * * H I E R A R C H I C A L   C L U S T E R   A N A L Y S I S * * * * * *

Agglomeration Schedule using Average Linkage (Between Groups)

Stage	Clusters Combined Cluster 1	Cluster 2	Coefficient	Stage Cluster 1st Appears Cluster 1	Cluster 2	Next Stage
1	21	28	.000000	0	0	6
2	24	27	.000000	0	0	4
3	11	26	.000000	0	0	23
4	18	24	.000000	0	2	5
5	18	23	.000000	4	0	19
6	1	21	.000000	0	1	9
7	12	20	.000000	0	0	11
8	14	17	.000000	0	0	9
9	1	14	.000000	6	8	13
10	8	13	.000000	0	0	13
11	4	12	.000000	0	7	12
12	4	10	.000000	11	0	26
13	1	8	.000000	9	10	16
14	5	6	.000000	0	0	18
15	2	3	.000000	0	0	16
16	1	2	.000000	13	15	19
17	15	22	418.339996	0	0	20
18	5	9	557.780029	14	0	20
19	1	18	1250.000000	16	5	23
20	5	15	1781.206665	18	17	24
21	19	25	2217.780029	0	0	22
22	16	19	2217.780029	0	21	25
23	1	11	2403.846191	19	3	26
24	5	7	2611.224121	20	0	25
25	5	16	4557.780273	24	22	27
26	1	4	4833.333496	23	12	27
27	1	5	8790.742188	26	25	0

Table L-5 Agglomeration schedule importance of ferry service elements regions

Clusters of Ferry Service Elements according to all region respondents (by Importance)						
Ferry Service Element	Number of Clusters					
	2	3	4	5	6	7
Advertising	1	1	1	1	1	1
Reservations	1	1	1	1	1	1
Signposting	1	1	1	1	1	1
Lorry drivers' facilities at terminal	1	1	1	1	1	1
Bar on-board	1	1	1	1	1	1
Restaurants on-board	1	1	1	1	1	1
Providing route information	1	1	1	1	1	1
Shop on-board	1	1	1	1	1	1
Terminal waiting area	1	1	1	1	1	1
Baggage handling	1	1	1	1	1	1
Children's facilities at terminal	1	1	1	1	1	1
Motorists' facilities at terminal	1	1	1	1	1	1
Rail links	1	1	1	1	1	1
Issuing tickets	1	1	1	1	5	5
Terminal buildings	1	1	1	1	5	5
Linkspans	1	2	2	2	2	2
Road links	1	2	2	2	2	2
Bus services	1	2	2	2	2	2
Disabled facilities at terminal	1	2	2	2	2	2
Keeping passengers /cargo lists	2	3	3	3	3	3
Security at terminal	2	3	3	3	3	3
Business travellers' facilities terminal	2	3	3	3	3	3
Cafeteria at terminal	2	3	3	3	3	3
Cinema on-board	2	3	3	3	3	3
Casino on-board	2	3	3	4	4	4
Swimming pool on-board	2	3	4	5	6	6
Restaurants at terminal	2	3	4	5	6	7
Spa - health club on-board	2	3	4	5	6	7

Table L-6 Clusters of importance of ferry service elements (region respondents)

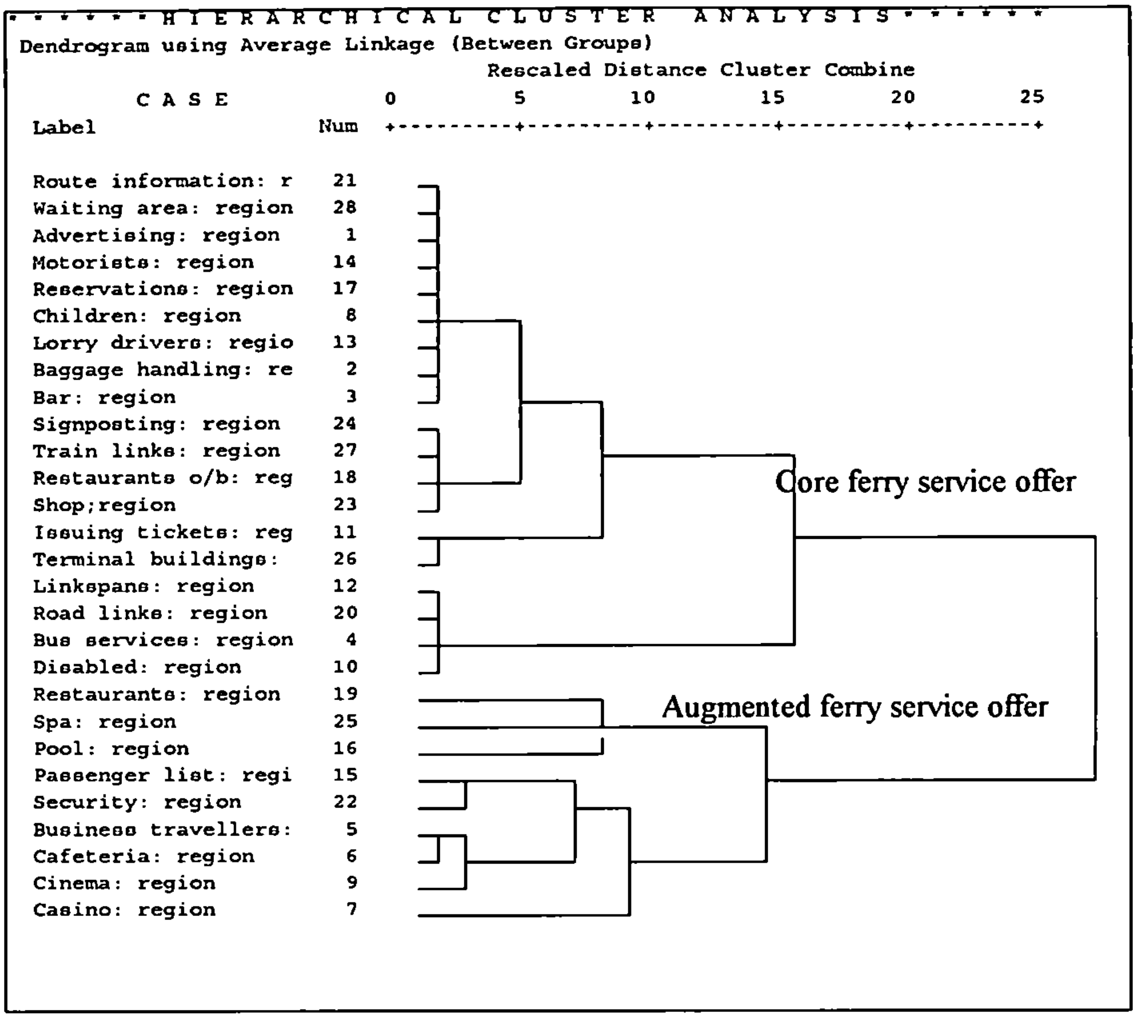

Figure L-6 Dendogram importance of ferry service elements (regions)

Importance of Ferry Service Element by port respondents (in percentages)					
Ferry Service Elements	Importance				
	Very Important	Important	Neutral	Unimportan	Very Unimportant
Keeping passengers / cargo list	100.0	.0	.0	.0	.0
Linkspans	100.0	.0	.0	.0	.0
Advertising	92.3	7.7	.0	.0	.0
Signposting	92.3	7.7	.0	.0	.0
Issuing tickets	91.7	8.3	.0	.0	.0
Road links	84.6	15.4	.0	.0	.0
Route information	76.9	23.1	.0	.0	.0
Terminal buildings	69.2	23.1	7.7	.0	.0
Restaurants on-board	69.2	15.4	15.4	.0	.0
Motorists' facilities at terminal	58.3	41.7	.0	.0	.0
Rail links	54.5	9.1	27.3	9.1	.0
Bar on-board	53.8	38.5	7.7	.0	.0
Bus services	50.0	33.4	.0	8.3	8.3
Lorry drivers' facilities terminal	46.1	38.5	15.4	.0	.0
Shop on-board	46.1	38.5	15.4	.0	.0
Security at terminal	46.1	38.5	7.7	7.7	.0
Terminal waiting area	38.5	53.8	7.7	.0	.0
Disabled facilities at terminal	30.8	53.8	15.4	.0	.0
Cafeteria at terminal	16.7	50.0	33.3	.0	.0
Baggage handling	16.7	50.0	8.3	16.7	8.3
Business travellers' facilities terminal	15.3	30.8	38.5	15.4	.0
Casino on-board	8.4	.0	33.3	25.0	33.3
Cinema on-board	8.3	58.4	16.7	8.3	8.3
Restaurant at terminal	8.3	25.0	33.4	25.0	8.3
Children's facilities at terminal	7.6	46.2	46.2	.0	.0
Spa / health club on-board	.0	8.3	41.7	16.7	33.3
Swimming pool on-board	.0	.0	33.3	16.7	50.0

Table L-7 Importance of ferry service elements by port respondents

* * * * * * H I E R A R C H I C A L   C L U S T E R   A N A L Y S I S * * * * * *

Agglomeration Schedule using Average Linkage (Between Groups)

Stage	Clusters Combined Cluster 1	Cluster 2	Coefficient	Stage Cluster 1st Appears Cluster 1	Cluster 2	Next Stage
1	1	24	.000000	0	0	5
2	13	23	.000000	0	0	10
3	15	17	.000000	0	0	4
4	12	15	.000000	0	3	11
5	1	11	.720000	1	0	7
6	3	14	89.779999	0	0	13
7	1	20	112.660004	5	0	11
8	10	28	118.580002	0	0	20
9	21	26	118.580002	0	0	12
10	13	22	118.580002	2	0	13
11	1	12	212.314987	7	4	21
12	19	21	237.160004	0	9	21
13	3	13	237.646667	6	10	18
14	6	8	263.660004	0	0	22
15	5	18	269.700012	0	0	22
16	7	25	278.899994	0	0	19
17	2	9	282.239990	0	0	23
18	3	4	303.032013	13	0	20
19	7	16	418.339996	16	0	26
20	3	10	625.823303	18	8	24
21	1	19	920.436218	11	12	27
22	5	6	981.205017	15	14	23
23	2	5	1299.045044	17	22	25
24	3	27	1725.957520	20	0	25
25	2	3	2398.608887	23	24	26
26	2	7	5058.790039	25	19	27
27	1	2	6074.684570	21	26	0

Table L-8 Agglomeration schedule ferry service elements by port respondents

Clusters of Ferry Service Elements according to all port respondents (by Importance)						
Ferry Service Element	Number of Clusters					
	2	3	4	5	6	7
Advertising	1	1	1	1	1	1
Issuing tickets	1	1	1	1	1	1
Keeping passengers /cargo lists	1	1	1	1	1	1
Linkspans	1	1	1	1	1	1
Providing route information	1	1	1	1	1	1
Reservations	1	1	1	1	1	1
Restaurants on-board	1	1	1	1	1	1
Road links	1	1	1	1	1	1
Signposting	1	1	1	1	1	1
Terminal buildings	1	1	1	1	1	1
Baggage handling	2	2	2	2	2	2
Cinema on-board	2	2	2	2	2	2
Bar on-board	2	2	3	3	3	3
Bus services	2	2	3	3	3	3
Disabled facilities at terminal	2	2	3	3	3	3
Lorry drivers' facilities at terminal	2	2	3	3	3	3
Motorists' facilities at terminal	2	2	3	3	3	3
Security at terminal	2	2	3	3	3	3
Shop on-board	2	2	3	3	3	3
Terminal waiting area	2	2	3	3	3	3
Business travellers' facilities terminal	2	2	2	2	4	4
Restaurants at terminal	2	2	2	2	4	4
Cafeteria at terminal	2	2	2	2	4	5
Children's facilities at terminal	2	2	2	2	4	5
Rail links	2	2	3	5	6	7
Casino on-board	2	3	4	4	5	6
Spa - health club on-board	2	3	4	4	5	6
Swimming pool on-board	2	3	4	4	5	6

Table L-9 Clusters of importance of ferry service elements (port respondents)

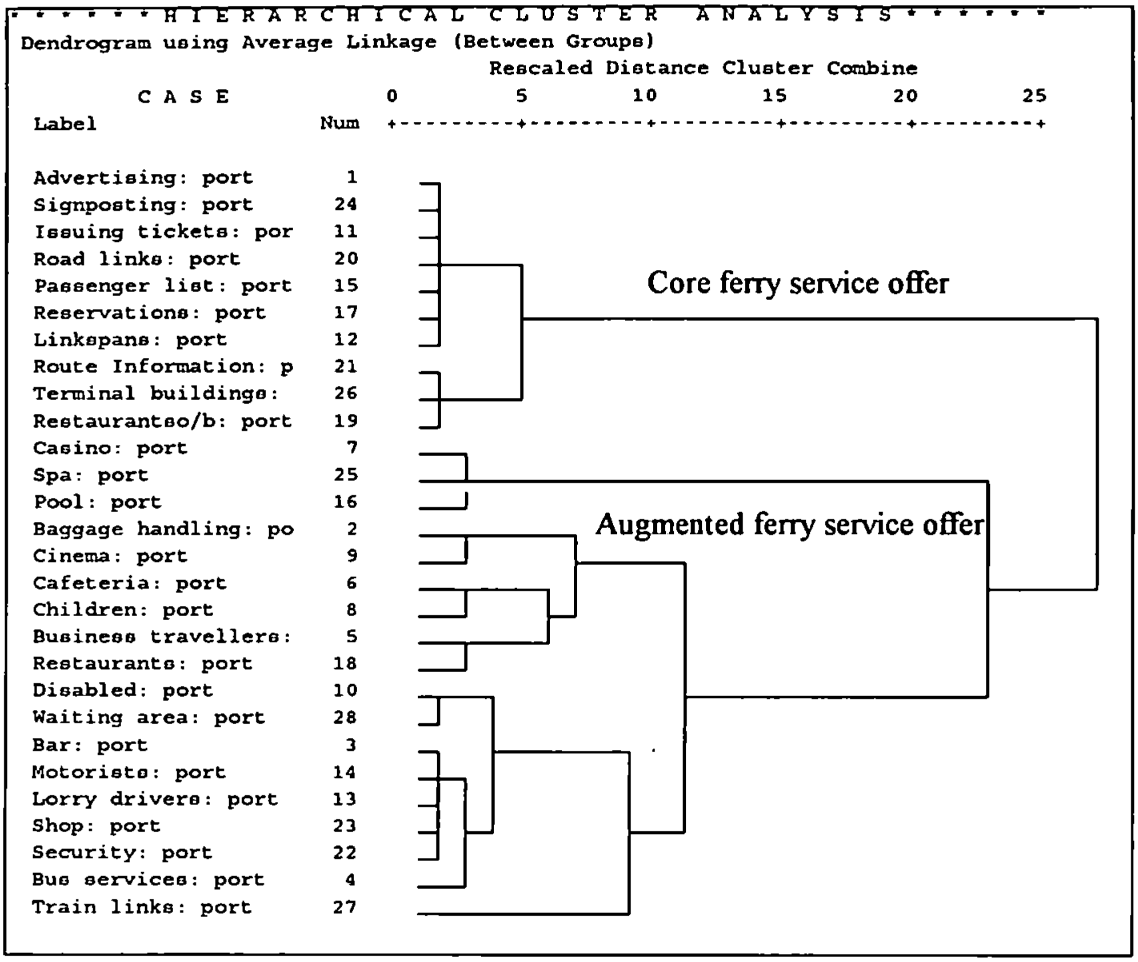

Figure L-7 Dendogram importance of ferry service elements by ports

RELIABILITY ANALYSIS - SCALE (ALPHA) Coefficients = 25 items Alpha = .8447 Standardised item alpha = .8415			
Provider of Ferry Service Element Description	Mean	Std Dev	Alpha if FSE deleted
Terminal buildings	1.1667	.3835	.8485
Terminal waiting area	1.1667	.3835	.8476
Linkspans at terminal	1.5556	1.2472	.8298
Disabled facilities at terminal	1.6111	.7775	.8418
Terminal motorists facilities	1.9444	.8726	.8357
Children's facilities at terminal	1.9444	1.1100	.8450
Terminal lorry drivers facilities	2.0000	.9075	.8364
Business travellers facilities	2.3889	1.0922	.8392
Baggage handling	2.7222	1.4473	.8302
Terminal security	2.7778	1.7675	.8594
On-board bar	3.0000	.0000	has zero variance *
On-board restaurants	3.0000	.0000	has zero variance *
On-board shops	3.0000	.0000	has zero variance *
Terminal cafeterias	3.0556	1.8934	.8304
Taking reservations	3.2222	1.1144	.8509
Terminal restaurants	3.2222	1.8647	.8326
Providing route information	3.2778	1.0178	.8369
Keeping pass./cargo lists	3.2778	1.0178	.8365
Advertising the service	3.3333	.9701	.8361
Signposting	3.3333	1.7823	.8430
On-board swimmingpool	3.4444	.8556	.8450
Issuing tickets	3.4444	1.1991	.8377
On-board casino	3.6111	1.0369	.8318
On-board cinema	3.6111	1.0369	.8318
On-board spa	3.6111	1.0369	.8318
Road links to/from terminal	3.6111	1.4608	.8425
Rail links to/from terminal	4.1111	1.1318	.8400
Bus services to/from terminal	4.6667	1.2834	.8344

Table L-10 Reliability of provider of ferry service element

In table L-10 the mean values are coded as 1 = Port Authority, 2 = Port Operator, 3 = Ferry Operator, 4 = Government, 5 = Private Third Party, 6 = Combination.

Preferred provider of ferry service elements (in percentages)						
Ferry Service Element	1 = Port Authority, 2 = Port Operator, 3 = Ferry Operator, 4 = Government, 5 = Private Third party, 6 = Combination					
	1	2	3	4	5	6
Bar on-board	.0	.0	100.0	.0	.0	.0
Restaurants on-board	.0	.0	100.0	.0	.0	.0
Shop on-board	.0	.0	100.0	.0	.0	.0
Advertising	.0	.0	91.7	.0	.0	8.3
Passenger list	.0	4.3	87.0	.0	.0	8.7
Reservations	4.5	.0	86.4	.0	.0	9.1
Route information	.0	4.2	83.3	.0	.0	12.5
Issuing tickets	.0	4.3	82.7	.0	.0	13.0
Swimmingpool	.0	.0	81.0	.0	19.0	.0
Casino on-board	.0	.0	78.3	.0	17.4	4.3
Cinema on-board	.0	.0	76.2	.0	19.0	4.8
Spa - health club	.0	.0	76.2	.0	19.0	4.8
Baggage handling	19.0	14.3	57.2	.0	.0	9.5
Business travellers'	22.7	18.2	54.6	.0	4.5	.0
Restaurants terminal	23.8	19.0	9.5	.0	42.9	4.8
Cafeteria at terminal	28.6	19.0	4.8	4.8	38.0	4.8
Bus services	8.7	4.3	.0	13.0	56.6	17.4
Lorry drivers' facilities	33.3	23.8	42.9	.0	.0	.0
Motorists' facilities	38.1	28.6	33.3	.0	.0	.0
Children facilities	36.4	27.3	27.3	.0	4.5	4.5
Disabled facilities	45.5	27.3	22.7	4.5	.0	.0
Security at terminal	26.1	26.1	17.4	13.0	.0	17.4
Linkspans	65.2	17.4	8.7	.0	.0	8.7
Terminal buildings	75.0	20.8	4.2	.0	.0	.0
Waiting area terminal	75.0	20.8	4.2	.0	.0	.0
Signposting	29.2	4.2	4.2	33.2	.0	29.2
Road links	20.8	4.2	.0	58.3	.0	16.7
Rail links	9.1	4.5	.0	50.1	22.7	13.6

Table L-11 Preferred provider of ferry service elements

* * * * * * H I E R A R C H I C A L   C L U S T E R   A N A L Y S I S * * * * * *

Agglomeration Schedule using Average Linkage (Between Groups)

Stage	Clusters Combined Cluster 1	Cluster 2	Coefficient	Stage Cluster 1st Appears Cluster 1	Cluster 2	Next Stage
1	26	28	.000000	0	0	15
2	9	24	.000000	0	0	6
3	18	22	.000000	0	0	4
4	3	18	.000000	0	3	16
5	11	20	.620000	0	0	7
6	7	9	7.220000	0	2	8
7	11	15	32.559998	5	0	10
8	7	25	40.166668	6	0	18
9	1	16	48.980000	0	0	10
10	1	11	72.353333	9	7	16
11	8	14	81.080002	0	0	14
12	6	17	92.180000	0	0	21
13	2	5	146.160004	0	0	23
14	8	10	176.889999	11	0	17
15	12	26	203.539993	0	1	24
16	1	3	325.708008	10	4	18
17	8	13	344.446686	14	0	20
18	1	7	632.273071	16	8	27
19	19	27	729.119995	0	0	22
20	8	21	849.015015	17	0	23
21	4	6	1128.449951	0	12	25
22	19	23	1170.229980	19	0	25
23	2	8	1317.510010	13	20	24
24	2	12	3002.297363	23	15	26
25	4	19	3994.529053	21	22	26
26	2	4	4672.022949	24	25	27
27	1	2	8076.941406	18	26	0

Table L-12 Agglomeration schedule providers of ferry service elements

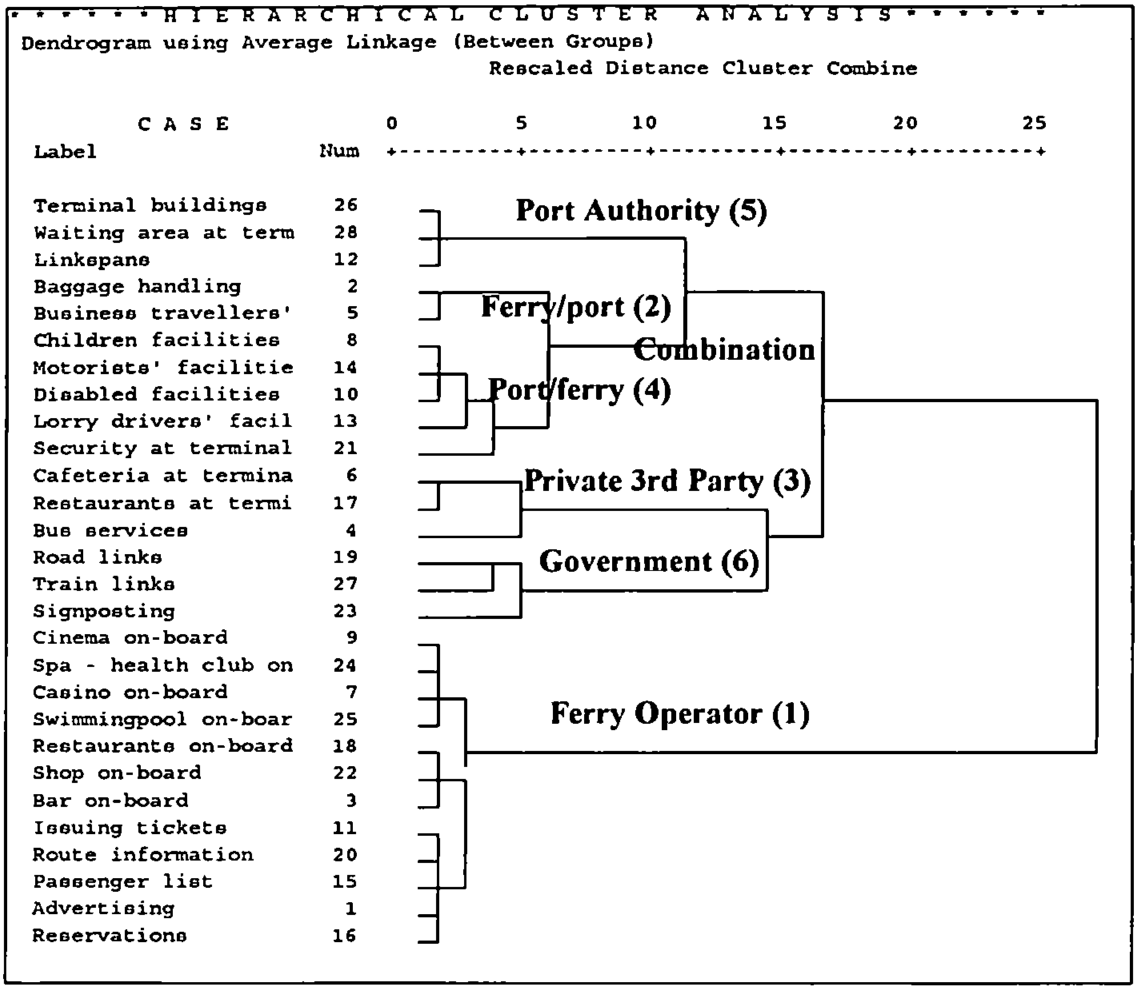

Figure L-8 Cluster analysis of preferred provider of ferry service elements

Cluster membership of provider of ferry service elements						
Ferry Service Element	Number of clusters					
	2	3	4	5	6	7
Advertising	1	1	1	1	1	1
Bar on-board	1	1	1	1	1	1
Casino on-board	1	1	1	1	1	1
Cinema on-board	1	1	1	1	1	1
Issuing tickets	1	1	1	1	1	1
Passenger list	1	1	1	1	1	1
Reservations	1	1	1	1	1	1
Restaurants on-board	1	1	1	1	1	1
Route information	1	1	1	1	1	1
Shop on-board	1	1	1	1	1	1
Spa - health club on-board	1	1	1	1	1	1
Swimmingpool on-board	1	1	1	1	1	1
Baggage handling	2	2	2	2	2	2
Business travellers' facilities	2	2	2	2	2	2
Bus services	2	3	3	3	3	3
Cafeteria at terminal	2	3	3	3	3	3
Restaurants at terminal	2	3	3	3	3	3
Children facilities at terminal	2	2	2	2	4	4
Disabled facilities at terminal	2	2	2	2	4	4
Lorry drivers' facilities terminal	2	2	2	2	4	4
Motorists' facilities terminal	2	2	2	2	4	4
Security at terminal	2	2	2	2	4	4
Linkspans	2	2	2	4	5	5
Terminal buildings	2	2	2	4	5	5
Waiting area at terminal	2	2	2	4	5	5
Road links	2	3	4	5	6	6
Signposting	2	3	4	5	6	7
Rail links	2	3	4	5	6	6

Table L-13 Provider clusters

Appendix M

Conjoint analysis

Appendix M Conjoint analysis

Conjoint Analysis

Conjoint analysis is a dependence technique which enables the evaluation of complex combinations of variables. The word 'conjoint' has to do with the fact that the relative values of things considered jointly can be measured when this may not be possible when taking one at a time. For example a market researcher wishes to assess the importance of a particular elements (price, ferry crossing time, and on-board restaurant) as well as their respective possible levels (high - medium - low, long - medium - short, 'a la carte' service - fixed menu waiter service - self service) in a ferry service offer. This results in 27 (3 x 3 x 3) possible combinations which are ranked by respondents. This ranking determines consumer preferences (see further Churchill (1991), and Hair et al. , 1995).

Appendix N

Factor analysis

Appendix N   Factor analysis

Factor analysis is a statistical methodology that can be used to analyze inter-relationships among a large number of variables and to explain these variables in terms of their common underlying dimensions (factors).

- - - - - - - - - - - F A C T O R   A N A L Y S I S - - - - - - - - - - -

Analysis number 1   Listwise deletion of cases with missing values

	Mean	Std Dev	Label
INDHOLI	1.64286	1.25357	Independent Holiday Makers
PACHOLI	1.78571	1.25778	Package Tour Holiday Makers
BUSTRAI	2.46429	1.20130	Business Travellers
STUDI	2.60714	1.10014	Students
DAYTI	2.32143	1.36228	Day Trippers
MINIXI	2.28571	1.35693	Mini Cruise Passengers
DRILORI	1.50000	.83887	Driver Accompanied Lorries
UTRAILI	1.92857	1.15241	Unaccompanied Trailers
COACHI	1.96429	1.23175	Coaches
ANI	3.28571	1.53616	Livestock / Animal Transport

Number of Cases = 28

Correlation Matrix:

	INDHOLI	PACHOLI	BUSTRAI	STUDI	DAYTI	MINIXI	DRILORI
INDHOLI	1.00000						
PACHOLI	.86578	1.00000					
BUSTRAI	.70446	.68109	1.00000				
STUDI	.70017	.79342	.78768	1.00000			
DAYTI	.65529	.71176	.69754	.72990	1.00000		
MINIXI	.65010	.68822	.59724	.72304	.72988	1.00000	
DRILORI	.14088	.14041	-.09188	.10033	-.11343	-.13015	1.00000
UTRAILI	-.24905	-.29202	-.51023	-.19823	-.43308	-.36542	.53637
COACHI	.85495	.83159	.66241	.80921	.71341	.64895	.30468
ANI	-.04121	.12870	-.07455	.20037	.06068	.01269	.25867

	UTRAILI	COACHI	ANI
UTRAILI	1.00000		
COACHI	-.10623	1.00000	
ANI	.30486	.16218	1.00000

Determinant of Correlation Matrix = .0001048

Kaiser-Meyer-Olkin Measure of Sampling Adequacy = .77988

Bartlett Test of Sphericity = 209.22802, Significance = .00000

Table N-1   Factor analysis for target customers

The aim is to reduce the large amount of information expressed by the original variables to a small number of factors with a minimum loss of that information. The factors must also be meaningful, simple and interpretable so as to allow new insights. The basic assumption of factor analysis is that underlying dimensions, or factors, can be used to explain complex phenomena. Observed correlations between variables result from their sharing of these factors. For example, see table N-1, the 'target customers' or 'target market' for a ferry operator may be explained by the correlations of the scores of respondents on variables which indicate the perceived importance of holiday makers, students, and other groups of people.

Factor analysis is conducted in four steps. First a correlation matrix of all variables is computed (see tableN-1). This identifies the strength of the relationship among the variables and enables evaluation of the appropriateness of the factor model. The second step is to determine the number of factors necessary to represent the data and the method for calculating them, and also, to ascertain how well the data fits the chosen model. The third step is the transformation of the factors to allow easier interpretation by means of 'rotation'. The fourth step is to compute the scores for each factor for each case. These scores can be used for further analysis of the data such as cluster analysis.

To test whether the data is suitable for factor analysis a test for sampling adequacy (the Kaiser-Meyer-Olkin test - which is an index for comparing the magnitudes of the observed correlation coefficients to the magnitude of the partial correlation coefficients and a high value supports the suitability; in our example KMO-MSA = 0.77988 and a test of sphericity (Bartlett's test of sphericity where a large value and a low significance level indicates suitability; in the example, resp. 209.22802 and 0.00000). Small values for the KMO measure indicate that a factor analysis should not be undertaken, since correlations between pairs of variables cannot be explained by other variables. Kaiser (1974) considers values below 0.50 as unacceptable.

In the example it can be seen that factor analysis could be undertaken, if the objective of the study was to identify the underlying factors. These factors, see figure N-1, could be termed 'passengers' for factor 1 as the variables independent holiday makers, package holiday makers, business travellers, students, day trippers, coaches and mini cruises score high on this factor. Factor 2 could be labelled 'freight' as driver accompanied lorries, livestock / animal transport and unaccompanied trailers score high on this factor. Using these factor scores to profile of the respondents can be seen in figure N-1. For example Ferry 2 is a passenger and cars only ferry operator and carries no freight. Ferry 2 scores very low on the factor freight. Port 8, which scores low on the factor passengers is mainly a freight port.

However, since the objective of the study is not to reduce the variables factor analysis is not suitable as an analytical technique and the example is only shown for illustrative purposes.

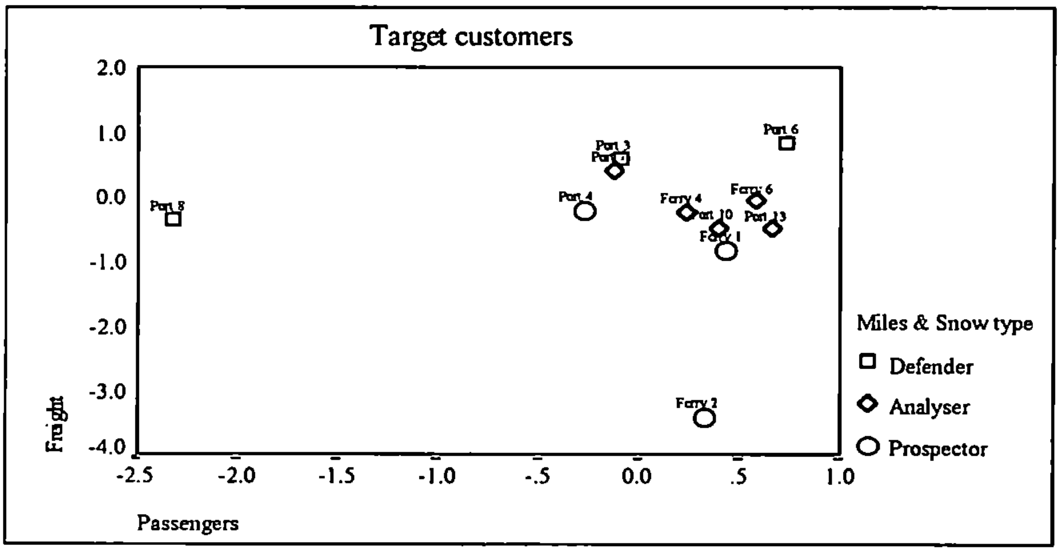

Figure N-1 Factor plot target market by respondent and Miles & Snow type

Appendix O

Linear probability models

Appendix O Linear probability models

Linearity Probability Models

Linearity probability models are an alternative form of regression analysis. Various types exist, but the most widely used is logit/ logistic regression or logit analysis. As can be seen in table N-1 the dependent variable for multiple regression is metric and the dependent variable of linear probability models is non-metric. The main difference between linear probability models and multivariate regression is the use of a dichotomous dependent variable. When the objective of the study is to determine whether something happens or not, for example whether ferry customers would like to purchase a particular service offer, logit analysis is an alternative to discriminant analysis and conjoint analysis. Logit analysis does, however, not predict whether such an event would occur or not (1 or 0), but does predict the probability of such an event. Therefore the dependent variable can be any value between zero and one. Linearity probability models are an alternative to discriminant analysis, but in instances where there are more than two levels of dependent variables, discriminant analysis is the more appropriate technique. For further details see Hosmer and Lemeshow (1989), Norusis (1993), and Sharma (1996).

Appendix P

Baseline diagrams

Appendix P Baseline diagrams

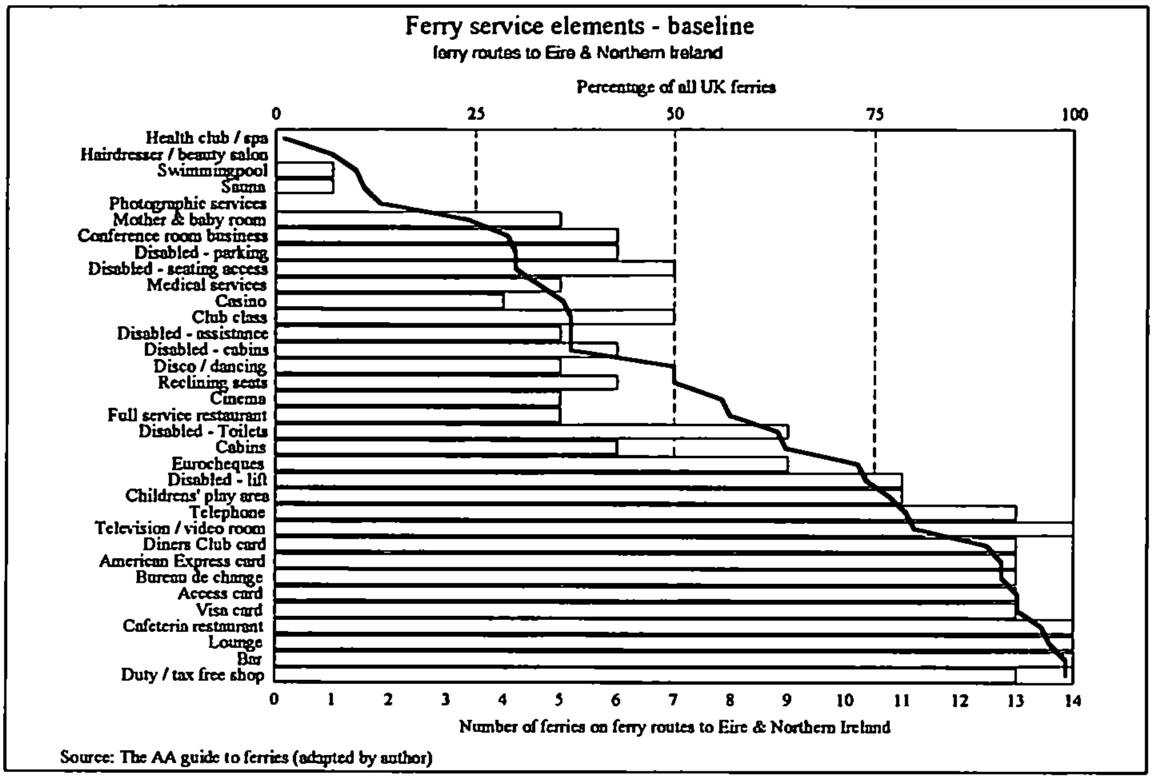

Figure P-1 Ferry routes to Eire & Northern Ireland compared to overall baseline

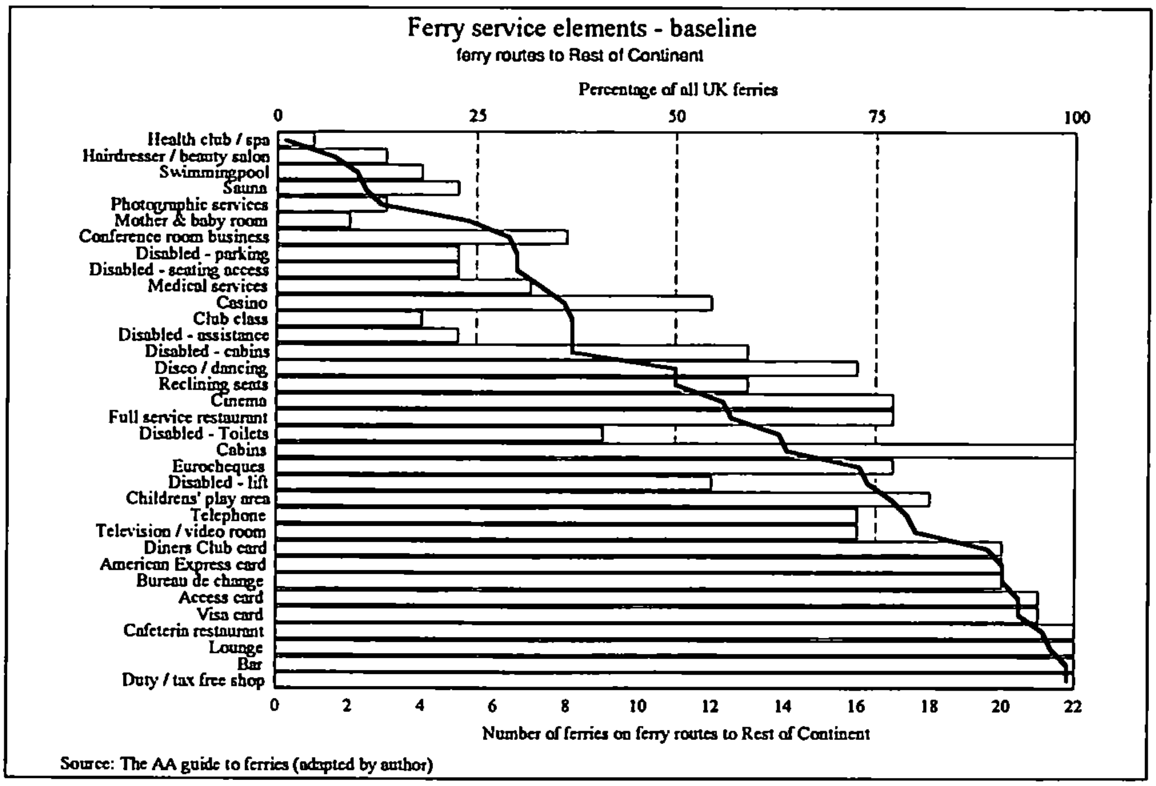

Figure P-2 Ferry routes to rest of Continent compared to overall baseline

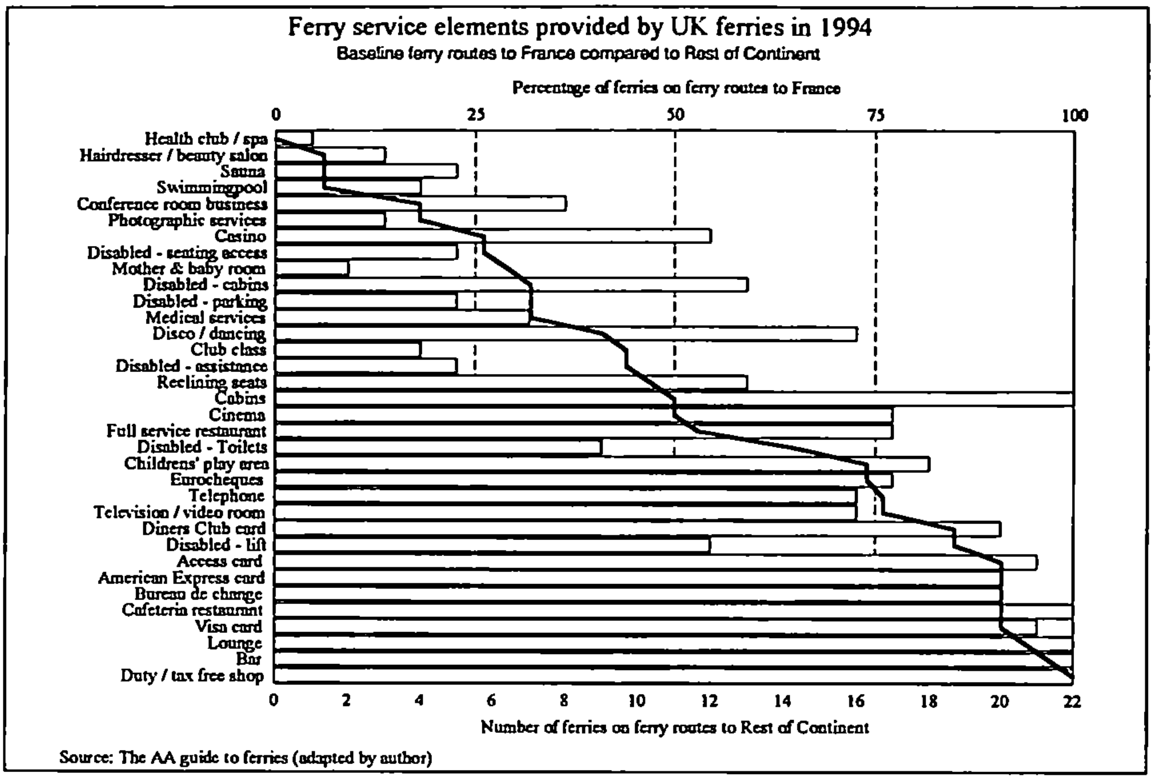

Figure P-3 Ferry routes to Rest of Continent compared to baseline France

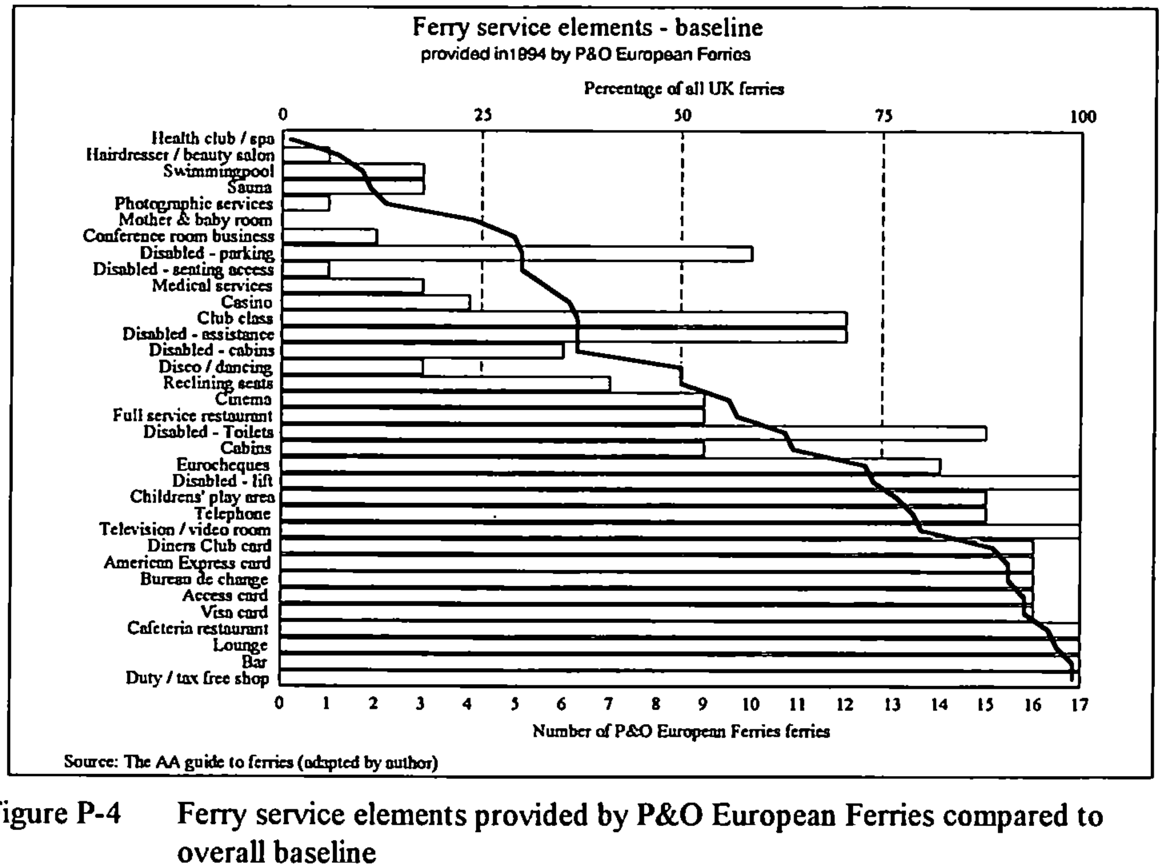

Figure P-4 Ferry service elements provided by P&O European Ferries compared to overall baseline

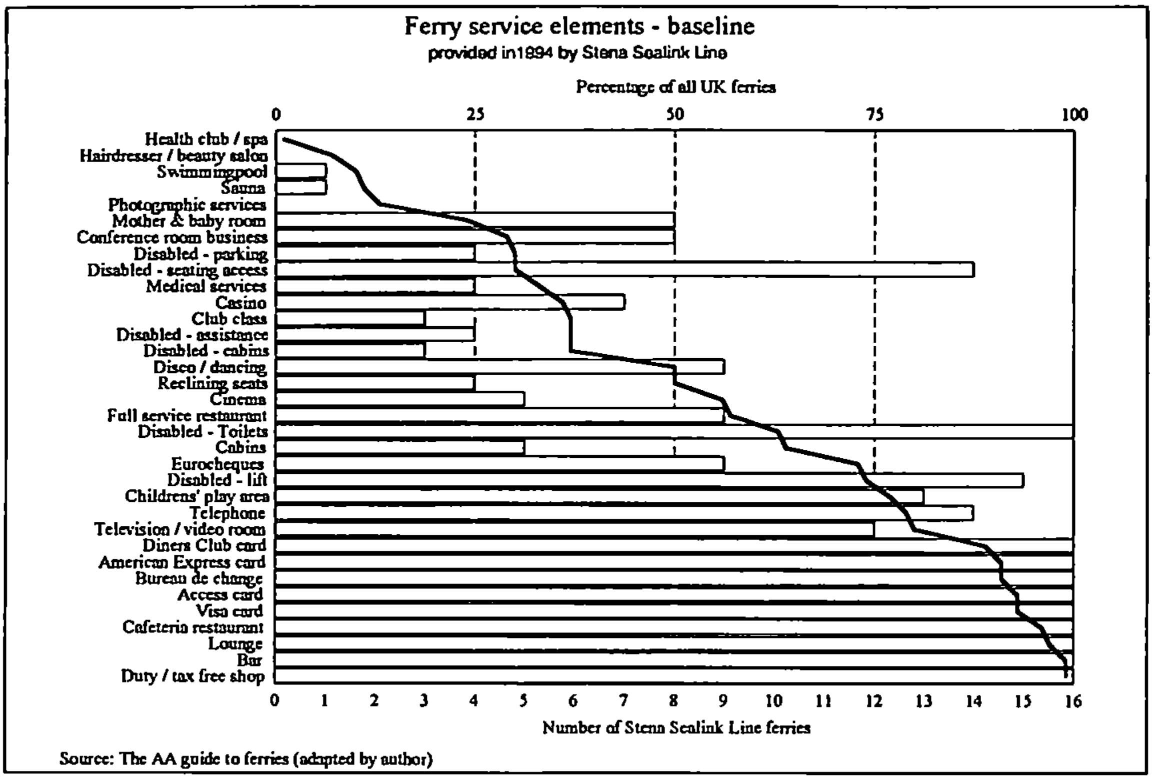

Figure P-5 Ferry service elements provided by Stena Sealink Line compared to overall baseline

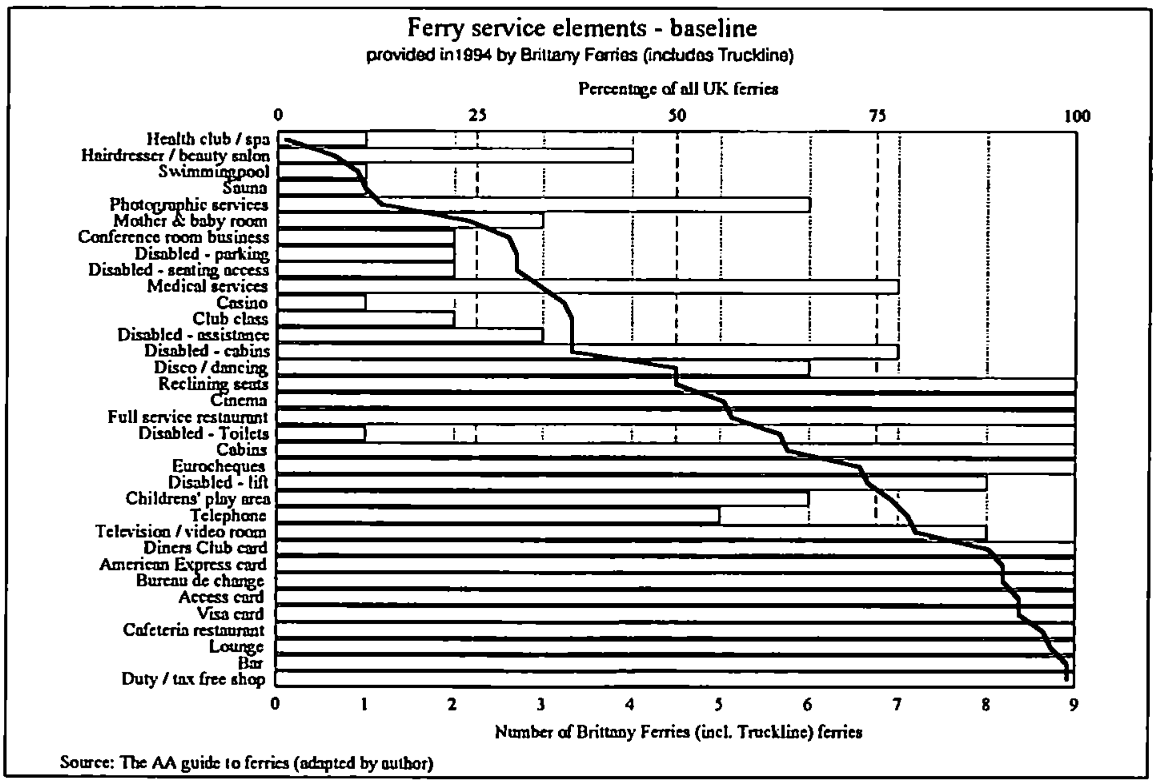

Figure P-6 Ferry service elements provided by Brittany Ferries compared to overall baseline

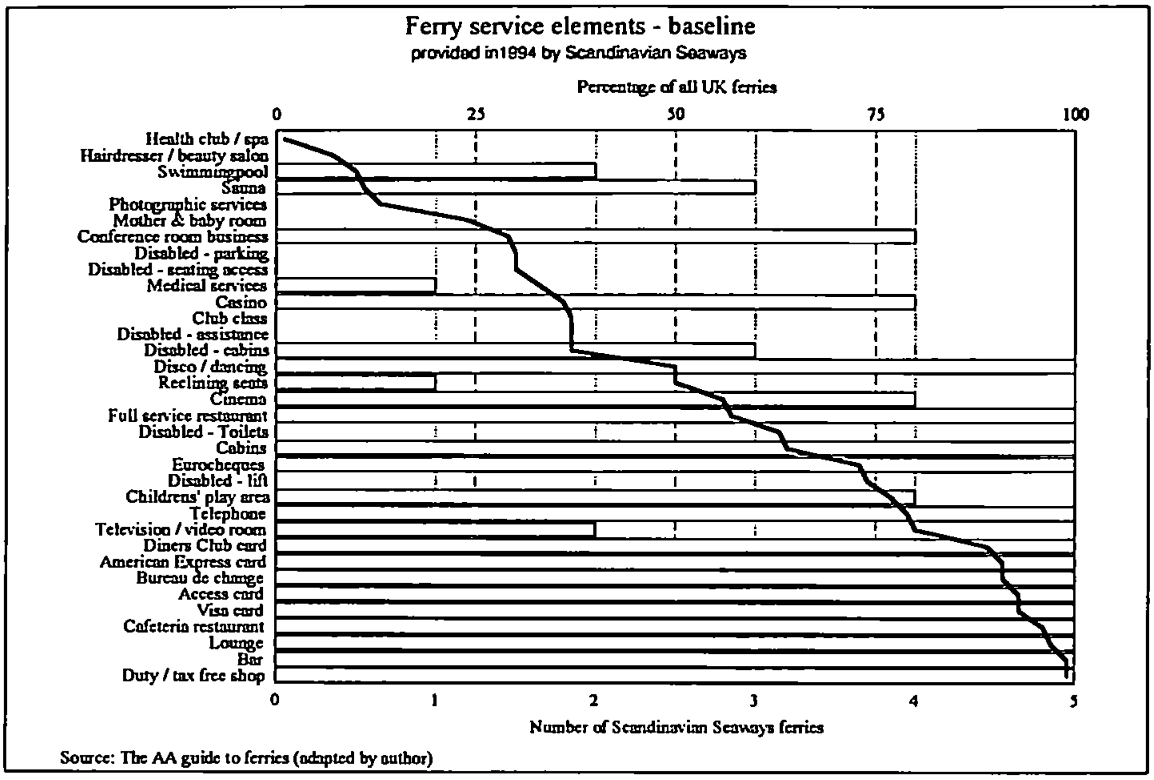

Figure P-7 Ferry service elements provided by Scandinavian Seaways compared to overall baseline

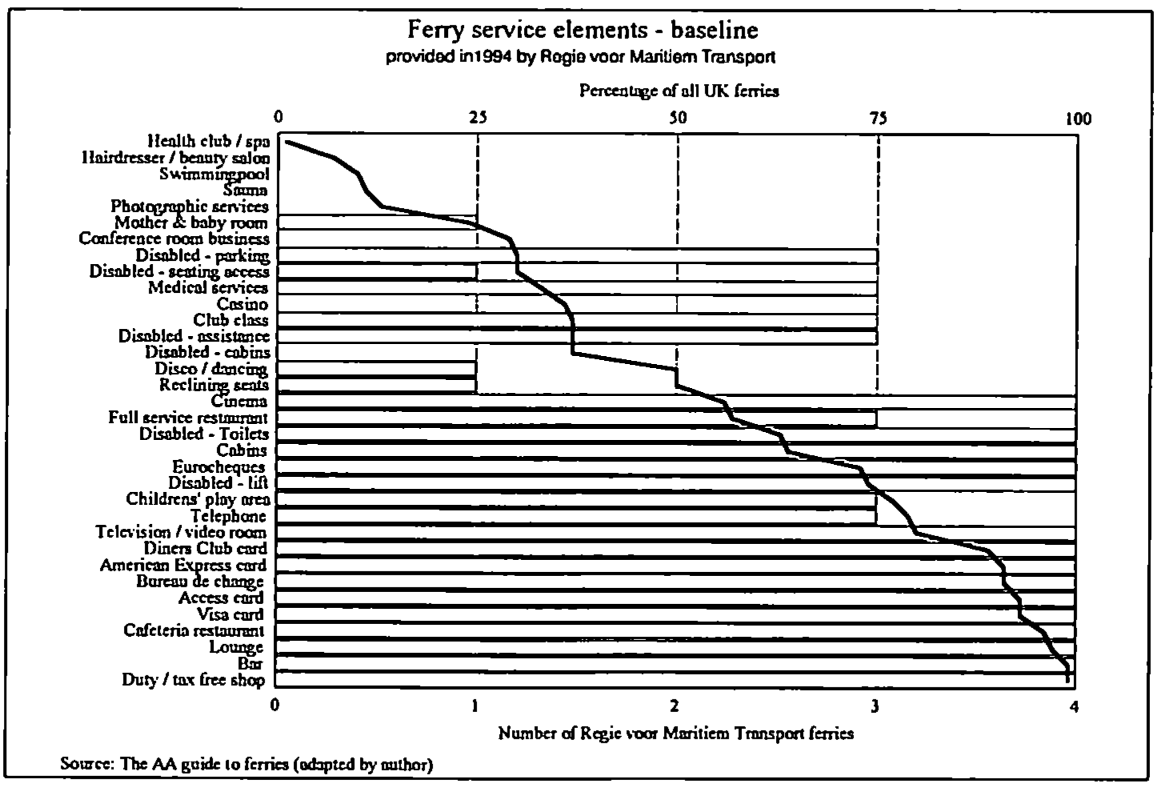

Figure P-8 Ferry service elements provided by Regie voor Maritiem Transport compared to overall baseline

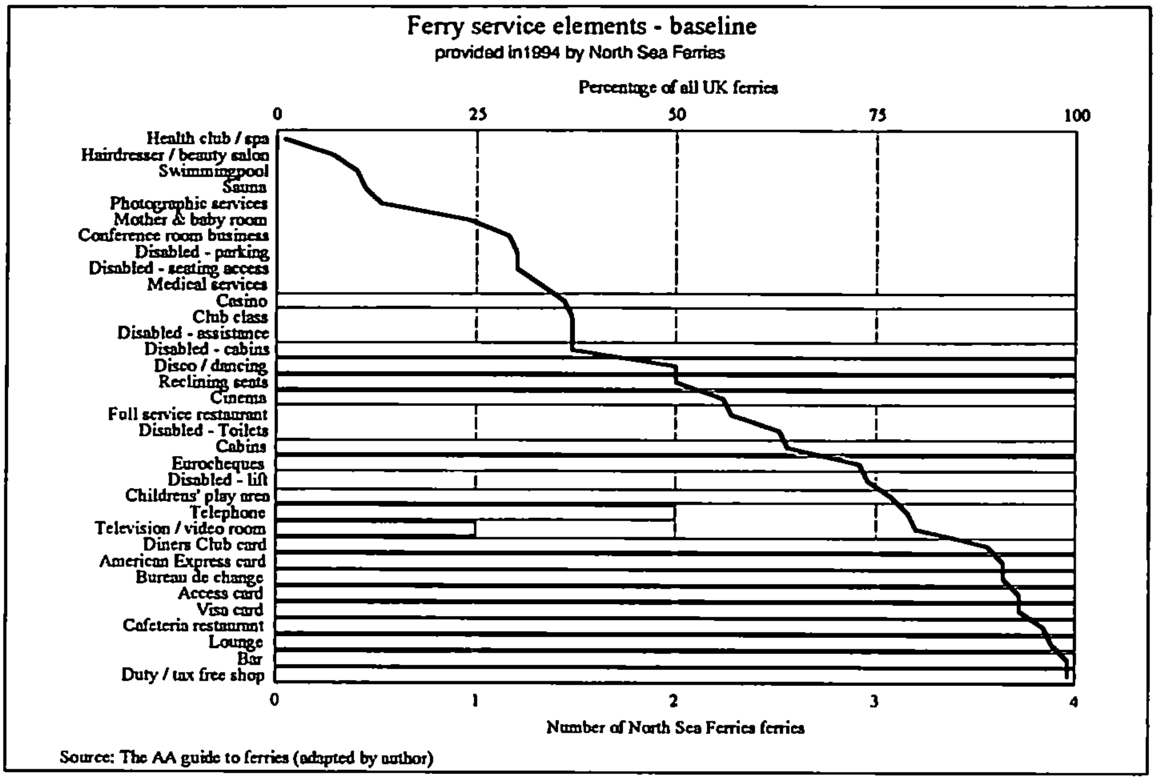

Figure P-9 Ferry service elements provided by North Sea Ferries compared to overall baseline

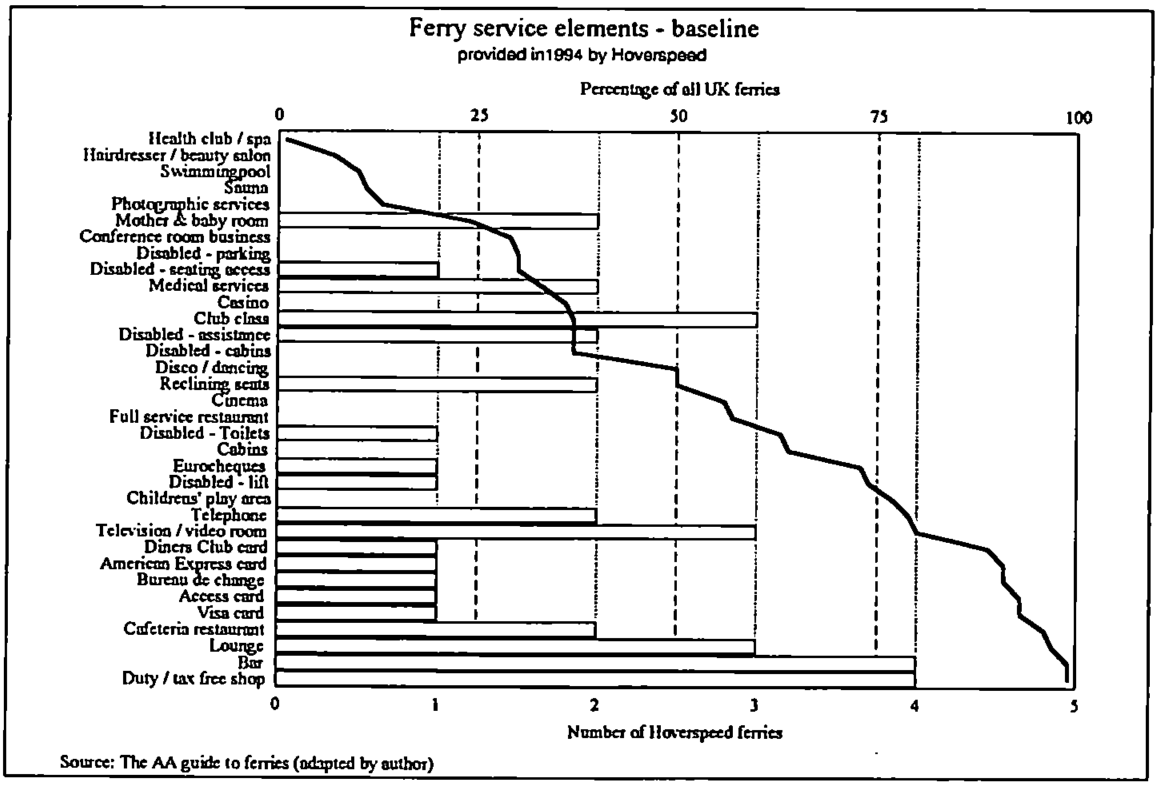

Figure P-10 Ferry service elements provided by Hoverspeed compared to overall baseline

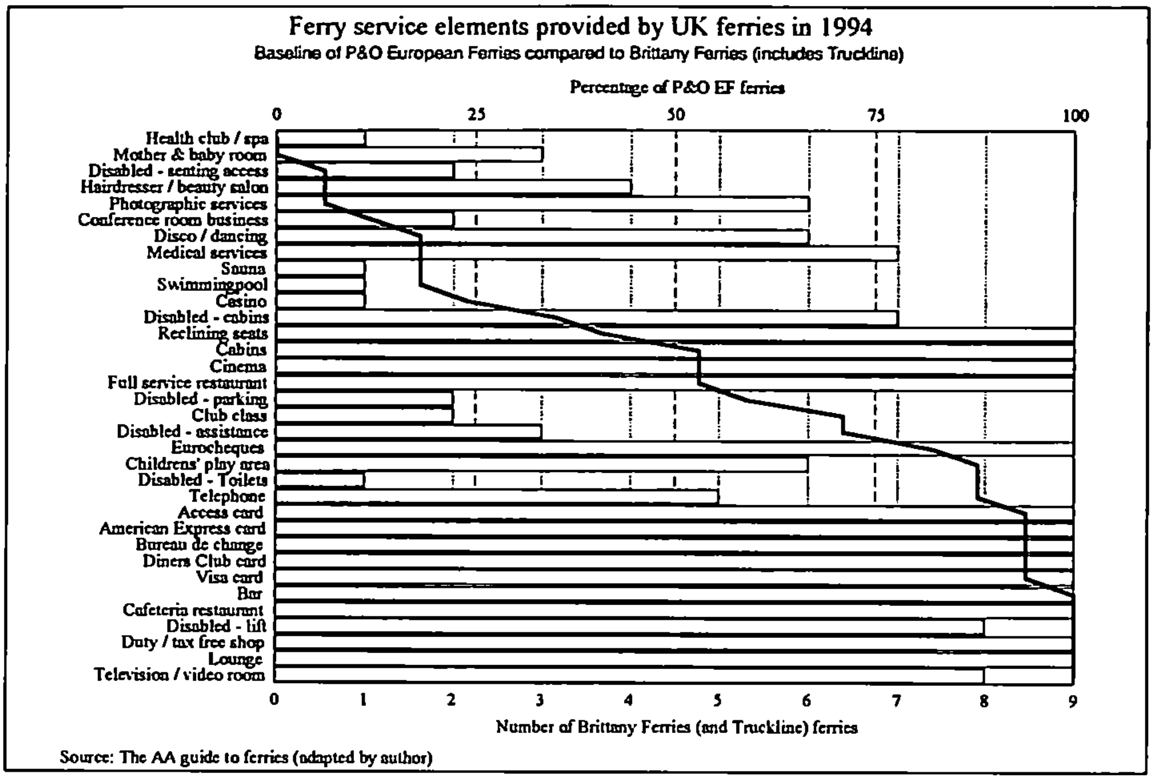

Figure P-11 Ferry operator Brittany Ferries compared to baseline P&O European Ferries

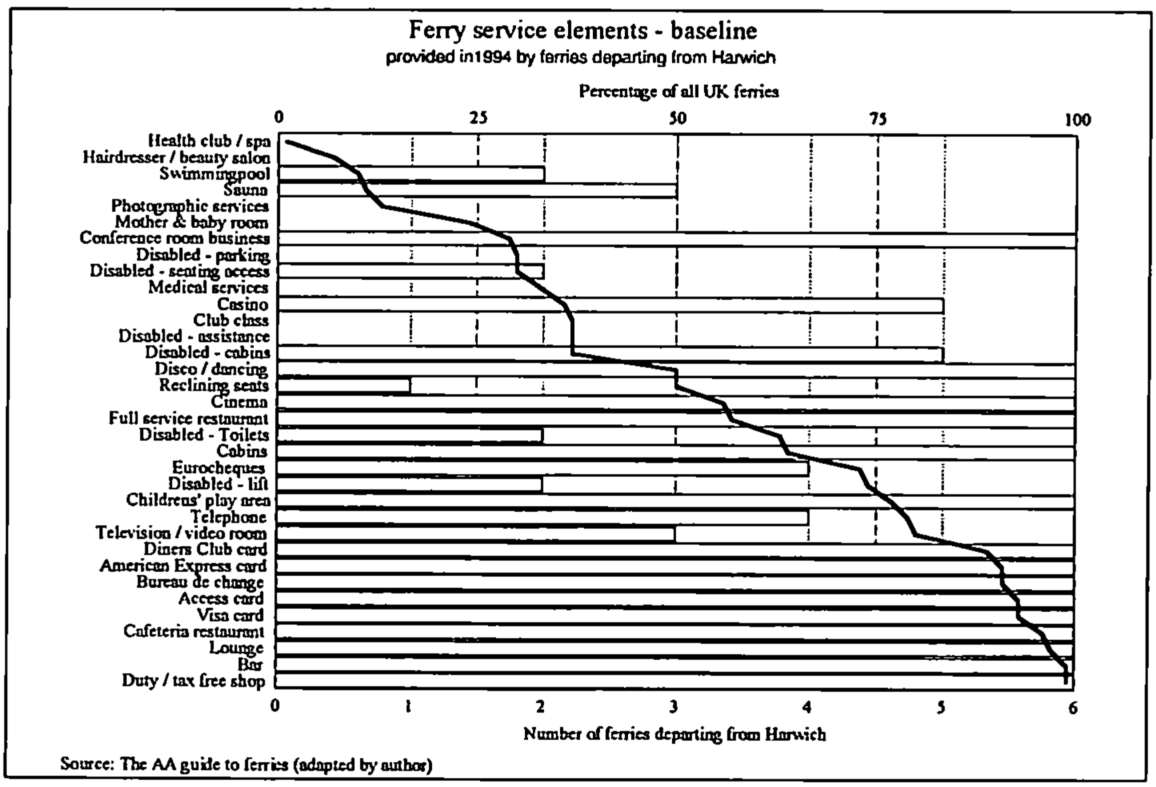

Figure P-12 Ferry service elements provided by ferries departing from Harwich

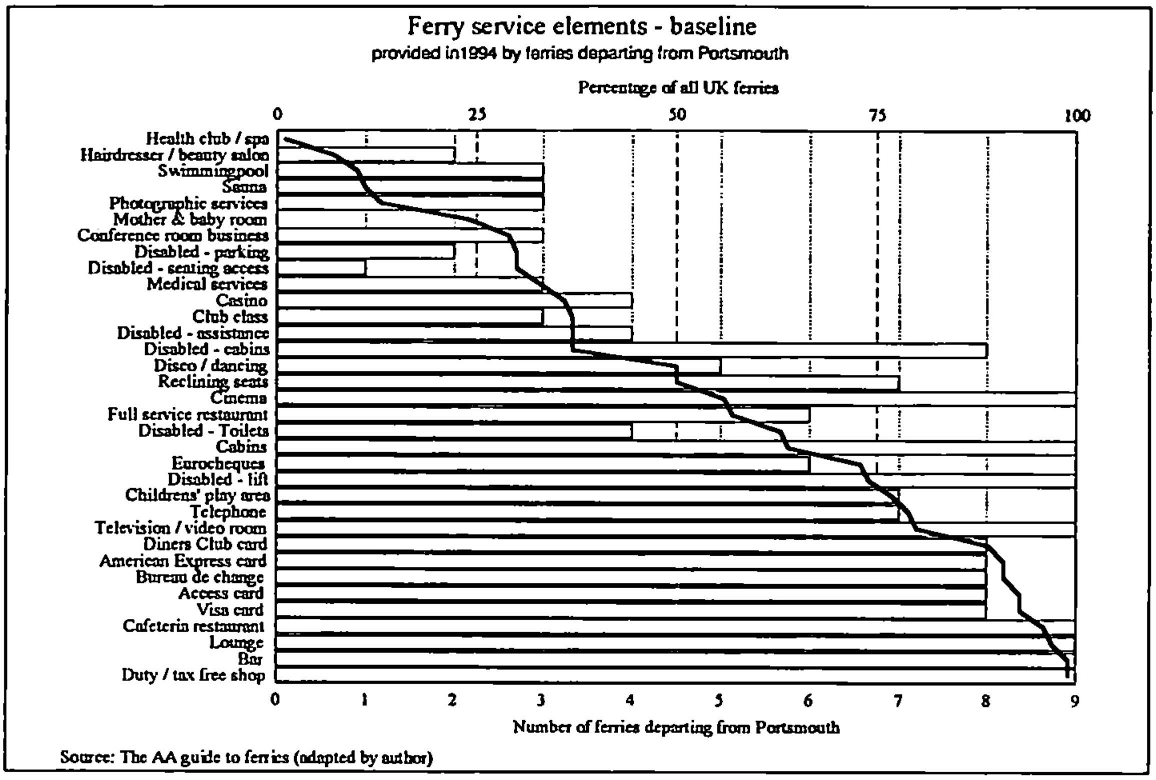

Figure P-13 Ferry service elements provided by ferries departing from Portsmouth

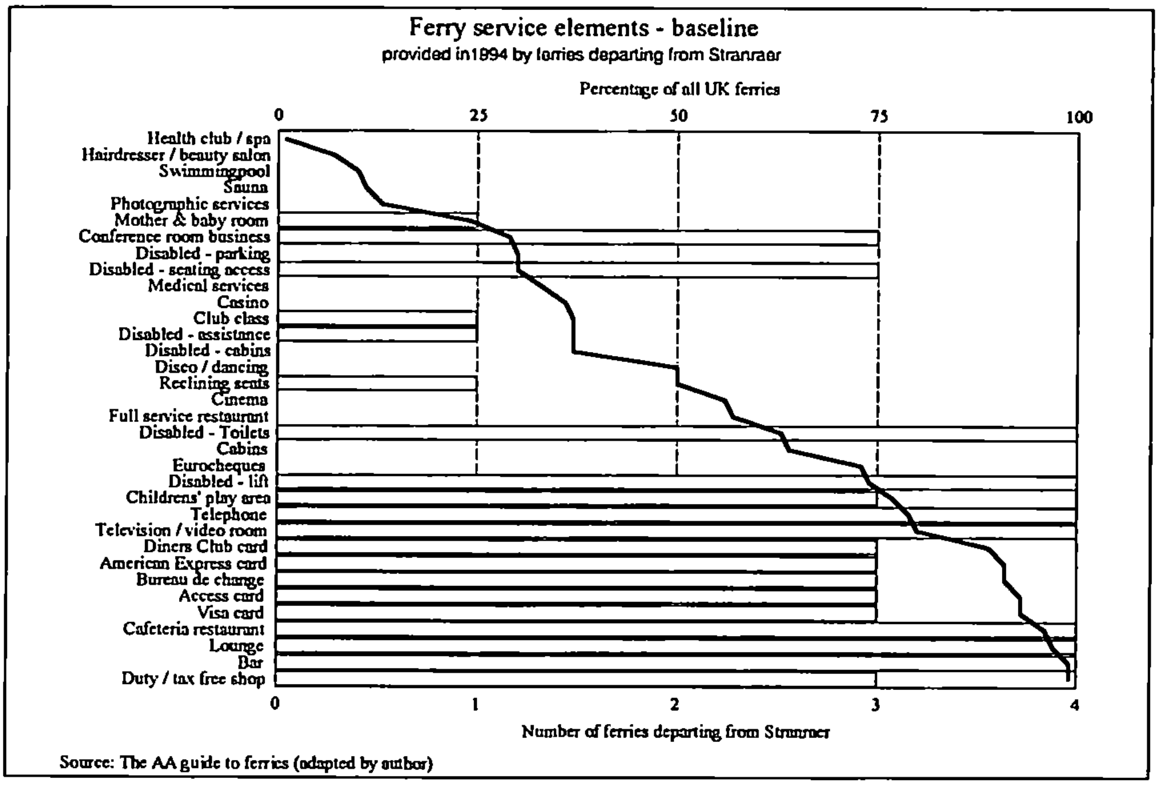

Figure P-14 Ferry service elements provided by ferries departing from Stranraer

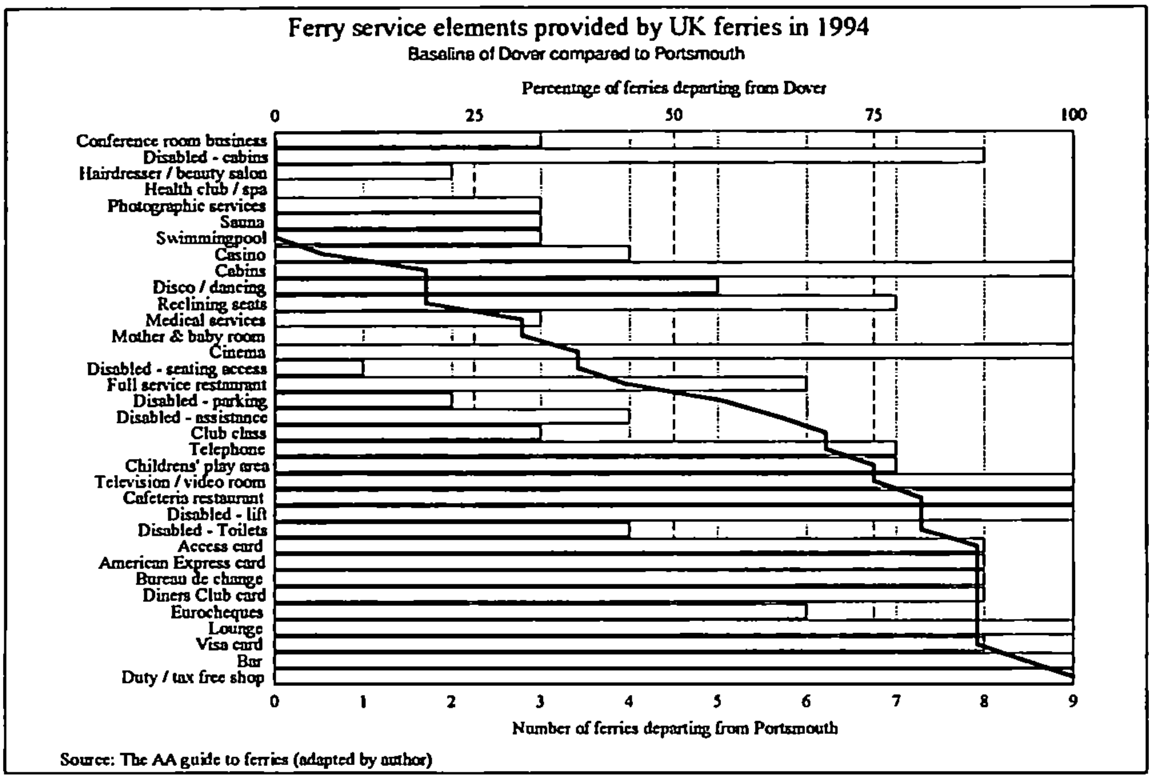

Figure P-15 Port of departure Portsmouth compared to baseline of Dover

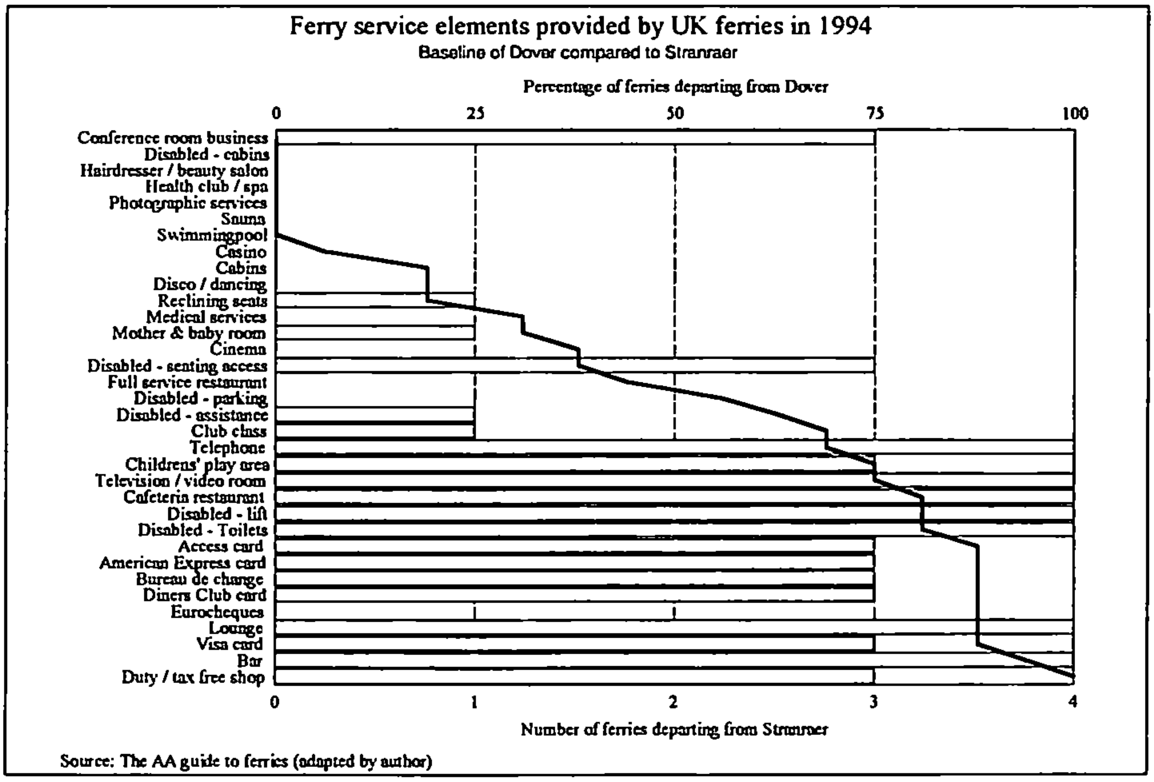

Figure P-16 Port of departure Stranraer compared to baseline of Dover

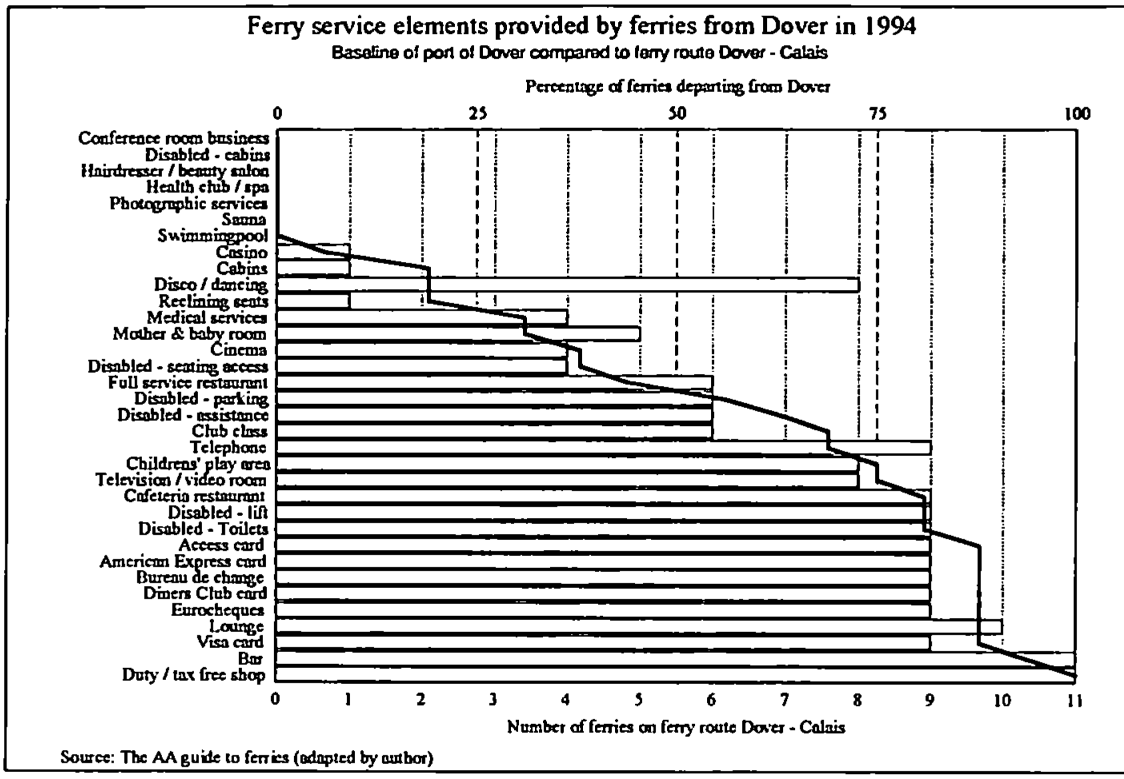

Figure P-17 Ferries on ferry route Dover - Calais compared to baseline of ferries departing from Dover

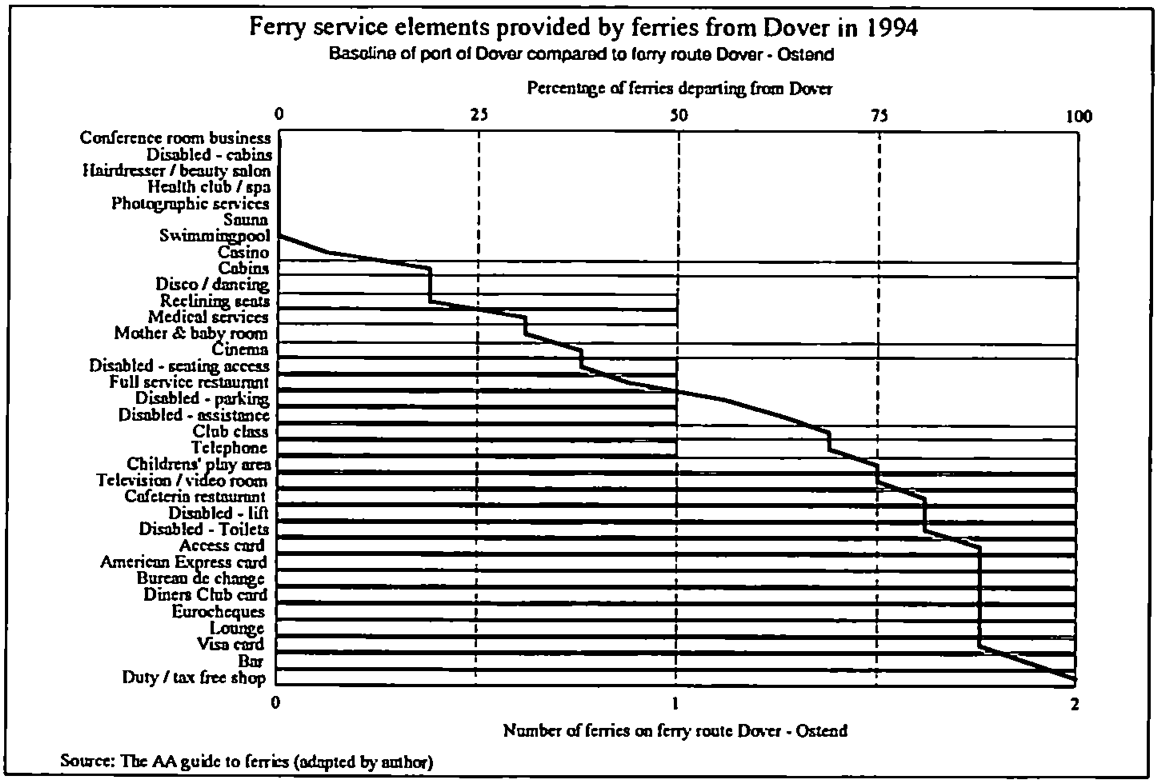

Figure P-18 Ferries on ferry route Dover - Ostend compared to baseline of ferries departing from Dover

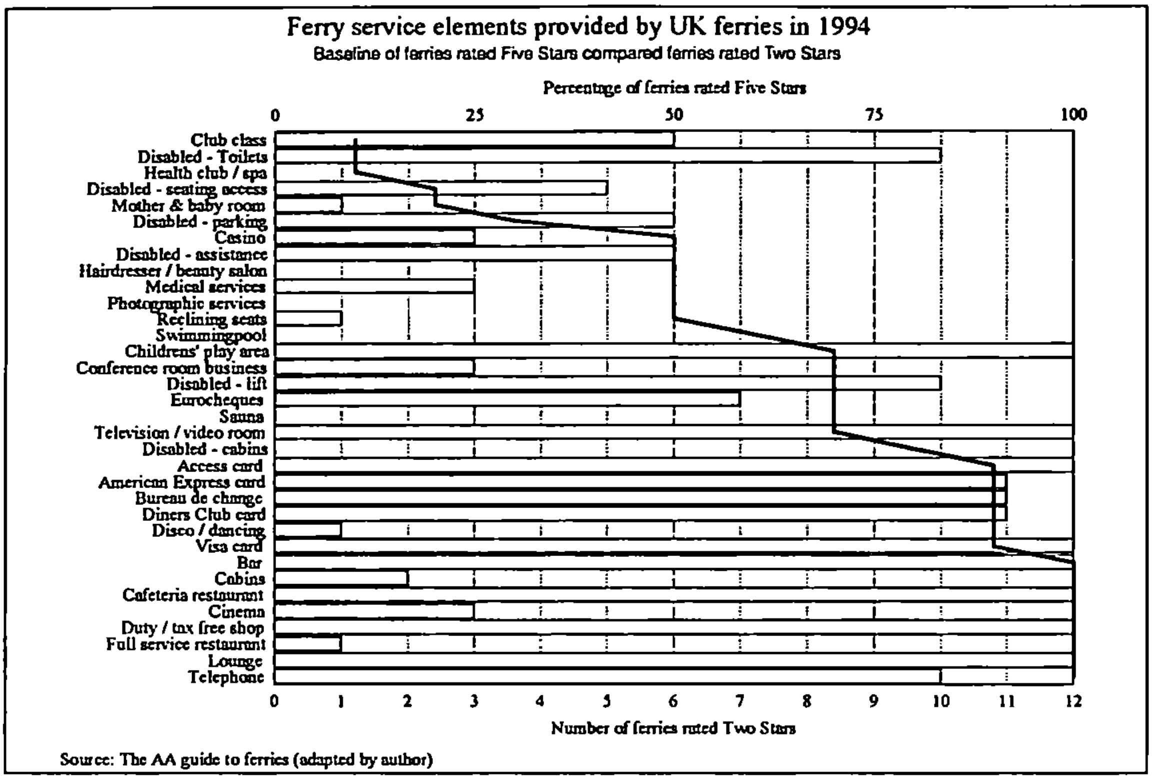

Figure P-19 Ferries rated Two Stars compared to baseline of ferries rated Five Stars

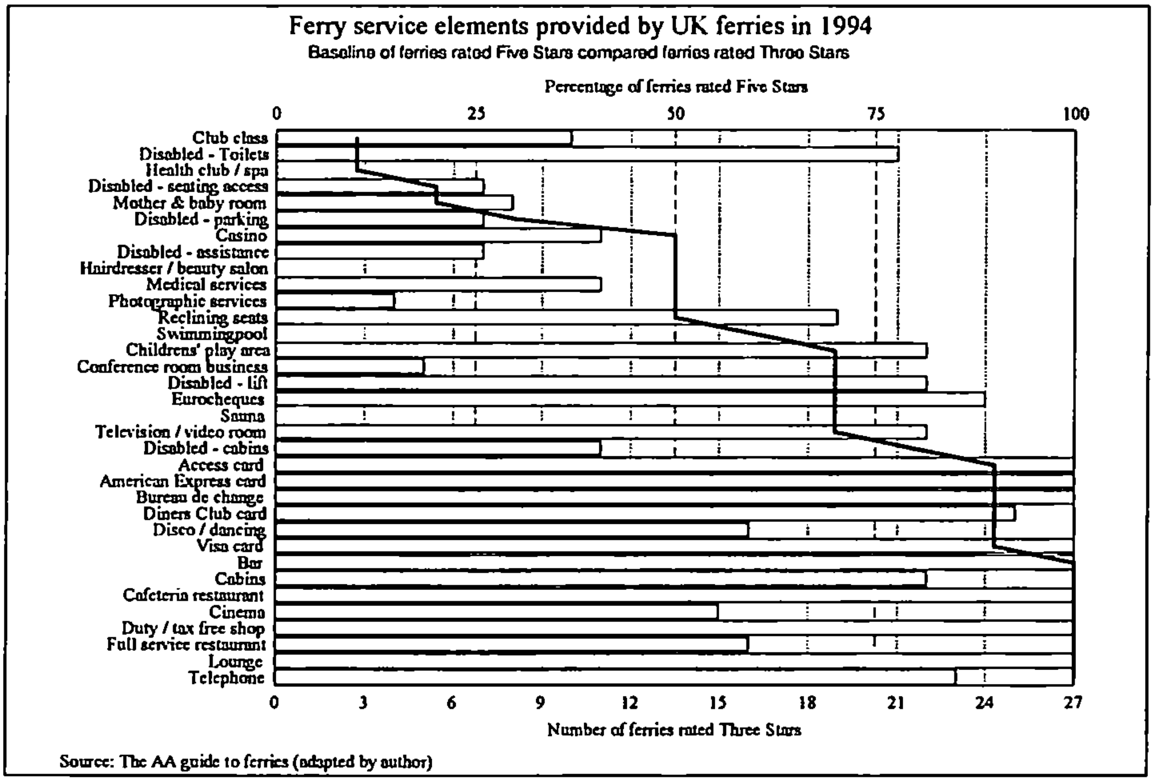

Figure P-20 Ferries rated Three Stars compared to baseline of ferries rated Five Stars

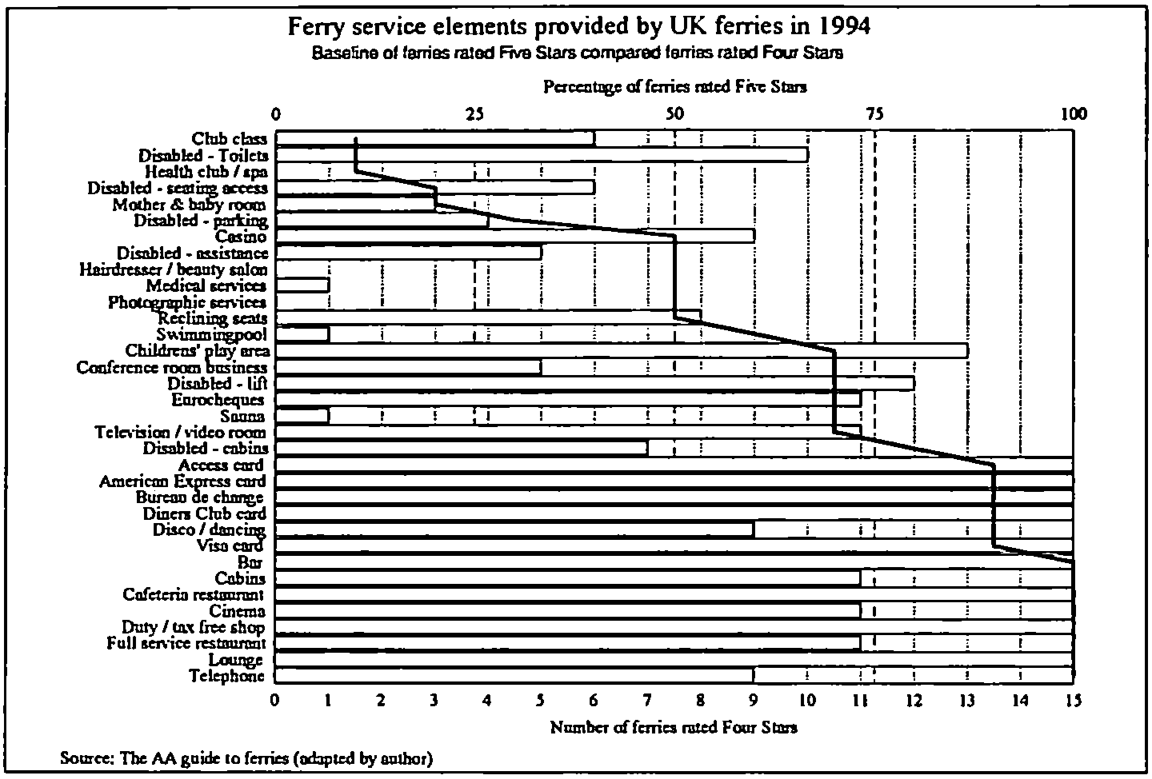

Figure P-21 Ferries rated Four Stars compared to baseline of ferries rated Five Stars

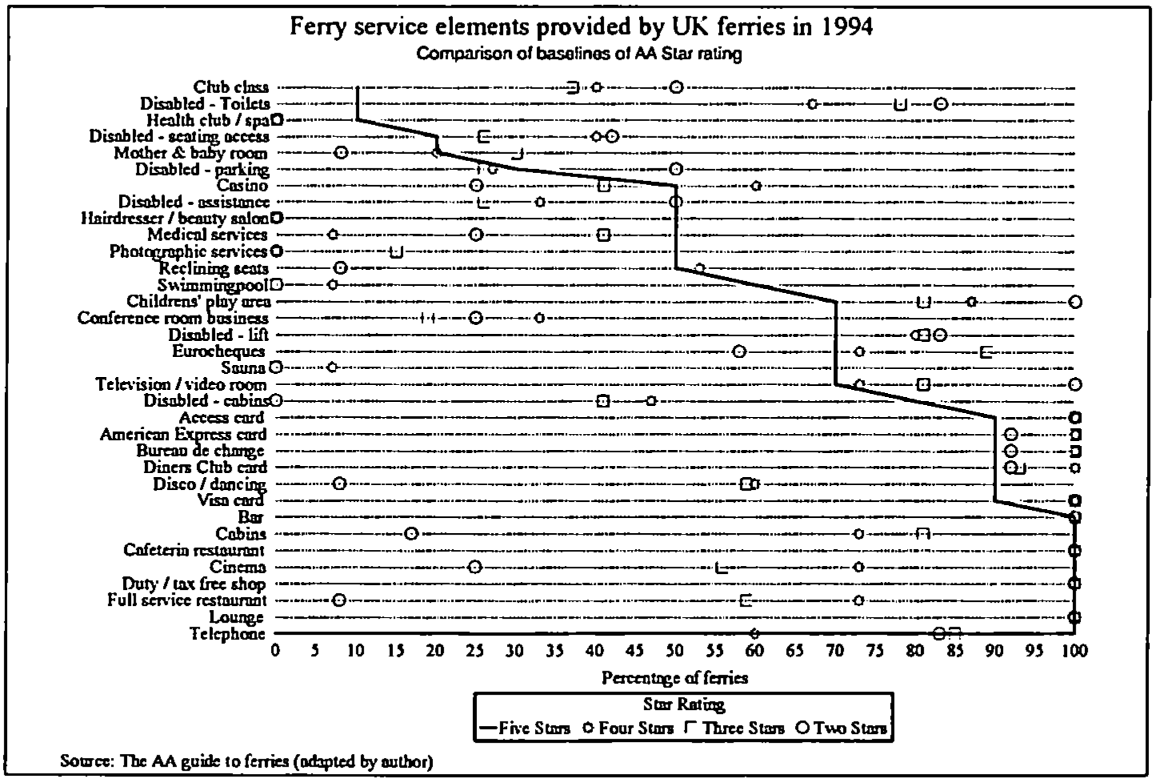

Figure P-22 All Star rating comparisons

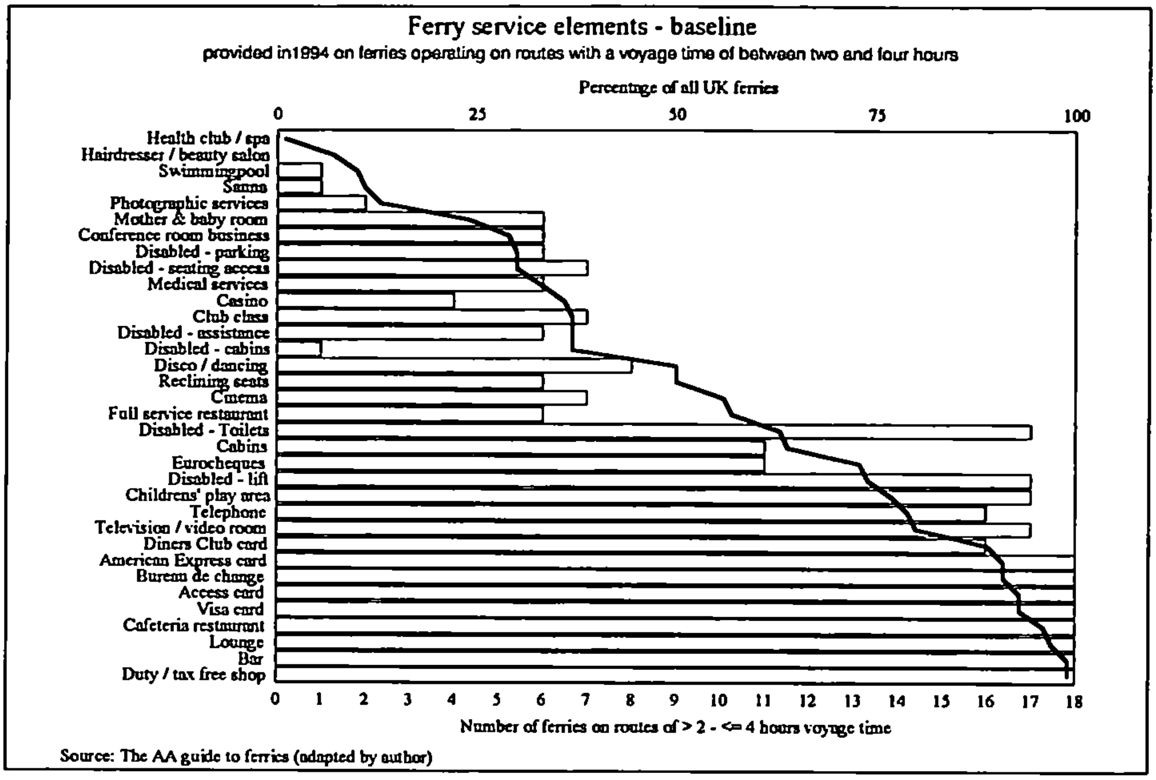

Figure P-23 Ferry service elements provided by ferries on ferry routes with a voyage time of between two and four hours compared to overall baseline.

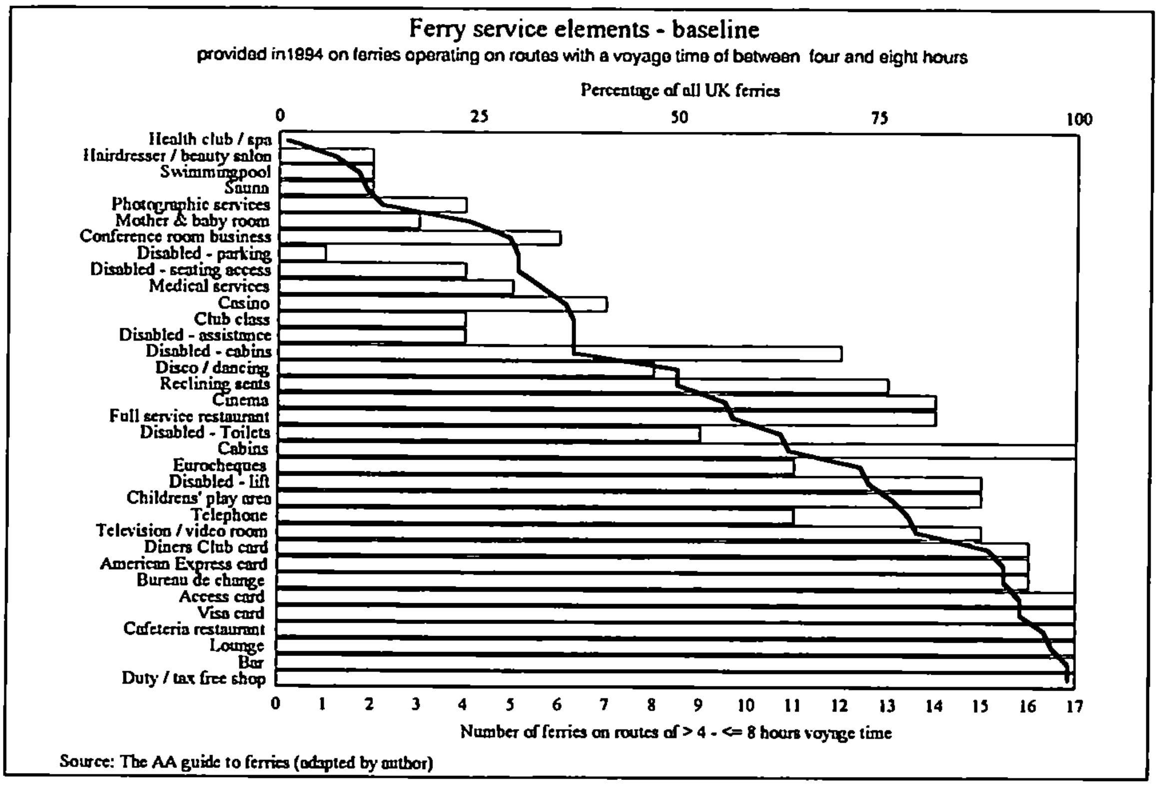

Figure P-24 Ferry service elements provided by ferries on ferry routes with a voyage time of between four and eight hours compared to overall baseline.

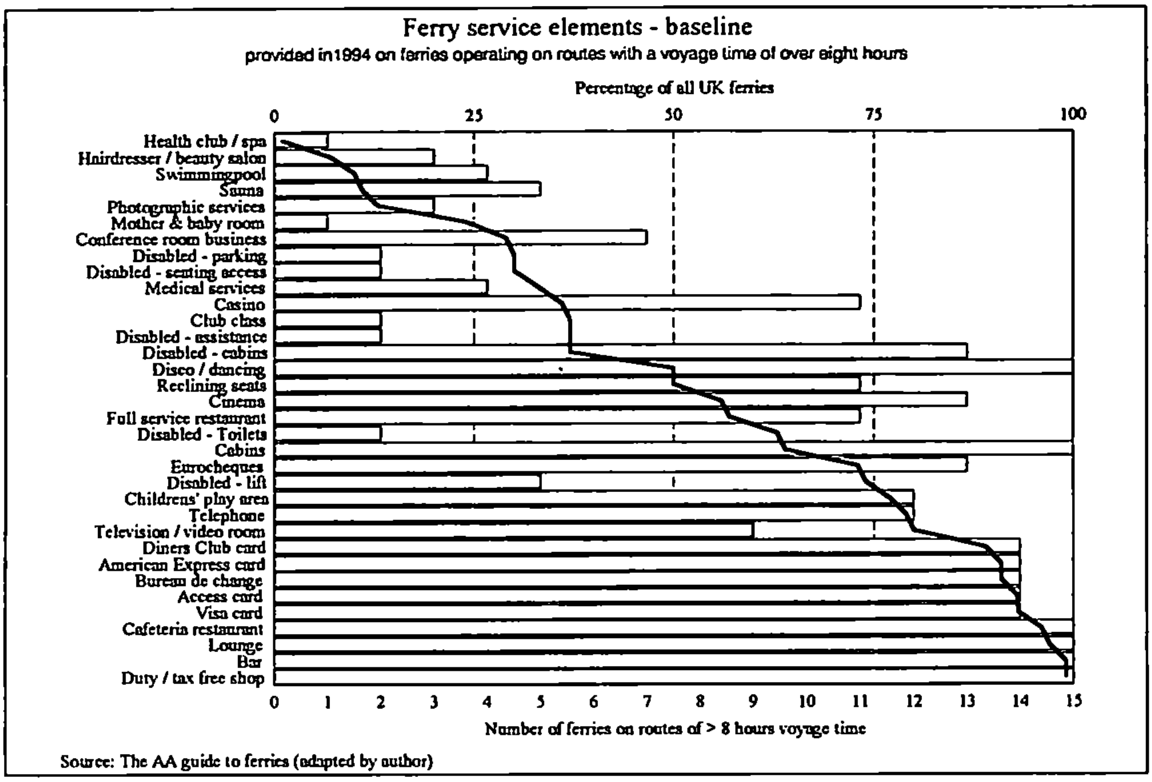

Figure P-25 Ferry service elements provided by ferries on ferry routes with a voyage time of over eight hours compared to overall baseline.

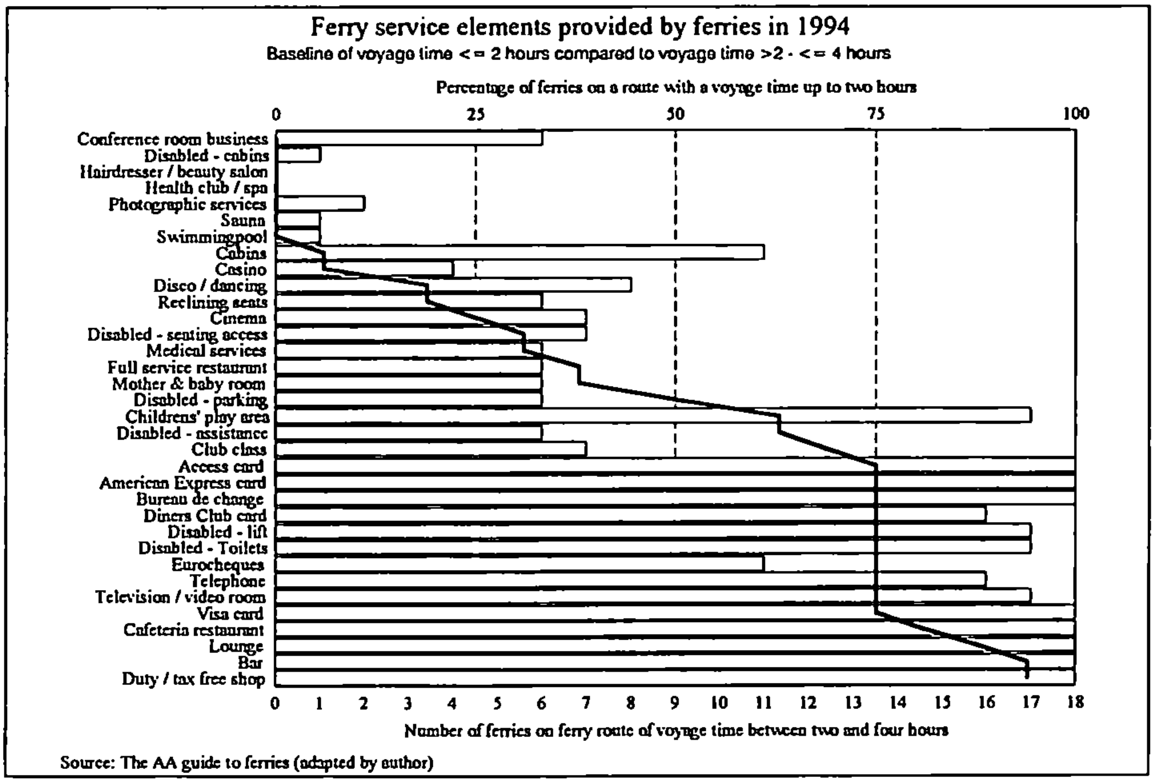

Figure P-26 Ferry crossing time between two and four hours compared to baseline of voyage time up to two hours

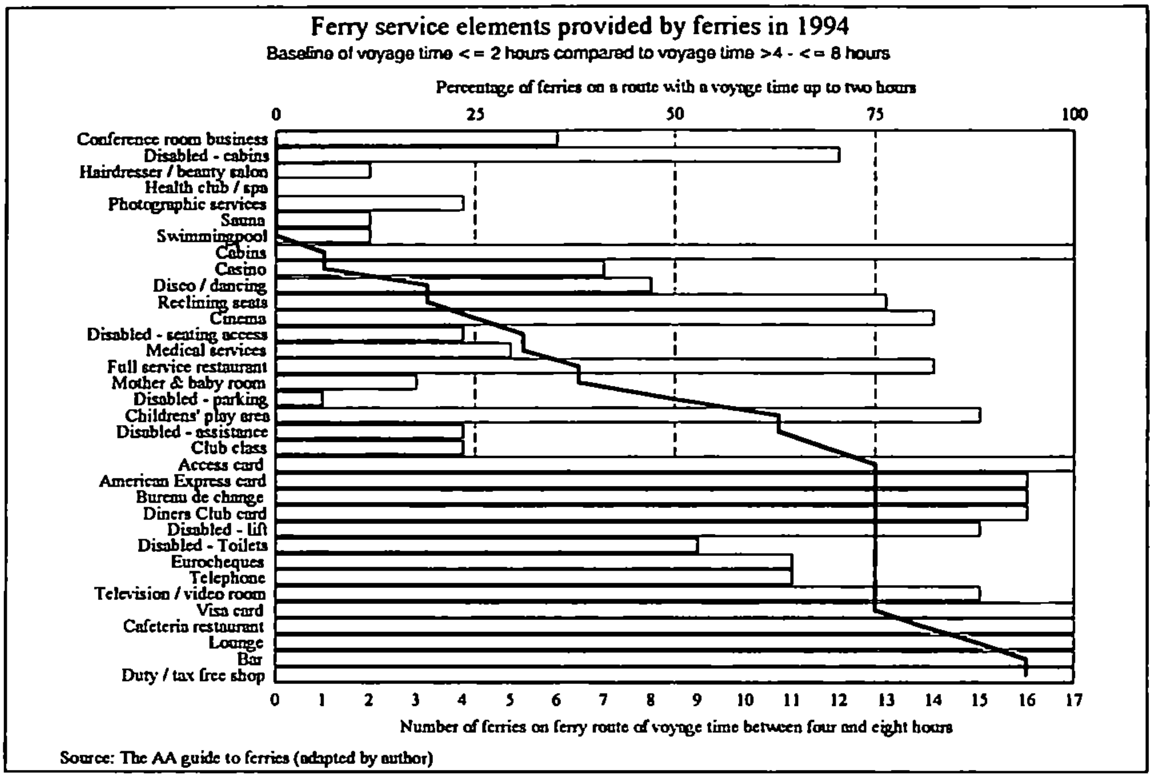

Figure P-27 Ferry crossing time between four and eight hours compared to baseline of voyage time up to two hours.

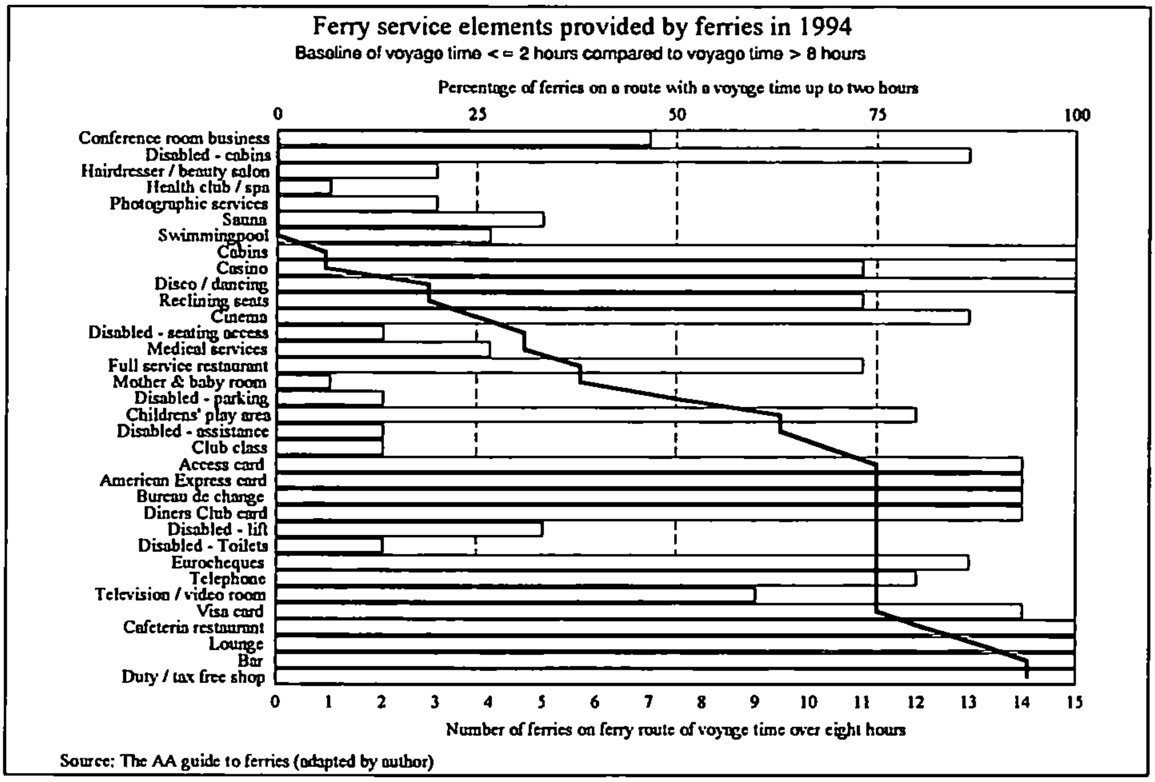

Figure P-28 Ferry crossing time of over eight hours compared to baseline of voyage time up to two hours.

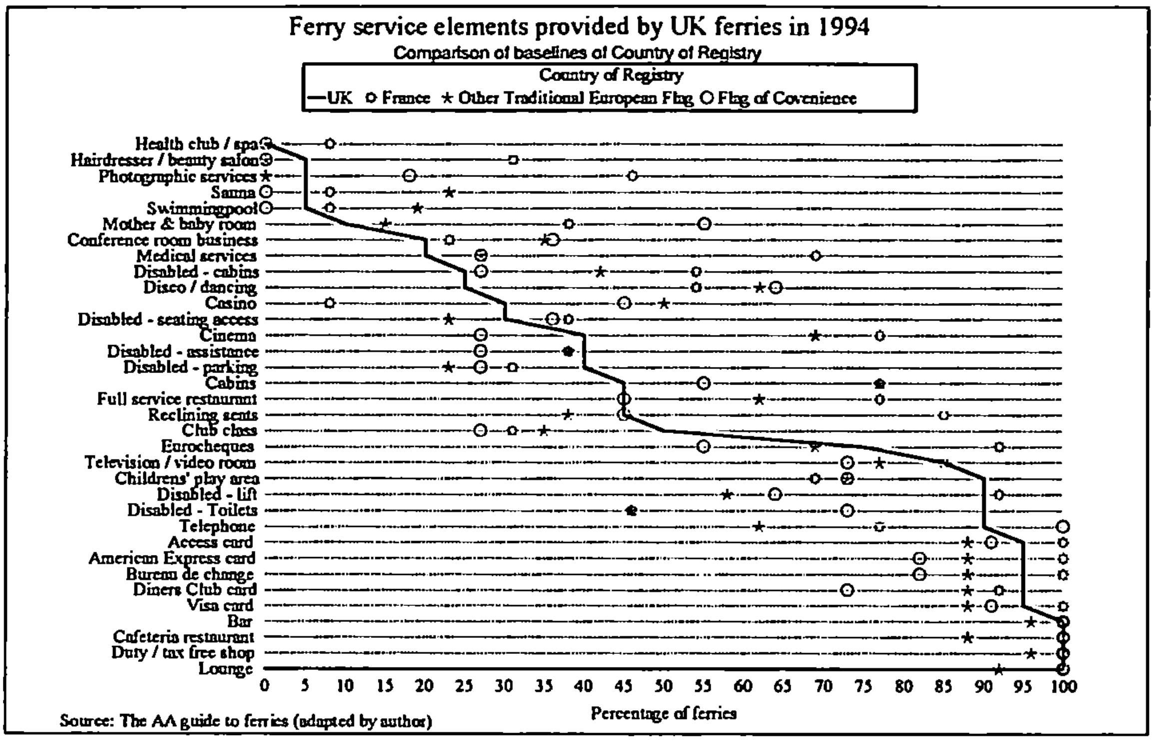

Figure P-29 Comparison of all baselines by country of registry

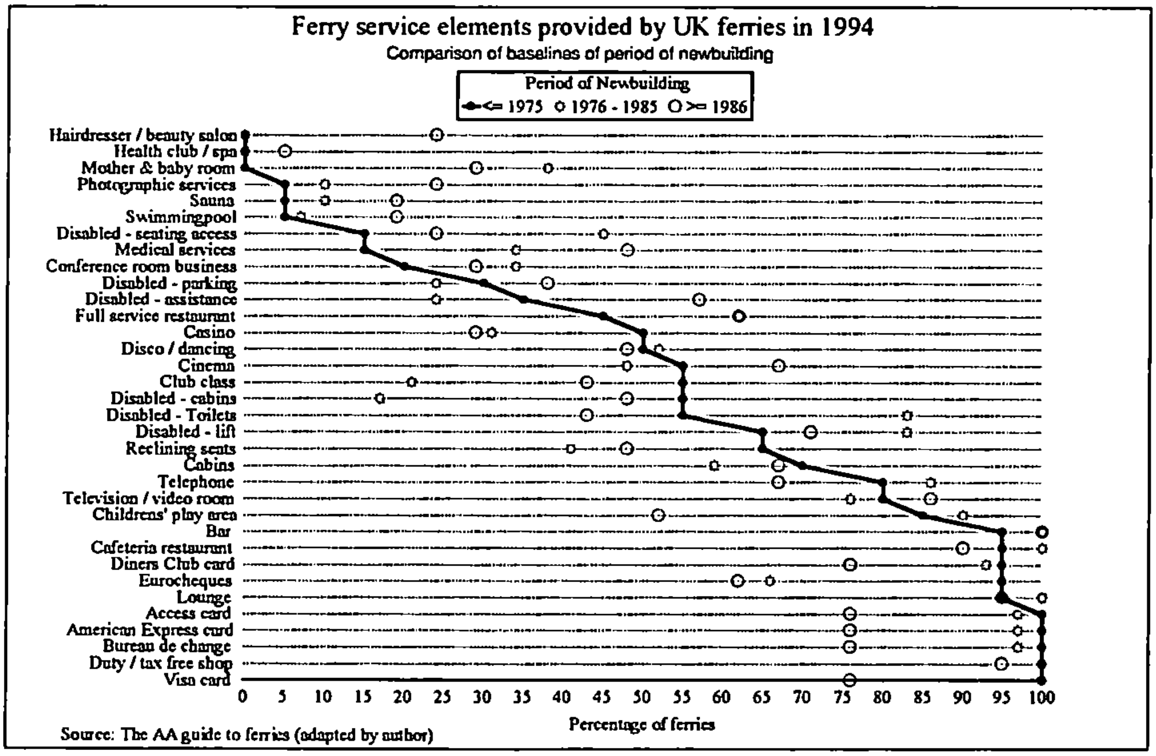

Figure P-30 Comparison of all baselines by period of newbuilding

Appendix Q

Strategy

Appendix Q Strategy

Concept of strategy

In the 1950's the concept of strategy entered the business vocabulary (Ansoff and McDonnell, 1990). In the early days the meaning was not clear, and dictionaries only listed the military explanations. Later this was corrected and a further explanation of strategy was given as 'a particular long-term plan for success, esp. in business and politics' (Collins, 1986). The concept of strategy has also been defined as 'a set of decision making rules for guidance of organisational behaviour' (Ansoff and McDonnell, 1990). Formulating the strategy of an organisation is one of the functions of management. Management has been defined by Stoner (1982) as

> 'the process of planning, organising, leading and controlling the efforts of the organisation members and of using all organisational resources to achieve stated organisational goals'

Simon (1979) equates management with decision making.

Strategy and decision making

Decisions have to be made in organisations at all levels, ranging from trivial everyday matters to the important ones which may seldom occur.

> 'Strategic decisions are the ones in which those who are involved believe will play a bigger rather than a smaller part in shaping what happens for a long time afterwards' (Hickson, et al., 1986)

This represents a judgement problem as the management in one organisation may consider a particular decision a big one, whereas another may consider it relatively small and insignificant (Wilson, 1966). This is in agreement with the view of management as an art, where individual styles based on creativity, judgement, intuition and experience are considered to be the main ingredients for decision making. It contrasts with the view of management as a science, which consists of:

> 'phenomena that can be measured, relationships that can be represented quantitatively, causal chains whose internal consistency can be logically verified, and conclusions which can be tested experimentally' (Feeney, 1971)

In organisations the nature of the decision situation and its environment requires a combination of both approaches, art and science, to reach acceptable results.

Decision making methodology

A general methodology involving the following steps has been identified in management decision making (Lee, 1983): define the decision problem, search for data and information, generate alternative courses of action, analyse feasible alternatives, select the best course of action, and evaluate results. This methodology can be applied to any decision situation.

Decision situations

Three types of decision situation can be distinguished (Ward, 1989). Type one, improving the efficiency and effectiveness of existing operations, e.g. scheduling; type two, showing how to evaluate and choose between designated options, e.g. investment appraisal; and type three, designing options and determining organisational requirements, e.g. strategic positioning. In comparison with type one, type three decision situations are the most problematic and the need for assistance is high, the outcomes are critical to the organisation, often there is little specific data available for further analysis, and the achievement of objectives is uncertain. In contrast, for type one situations the need for assistance is least felt by the decision maker, is not seen as problematic, is seldom critical and often the desired improvement is achieved through detailed analysis on the basis of sufficiently available data.

Decision making environment

Four basic states in the decision making environment have been identified (Lee, 1983). They are *certainty*, where all the information required to predict the outcome of each alternative course of action is known; *risk*, where all the probabilities of certain decisions outcomes occurring in each of the alternative courses of action are known; *uncertainty*, where the probabilities of decision outcomes are not known at all, and where it is even impossible to estimate the probabilities of various consequences, and *conflict*, where the decision maker is not only interested in his own course of action, but also in those of competitors

Decision making behaviour

Decision making behaviour can be divided into three main categories (Bell, 1988). *Normative*, logically consistent decision procedures, how people should decide; *descriptive*, decisions people make, how people decide; and *prescriptive*, how to help people make good decisions.

Strategic decisions

Strategic decisions relate to the interface between business and its external environment (Howe, 1989). These decisions are made relatively infrequent, have a long lasting impact, and their requirement to be made is not self evident. The latter presents management with a particular difficulty. Most decisions of a non-strategic nature are generated by problems, opportunities, or threats which are easily identifiable and will be given all attention to be solved, not least because of the short term urgency to do so. This is seldom the case with decisions of a strategic nature. The long term nature, the absence of a time limit to reach a decision and the perception of management as to the usefulness of strategic decisions requires the establishment of a formal strategic decision making process.

Two modes on strategy development have been identified (Mintzberg, 1972). Firstly, *the planning mode*, which describes strategy as a plan or explicit set of guidelines in advance. Management identifies where it wants to go, then develops a systematic and structure plan to get there. Secondly, *the evolutionary mode*, which views strategy not necessarily as a well-thought-out and systematic plan, but rather as something which evolves over time as a pattern of significant decisions (see also: Mintzberg, 1973, 1979, 1983, 1987; Mintzberg and Waters, 1985).

Many authors have given their own definitions of business strategy, see for example: Chandler, 1962; Learned, et al. 1965; Steiner and Miner, 1977; Andrews, 1980; Chaffee, 1985; Porter, 1985; Jauch and Glueck, 1988.

Strategic Management

Strategic management is concerned with deciding on strategy and planning how that strategy is to be put into effect (Johnson and Scholes, 1989). It can be thought of comprising strategic analysis, strategic choice and strategic implementation.

Strategic analysis

Strategic analysis is concerned with understanding the strategic position of the organisation. Its aim is to form a view of the key influences on the present and future well being of the organisation. The basis of which will be provided by consideration of the external and internal environment of the organisation, its resources, and the expectations and objectives of the stakeholders. Strategic analysis in turn provides the basis for strategic choice.

Strategic choice

The generation of strategic options, within which strategic directions are to be identified is the first important stage. These will be evaluated to assess their relative merits. The main criteria to be applied are suitability or 'strategic fit', feasibility, and acceptability. Finally one strategy, or several, will be selected. This selection will be strongly influenced by the values of management, the power structure within the organisation, and other 'irrational' motives, alongside rational arguments. The next step is strategy implementation.

Strategy implementation

Strategy implementation transfers strategy into action. It is to involve resource planning, design of organisational structures and systems.

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by

H. Heijveld and R. Gray

14. U.K. shortsea ferry services: a baseline model approach for policy decision making

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ABSTRACT

The objective of the paper is to identify the precise definition of a passenger service and its minimum acceptable requirements. The study is based on shortsea ferries operating between the U.K. and the Continent and Ireland. The importance of the U.K. shortsea ferry services will be shown, followed by an analysis of marketing models relevant to ferry services. A 'baseline' model of ferry service attributes will be developed which is suitable for policy decision making by ferry operators. This can be modified to suit the decision maker and clearly indicates where the ferry service offer exceeds or falls short of the baseline. The baseline is a dynamic line and varies both in time and purpose of use according to the actual ferry services provided. Some examples of the many baseline cases possible show the scope for future ferry marketing policy initiatives.

U.K.–CONTINENT FERRY MARKET

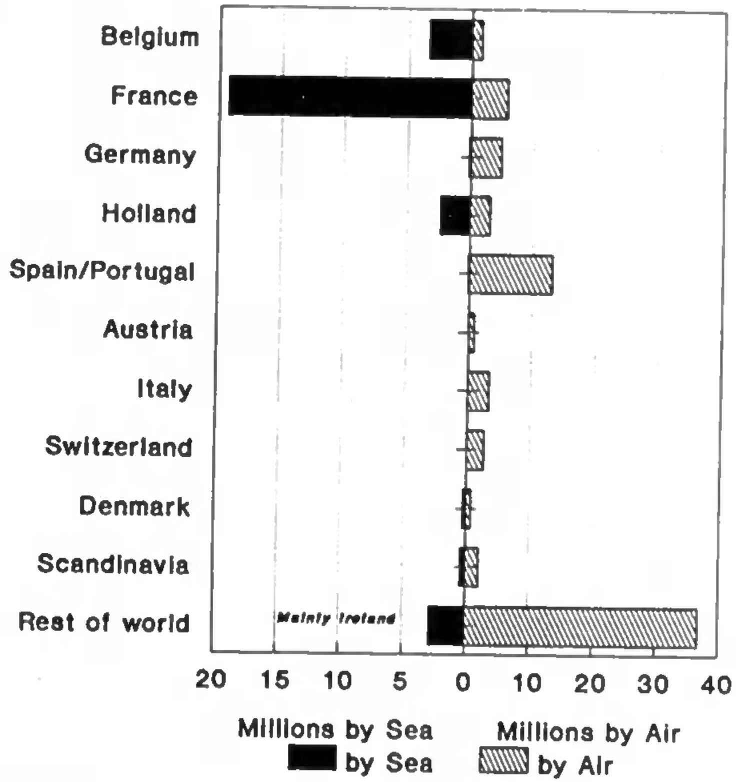
Ferry travel from the U.K. to the Continent and Ireland is very important, and the only alternative at present is travel by air. This of course is not an alternative for those wishing to drive their own car or for lorries and other vehicles. A comparison of the number of passenger movements from and to the U.K. by sea or by air in 1989 is shown in Figure 14.1. For purposes of this paper the U.K.–Continent ferry market includes the operators and vessels with passenger and car carrying capacity as shown in Table 14.1.

PRODUCT POLICY FOR FERRY SERVICES

In marketing terms a product is the total utility that a buyer receives as a result of a purchase. Various authors have identified different levels of products/services. These levels correspond to the needs, benefits sought, or wants which they are to satisfy. Each product or service has its essential features (the core product or service) which are then augmented or enhanced to provide marketing appeal. Different authors have proposed different 'levels' of product or service as shown in Table 14.2. There is some variation in the definition of the core level (see Table 14.3), and in those levels in addition to the core level (see Table 14.4).

Although the approaches of the various authors differ, they are essentially similar in identifying a value added service beyond the basic core service, often associated with the concept of tangibility. The core service is the main reason for the service to

Figure 14.1 Passenger movements to/from U.K. in 1989



Source: DTp, 1991

exist. For example, a ferry service may be perceived as providing the core service of sea transportation.

The general marketing literature identifies, beyond the core level, attributes such as packaging, size, colour, styling, quality, quantity, name, brand, reputation, before and after sales service, guarantee, credit and reliability. Such attributes specific to a ferry service would include: punctuality, speed of loading and unloading, plentiful and comfortable seats, cabin comfort, safety, cleanliness, or separate motorists' lounge, friendly service, facilities for children, clean toilets, available staff, choice and variety of food, speed of food service, and efficient booking.

When customer expectations have been raised a basic service is no longer acceptable and the additional attributes become part of the core service offer. It is at this 'mixture' of levels of the service offer that the 'new' competition is taking place. Cus-

Table 14.1 Selected U.K.–Continent ferry fleet

Vessel Operator	Name of Vessel	Passenger Capacity	Car Capacity
British Channel Island Ferries	*Havelet*	550	205
	Beauport	—	—
Brittany Ferries	*Bretagne*	2030	580
	Quiberon	1286	300
	Bretagne	2030	580
	Duc de Normandie	1500	354
	Normandie	1280	680
	Armorique	700	160
Color Line	*Venus*	1050	300
Hoverspeed	*Hovercraft*	—	—
	Seacat	450	80
North Sea Ferries	*Norsea*	1250	850
	Norsun	1250	850
	Norland	889	500
	Norstar	889	500
Olau Line	*Olau Britannia*	1600	575
	Olau Hollandia	1600	575
P & O European Ferries	*Pride of Ailsa*	1035	330
	Pride of Rathlin	1035	330
	Pride of Canterbury	1125	215
	Pride of Hythe	1125	202
	Pride of Calais	2290	650
	Pride of Dover	2290	650
	Pride of Bruges	1326	336
	Pride of Kent	1326	336
	Pride of Suffolk	682	220
	Pride of Flanders	682	220
	Pride of Cherbourg	1200	275
	Pride of Winchester	1200	275
	Pride of Hampshire	1200	380
	Pride of Le Havre	1200	380
Regie voor Maritiem Transport	*Reine Astrid*	1200	450
	Prins Filip	1200	—
Sally Ferries	*Sally Sky*	1155	310
	Sally Star	1754	480
Scandinavian Seaways	*Dana Anglia*	1322	470
	Princess of Scandinavia	1532	364
	Prince of Scandinavia	1517	364
	Hamburg	1085	404
Sealink Stena Line	*Stena Invicta*	1850	403
	Stena Fiesta	1800	630
	Stena Fantasia	1800	630
	Cote d'Azur	1600	330
	Stena Felicity	2000	517
	Koningin Beatrix	2100	500
	Stena Britannica	2000	450
	Stena Cambria	1400	310
	Stena Normandy	1800	450
	Stena Antrim	1400	310
	Stena Caledonia	1000	306
	Stena Galloway	1000	296
Truckline Brittany Ferries	*Barfleur*	1212	600
Sealink Newhaven–Dieppe	*Champs Elysée*	1800	330
	Versailles	1685	425

Table 14.2 Description of products/services				
Author	Levels			
	1	2	3	4
Levitt	Core	Expected	Augmented	Potential
Kotler	Core	Tangible	Augmented	
Eiglier	Core	Peripheral	Global	
Sasser	Substantive	Peripheral		
Christopher	Core	Surround		
Grönroos	Core	Auxiliary		

Table 14.3 Core product/service	
Author	Definition
Levitt	Basic physical product or utility
Kotler	What is the buyer buying?
Eiglier	1. Main reason why customer buys 2. Main output that the company provides
Sasser	The essential function of the service
Christopher	Essential elemental attributes
Grönroos	General and specific service concepts

tomers may value reliability or friendly service more than speed or price. So it is vital to be aware of the needs and expectations of customers and the extent to which they vary between different market segments.

As mentioned earlier the concept of tangibility is particularly important in services marketing. It can be argued that airlines have shown much more awareness of the importance of tangibility compared with ferry companies. The transport service itself is intangible, but other important aspects are tangible such as food and drink, seats, cabins, and even the uniforms of staff.

There is no single set of core and additional attributes which could be described effectively by the term 'ferry crossing' but the various combinations of discrete attributes could be seen as a 'molecules' of the ferry service offer. In Figure 14.2 the attributes consisting of sea transport, shop, lounge, self-service restaurant, bar, and children's playroom are shown as examples of core attributes, because they are offered in well over 90 per cent of all U.K. ferries. Additional attributes such as cabins, baby room, sauna, cinema, pool, television room, club room, waiter service restaurant, conference room, reclining seats, spa, telephone, discotheque, casino, medical services, and photographer are included as examples appropriate for different situations. For different marketing purposes continuous adjustment of the attributes can be made. For example, a 'no frills' crossing may be important in some markets or market segments (e.g. low budget student travel), whereas sailing frequency or travel time may be important for business travellers, and bars, restaur-

Table 14.4 Product or service levels beyond the core level	
Author	Definition
Levitt	Level 2. Expected Service Minimal purchase conditions to be met Level 3. Tangible Service Added value Level 4. Potential Service Potential added features and benefits that are or may be of utility to some buyers
Kotler	Level 2. Tangible Service Added tangibility through quality level, features, styling, brand name, packaging Level 3. Augmented Service Additional benefits and services
Eiglier	Level 2. Peripheral Service Some added value Level 3. Global Service Set of core and peripheral services which constitute the service offering
Sasser	Level 2. Peripheral Service Service that surrounds the substantive service
Christopher	Level 2. Service Surround Added values, e.g. image, service, styling, support
Grönroos	Level 2. Auxiliary Service Extras, not essential but can become an integral part of the offer

ants or entertainment for family holiday makers. Marketing the service concentrates on one or more of these attributes. However all market segments may be travelling on the same ship, and the difficulty is to achieve the correct balance of attributes.

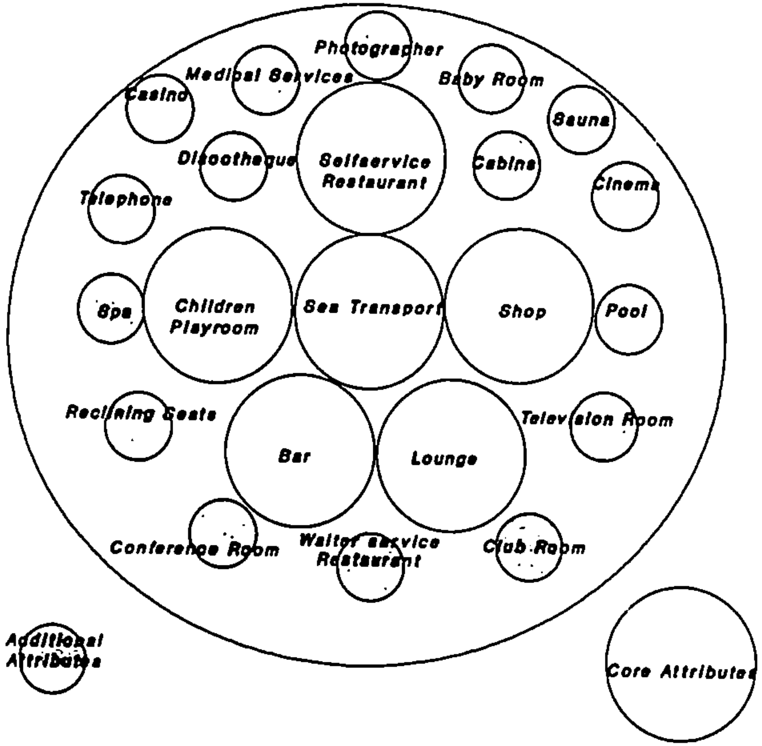
Is it fair to expect a consistent package of service attributes on all ferries? The airline industry, more than most other service industries, has an almost identical package of service attributes and differentiates only in presenting the 'same' product differently through the company's identity, its uniforms, house style, decor, and advertising.

Unlike the airline industry, the ferry facilities vary considerably from ship to ship, from route to route and from operator to operator. This makes the 'molecular model' in Figure 14.2 impractical for actual use as a policy decision model. More suitable is a baseline model which is dynamic to allow for changing facilities and consumer expectations, and which can be measured against 'key' variables which define the 'market,' such as route, port of origin/destination etc. Figure 14.3 shows a baseline model of the U.K.–Continent ferry market.

The collection of ferry data to analyze the product features and attributes contained the following elements:

1. the route, such as port of departure (origin), country of departure, port of arrival (destination), country of arrival, and the distance (nautical miles);
2. scheduling, such as sailing time during the day, sailing time during the night, and the frequency of sailing;

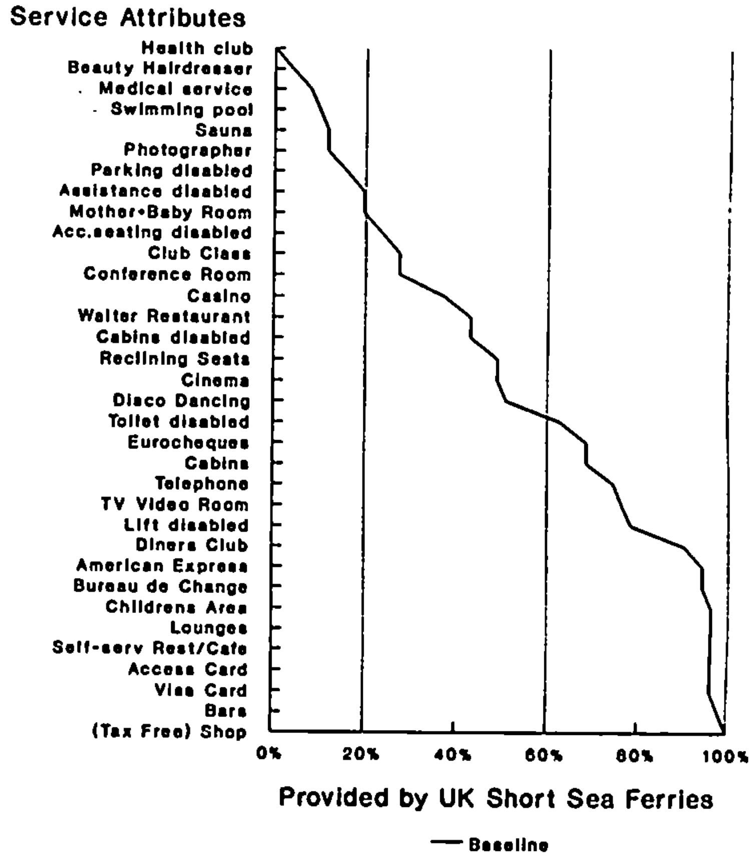
Figure 14.2 The 'ferry crossing': molecular model for the ferry service offer



Source: Shostack (1977) Adapted.

3. particulars of the ferry, such as name, operator, year of new-building, tonnage, number of cars, and the number of passengers;
4. accommodation, such as the cabin types—basic (usually a washbasin), ensuite (usually a washbasin, shower and w.c.), and luxury cabins;
5. details of on-board facilities, such as TV/video room, cinema, children's area, swimming pool, sauna, health club, disco/dancing, casino, conference/business facility, bar, lounge, club class, duty/tax free shop, telephones, reclining seats, mother and baby room, photographic service, medical service, hairdresser/beauty salon, restaurants—number of full waiter service restaurants, and number of self-service (includes buffets, free flow restaurants, cafeterias etc);
6. facilities specifically for disabled people (some of which are available to all passengers), such as lift, toilets, special parking, assistance, access to all seating areas, and cabins;
7. payment facilities, such as Bureau de Change, acceptance of VISA, Access, American Express, Diners Club credit cards, or Eurocheques.

Figure 14.3 Ferry service offer: U.K. shortsea ferries

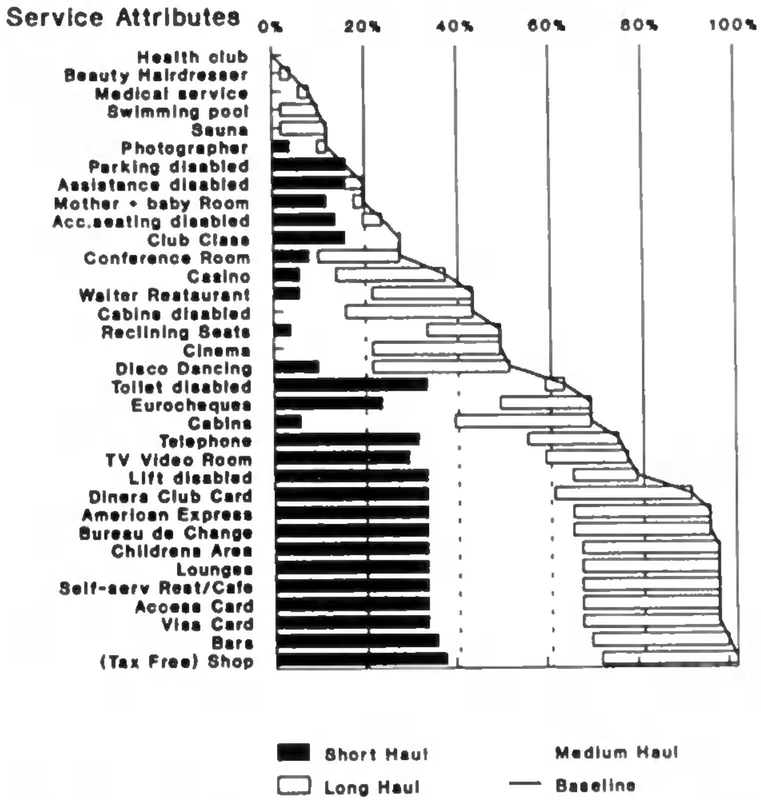


The above data were collected from sources such as ferry company brochures, HMSO and other statistics, travel/motorist organization information on ferries (in particular the AA and *Which*? magazine), from newspapers and trade magazines, and a report from the Monopolies and Mergers Commission. The data have been analyzed using the statistical mainframe computer package SPSSx3.

RESULTS AND FINDINGS

The main purpose of the analysis was to find a common pattern for the ferry service offer based on variables such as route, port of origin, port of arrival etc. Little consistency could be established using these variables. However all ferries have a shop (ordinary, duty or tax free). Therefore one could consider this attribute, together with the actual provision of sea transport as the 'core' attributes of the U.K.–Continent ferry service.

Figure 14.4 Ferry service offer (by travel distance) provided by U.K. shortsea ferries

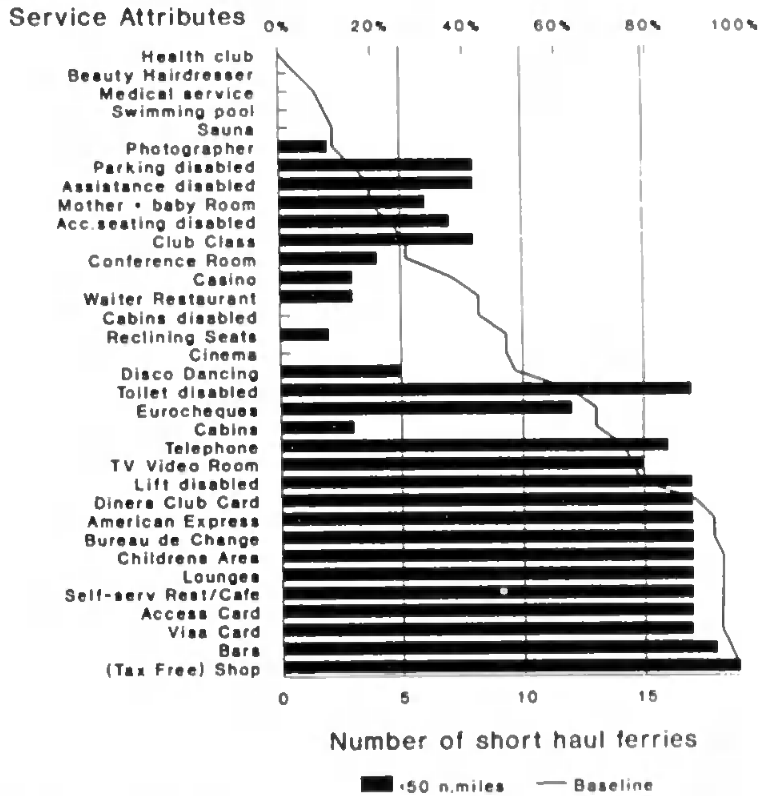


More than 90 per cent of all ferries have a bar, one or more self-service restaurants, a children's room and a lounge, and money can be changed in a Bureau de Change. More than 90 per cent of all ferries accept Visa, Access, American Express and Diners Club credit cards for payment. As the rest of the facilities are provided on less than 80 per cent of all ferries, it could be argued that if one were to offer a 'new' ferry service anywhere from the U.K. to the Continent the minimal required customer benefits offered should contain the above elements.

POLICY APPLICATION OF BASELINE MODEL

By selecting a key variable, such as travel distance, the ferries together make up the same baseline, but their individual contribution varies. In Figure 14.4 the travel distance has been divided into short haul (under 50 nautical miles), long haul (over 100

Figure 14.5 Ferry service offer (by travel distance) provided by U.K. shortsea ferries



nautical miles), and medium haul (between 50 and 100 nautical miles). From this diagram a visual image of the contribution of these categories of shortsea ferry distances to the total of attributes is quite clear. For instance cabins for disabled and cinemas are only provided on medium and long haul routes. A further analysis of the short haul ferries (Figure 14.5) and the long haul ferries (Figure 14.5a) shows these segments compared to the baseline. The scales have been modified to show their respective numbers (19 and 15 ferries) to the total number of ferries (51) included in the study. It can be seen that facilities for the disabled are mostly exceeding the baseline on short haul, and that a discotheque and cabins are available on all long haul ferries.

Figure 14.6 shows all the ferries and their service attributes based on the speed of transport or travel time. Dividing the ferries in segments based on the speed of transport or travel time and linking these to the service level or number of facilities provided it can be seen that ferries up to two hours at sea (Figure 14.6a) have no cabins, cinema, or conference room and generally have fewer facilities than the ferries at sea between two and four hours (Figure 14.6b) which fall short on casino, waiter restaurant, cabins, reclining seats, and cinema. Eurocheques are only accepted on six of the total of 13 ferries in this segment. Comparing the ferries at sea between four and eight hours (Figure 14.6c) to those making crossings of over eight hours at sea (Figure 14.6d) it can be seen that the 15 ferries employed in services lasting over four hours but not over eight hours match the baseline more closely than the 11 ferries making voyages lasting over eight hours. However the latter have in total more service attributes (12) on all ferries and may be perceived more consistent in the service offering.

Another key variable could be the port of departure. A reason for doing this would be to ensure that a ferry company is the 'leading' operator in terms of attributes from the port it is using. When contemplating opening a new route or improving an existing one the baseline can be compared to specific ports such as Harwich (Figure 14.7) and Dover (Figure 14.8). Services from Harwich show that all ferries have waiter restaurants, discos, cabins, conference rooms and cinemas. The only facility from Dover on all ferries is a (duty free) shop. These comparisons are, naturally, with the total baseline, but a further step is to use another criterion, such as 'port' baseline. For example, Figure 14.8 shows all ferries from Dover compared to the total baseline, whereas in Figure 14.9 the baseline is all ferries from Dover only. The sequence of attributes now becomes a range from none (photographer to health club) to all ferries (tax free shop).

In Figure 14.10 a specific route (Dover–Calais) has been compared to the port baseline of Dover. This shows that all ferries on this route have telephones and none have cabins or a cinema.

Analyzing the fleet of ferries of an actual operator, called operator A for reasons of anonymity, Figure 14.11 gives a clear view of the ferry service offer and the lack of consistency, even within one company, of the service attributes, such as facilities for disabled. It enables the decision maker to ask questions such as should a photographer or a mother and baby room be part of the service offer and, if so, should it be for all ferries or just on selected routes. A final use of the baseline model for policy decision-making is to compare the service offer to that of a competitor. Figure 14.12 shows the service offer of another actual operator B compared to the baseline of operator A. Operator B has on all its ferries good access to seating for disabled, but interestingly accepts only Eurocheques on about 41 per cent of its fleet.

CONCLUSION

The results using the baseline model show that although there is a degree of consistency amongst ferry operators regarding the total service on offer, there are significant differences which cannot be explained easily by obvious variables such as distance travelled, travel time, or route. More fundamental research is required into the precise definition of a passenger ferry service and its minimum acceptable requirements in terms of core and additional attributes, and the financial justification of this service level in terms of associated cost and revenue.

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Figure 14.5a Ferry service offer (by travel distance) provided by U.K. shortsea ferries

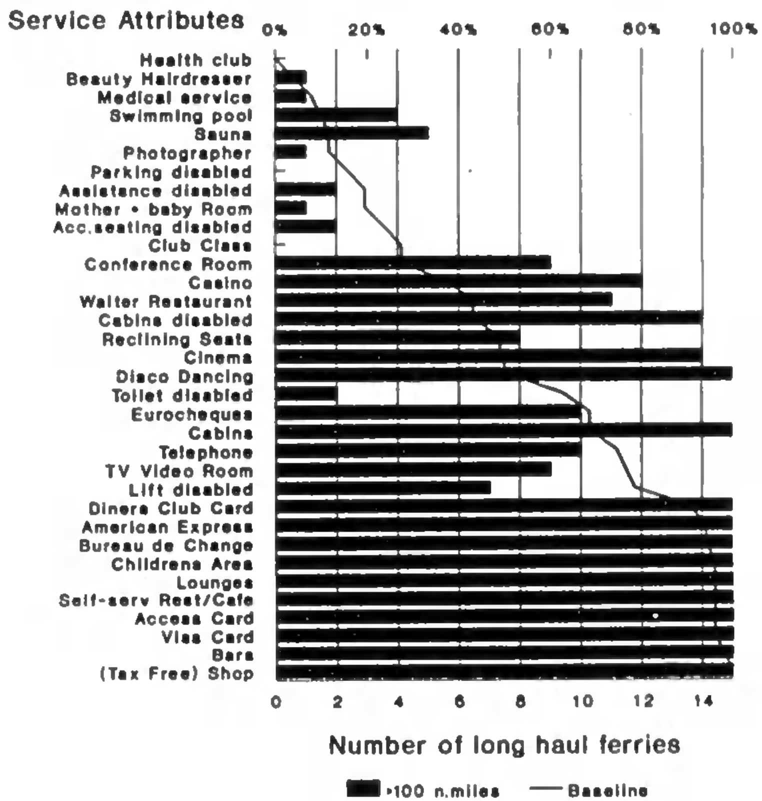

Figure 14.6 Ferry service offer (by travel time) provided by U.K. shortsea ferries

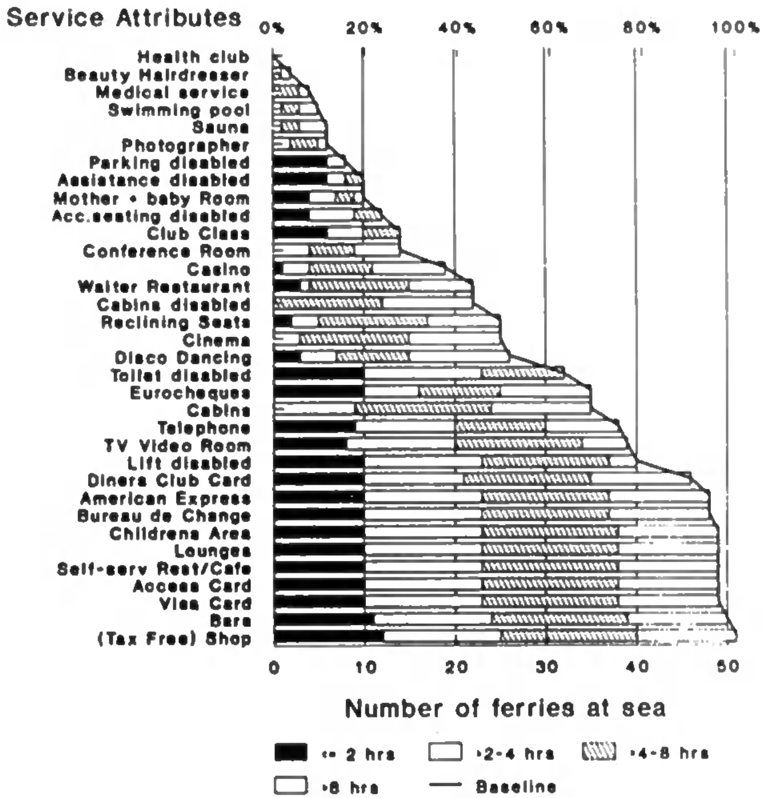

Figure 14.6a Ferry service offer (by travel time) provided by U.K. shortsea ferries

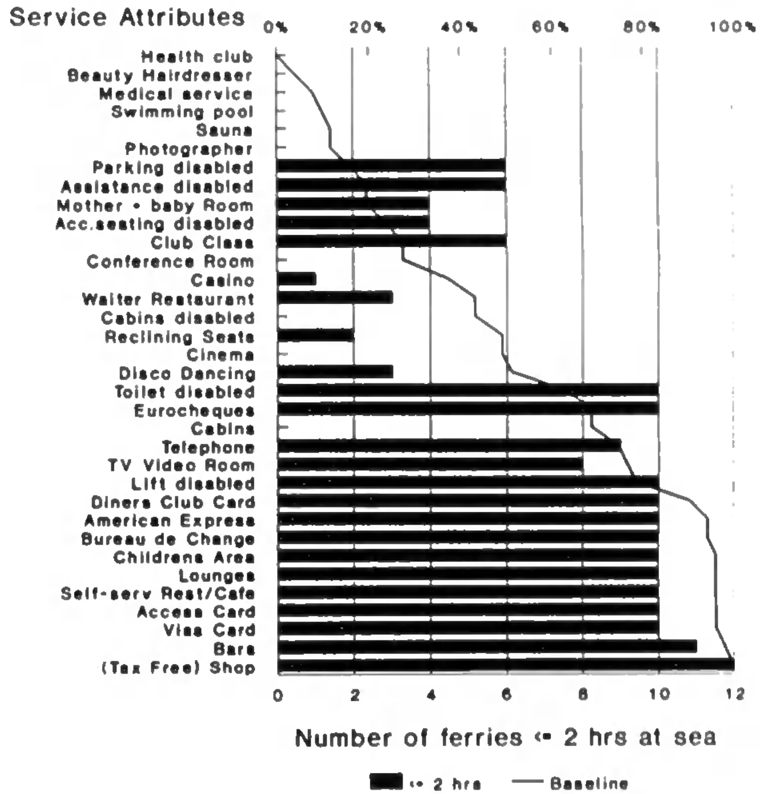

Figure 14.6b Ferry service offer (by travel time) provided by U.K. shortsea ferries

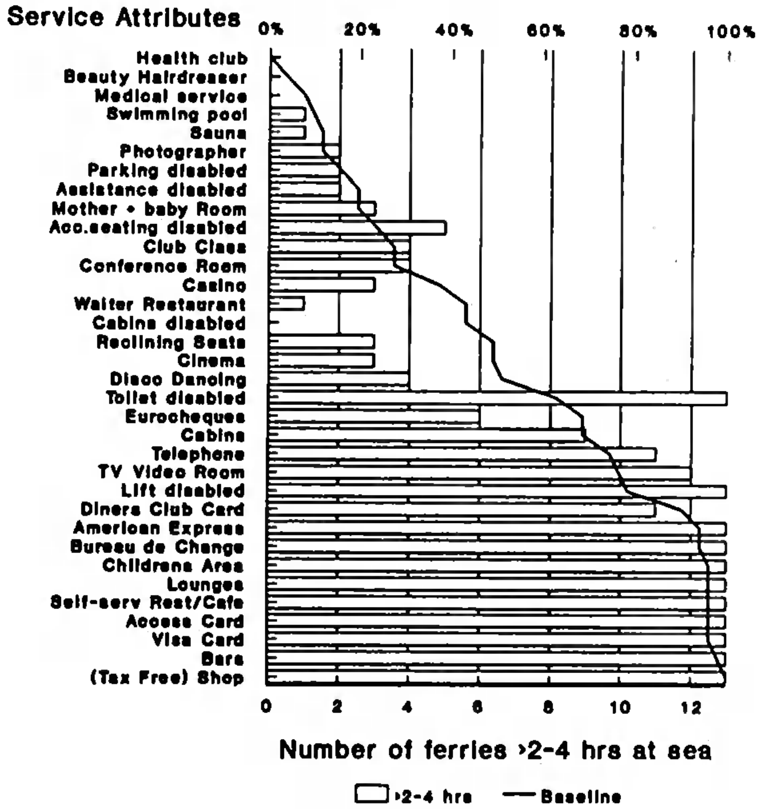

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Figure 14.6c Ferry service offer (by travel time) provided by U.K. shortsea ferries

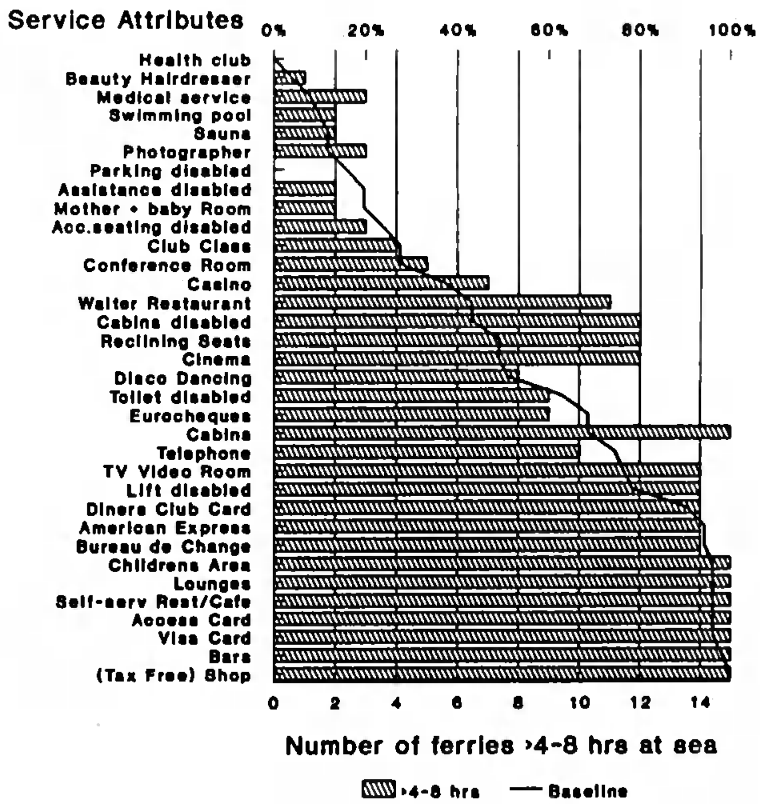


Figure 14.6d Ferry service offer (by travel time) provided by U.K. shortsea ferries

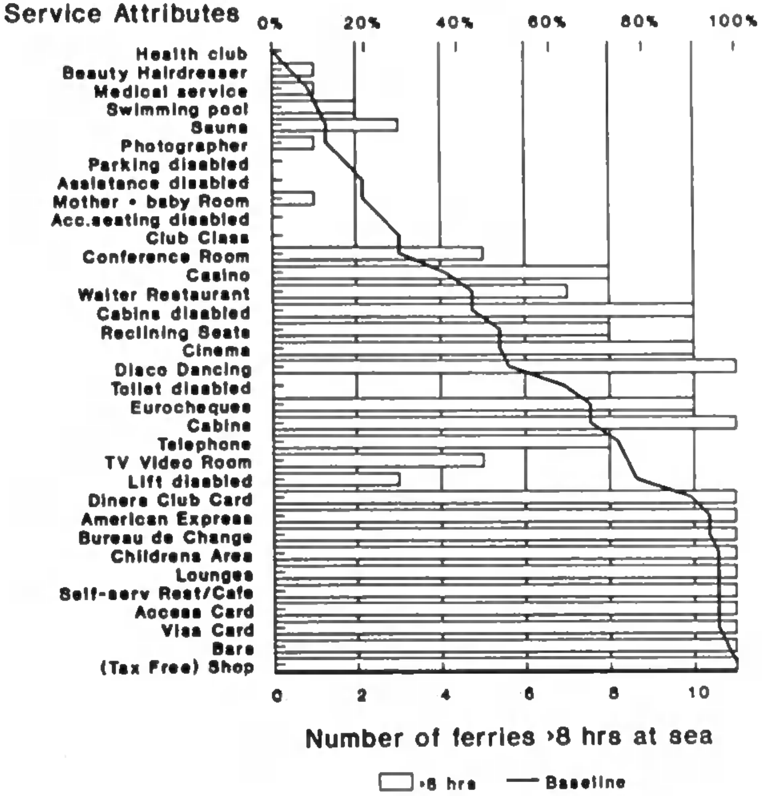


Figure 14.7 Ferry service offer from Harwich provided by U.K. shortsea ferries

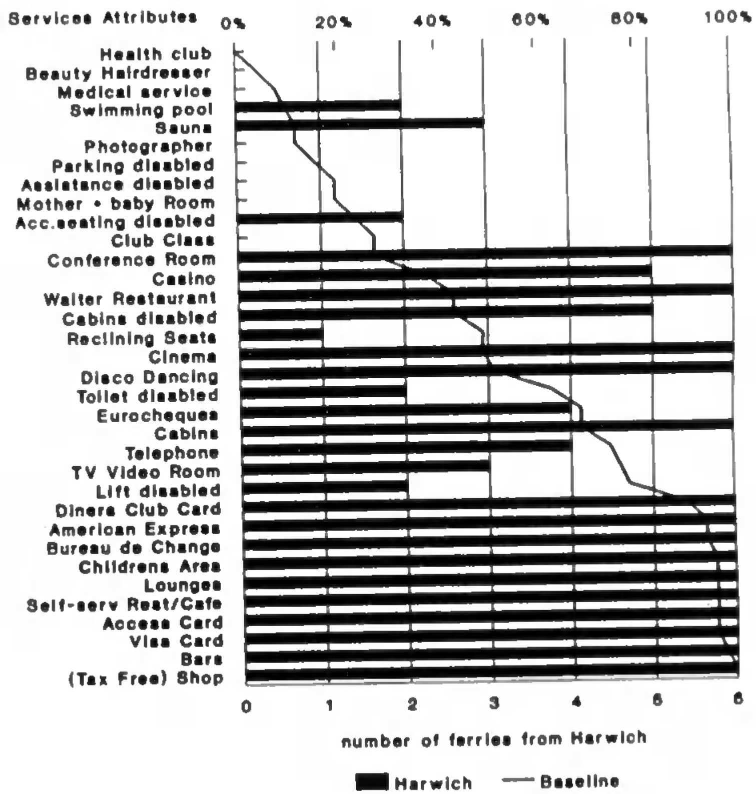


Figure 14.8 Ferry service offer from Dover provided by U.K. shortsea ferries

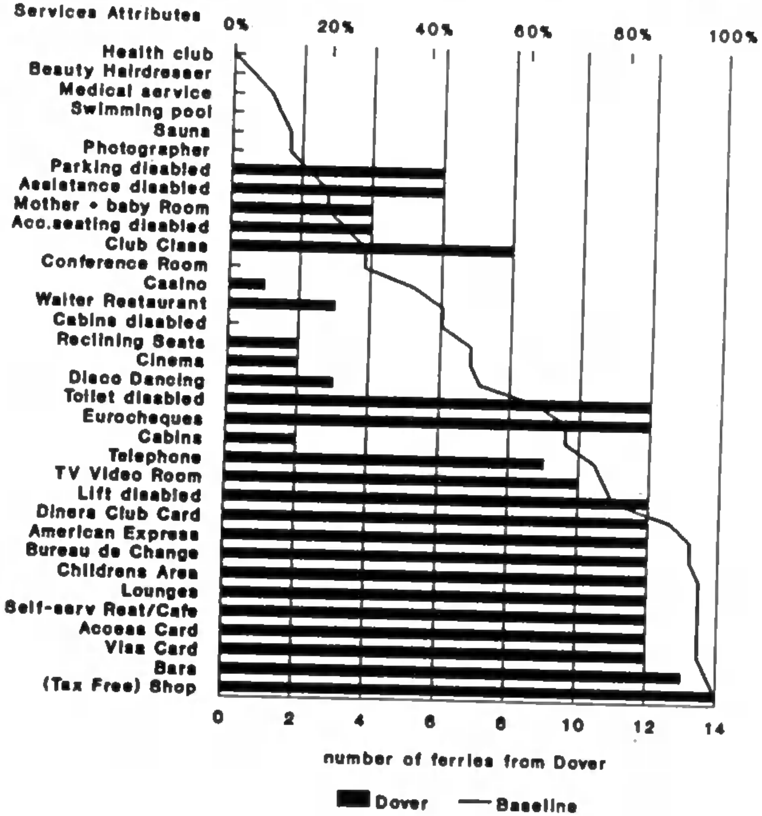


Figure 14.9 Ferry service offer from Dover by route provided by ferries from Dover

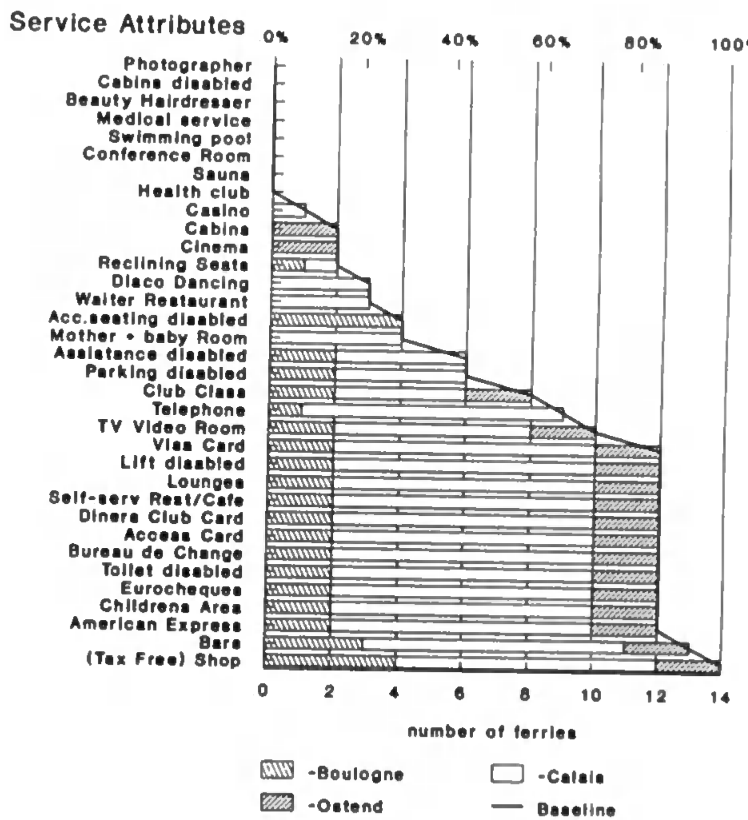


Figure 14.10 Ferry service offer on the Dover–Calais route provided by ferries from Dover

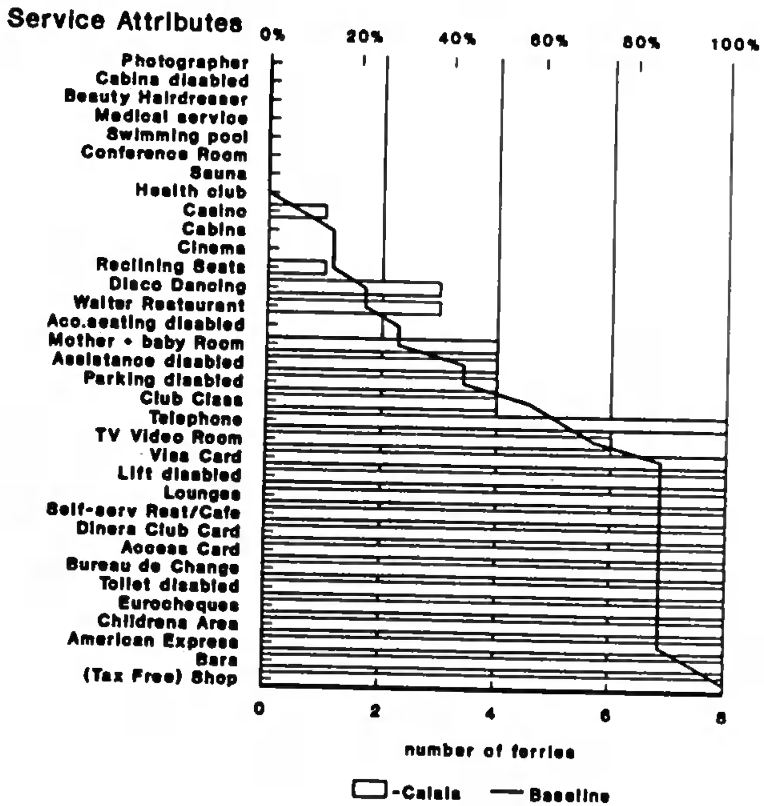


Figure 14.11 Ferry service offer operator baseline

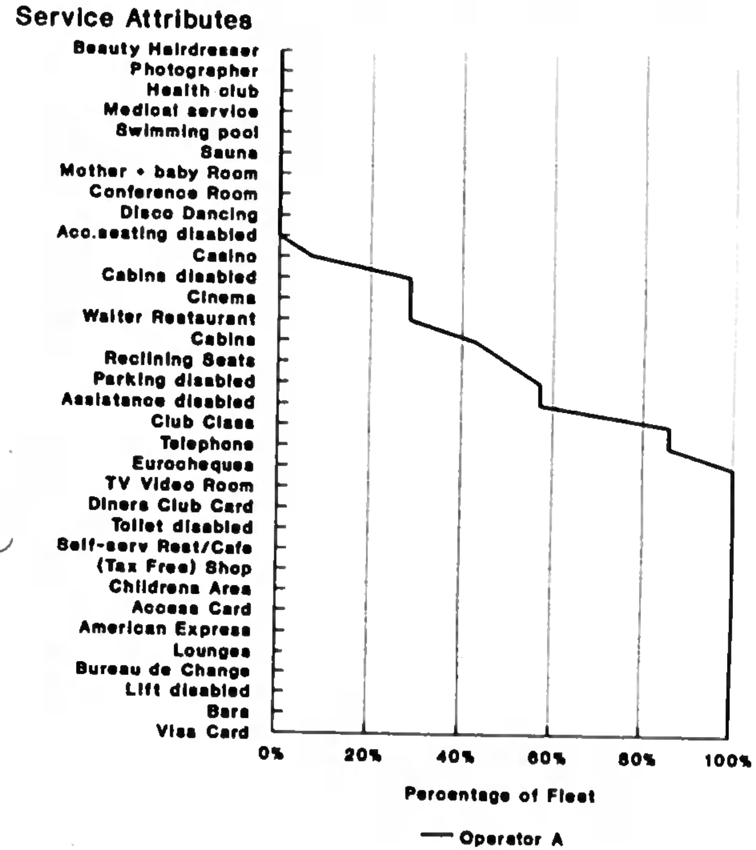
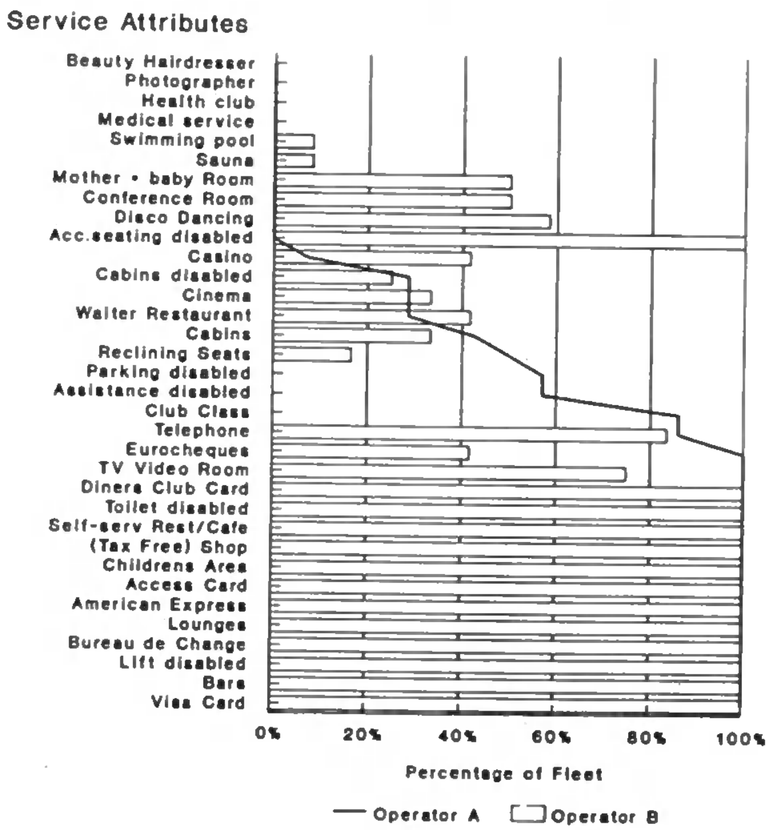


Figure 14.12 Ferry service offer by operator (compared to a competitor)



An analysis of service elements for ferry networks

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AN ANALYSIS OF SERVICE ELEMENTS FOR FERRY NETWORKS

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The objective of the paper is establish the importance of the different servic elements and who should provide them in a passenger car ferry service network.

The study is based on international and domestic ferry services provided i Ireland, United Kingdom, France, Spain, and Portugal in the European regio known as the Atlantic Arc.

The ferry service offer, as perceived by customers, is the provision of differer service elements by port authorities, port operators, ferry operators, local an regional governments, and independent third party operators. This service offer i. not just the ferry crossing, but effectively consists of a ferry network, whicl includes service elements such as reservations, road and rail access to the ferr port, the ferry port facilities and terminal, the ferry and on-board facilities anc services, and exit infrastructure for onward travel by car, public transport, o train.

The study, based on data collected from ports, ferry operators, and regiona government, shows the preferences of significant decision makers in providing a total network for ferry passengers and the various providers' perceived importance of specific parts of this network.

The ferry service offer network.

The user of the ferry service is offered a number of facilities and services by different providers, normally ports, regional governments and ferry companies. The main components of this 'total ferry experience' are pre-booking, booking, access to the ferry terminal at the port of departure, the ferry terminal facilities and services, the ferry crossing, and the continuation of the voyage at the port of arrival (exit). The ferry service offer network and its main components are shown in Figure 1.

Using these components, a questionnaire was designed to obtain the views of companies or organisations providing the various elements of the ferry service offer: the importance and preferred providers of on-board facilities and services, and of ferry terminal facilities and services. A survey was conducted to establish which of the components are important to the different providers, and who should provide specific facilities and services. This study extends previous research into the ferry service offer (see: Heijveld and Gray, 1993).
Data collection.

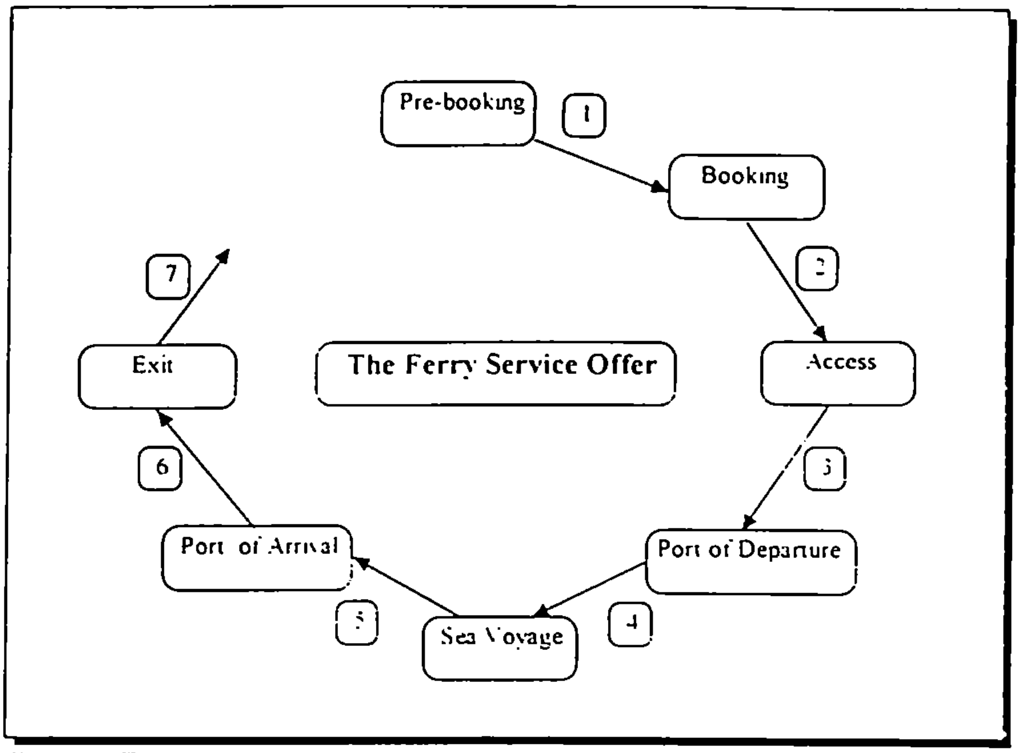

Figure 1: The ferry service offer network

The target population consists of ferry service providers located and operating between the United Kingdom and Ireland, France, Spain and Portugal. This provided a sampling frame of 31 ferry operators, 98 ports and 23 regional governments. Data collection was carried out as part of an 8-page postal questionnaire sent to the target response group. The overall response rate was about 25 %, which is typical for business surveys and is acceptable given the length of the questionnaire.

Data Analysis.

Data analysis derived an importance score for each component of the ferry service offer, based on the aggregate importance ratings of the service elements of the component. For example, the *prebooking* component consisted of two service elements (advertising the service and providing route information). Thus, in table 1, 73.1 % of responses from ports rated prebooking elements as very important, and 76.9 % of port responses considered that prebooking elements should be undertaken by ferry operators.
Booking was measured by three service elements; reservations, issuing tickets, and the keeping of passenger and cargo lists. *Access* to the ferry terminal at the port of departure and *exit* of the terminal in the port of arrival were measured by four service elements; sign posting, road-, rail-, and bus-links. As these elements

enable both access and exit this ferry service offer component was renamed infrastructure. The ferry *terminal* was measured by twelve different service elements. Upon initial analysis these were split in two groups of seven and five service elements respectively. The first group was renamed *basic terminal facilities* comprising terminal buildings, terminal waiting area, security, baggage, restaurants, cafeteria, and linkspans. The second group, renamed *special terminal facilities*, was measured by the service elements of special facilities for children, disabled, business travellers, lorry drivers, and motorists. The *ferry* component was also upon initial analysis divided in basic and special on-board ferry facilities and services. *Basic on-board facilities* were measured by the service elements of shops, restaurants, and bar. The *special on-board facilities* were measured by the swimming pool, cinema, casino, and health club/spa.

Results and Findings.

Analysis of the service component of prebooking (see Table I) shows that advertising the ferry service and providing route information is considered very important and that the ferry operators should provide these elements.

Only a limited number of responses from port operators indicated that they shoulo provide prebooking services. An important point for further investigation is whether the ferry user, when making initial contact with the industry, identifies with a ferry company (which is the perception of the industry) or with a port/route, or whether there may be two significant market segments, one segment identifying with ferries and one with routes or ports.

Booking

The responses to the booking component of the ferry service offer are shown ir Table II.
Most groups agree that the booking service elements should be provided by ferry operators as well as perceiving them to be important. Port respondents were unlike the ferry operators and the regional governments, also of the opinion tha passenger and cargo lists should be kept by the port authority or port operator suggesting that they felt responsible to collect this information for both safety an commercial reasons.

Infrastructure

Questions about the infrastructure component provided mixed responses from th different groups. The majority of the ferry operators felt that the governmer should be the provider of these service elements, but some indicated that th infrastructure should be provided by the port authority or private third parties. Th regional governments do not perceive port authorities, port operators, or ferr operators as providers of infrastructure, but the ports identified a wider range (possible providers of infrastructure.

Prebooking Preferred providers and perceived importance according to Ports, Regions and Ferry Operators by number of responses and rating score (out of 100)							
According to	**To be provided by**	+ +	+	O	-	--	Total
26 Ports 52 Responses	Port Authority						
	Port Operator	4 (7.7)	1 (1.9)				5 (9.6)
	Ferry Operator	29 (56)	8 (15.4)	3 (5.8)			40 (76.9)
	Government						
	Private Third Party						
	Combination	5 (9.6)	2 (3.8)				7 (13.5)
	Total	38 (73)	11 (21)	3 (5.8)			52 (100)
4 Regions 8 Responses	Port Authority						
	Port Operator						
	Ferry Operator	2 (25.0)	3 (37.5)				5 (62.5)
	Government						
	Private Third Party						
	Combination	2 (25.0)	1 (12.5)				3 (37.5)
	Total	4 (50.0)	4 (50.0)				8 (100)
7 Ferry Operators 14 Responses	Port Authority						
	Port Operator						
	Ferry Operator	11 (78)	2 (14.3)	1 (7.1)			14 (100)
	Government						
	Private Third Party						
	Combination						
	Total	11 (78)	2 (14.3)	1 (7.1)			14 (100)

+ + = very important
\+ = important
O = Neutral
\- = unimportant
-- = very unimportant

Table I: Prebooking

Booking Preferred providers and perceived importance according to Ports, Regions and Ferry Operators by number of responses and rating score (out of 100)							
According to	To be provided by	+ +	+	O	-	--	Total
26 Ports 52 Responses	Port Authority	2 (2.9)					2 (2.9)
	Port Operator	2 (2.9)	1 (1.4)				3 (4.3)
	Ferry Operator	47 (68)	7 (10.1)	2 (2.9)			56 (81.2)
	Government						
	Private Third Party						
	Combination	5 (7.2)	3 (4.3)				8 (11.6)
	Total	56 (81)	11 (16)	2 (2.9)			69 (100)
4 Regions 8 Responses	Port Authority						
	Port Operator						
	Ferry Operator	5 (45.5)	4 (36.4)				9 (81.8)
	Government						
	Private Third Party						
	Combination	1 (9.1)		1 (9.1)			2 (18.2)
	Total	6 (54.5)	4 (36.4)	1 (9.1)			11 (100)
7 Ferry Operators 14 Responses	Port Authority						
	Port Operator						
	Ferry Operator	15 (72)	4 (19.0)				19 (90.5)
	Government						
	Private Third Party						
	Combination	2 (9.5)					2 (9.5)
	Total	17 (81)	4 (19.0)				21 (100)

+ + = very important
\+ = important
O = Neutral
\- = unimportant
-- = very unimportant

Table II: Booking

Infrastructure - Access/Exit Preferred providers and perceived importance according to Ports, Regions and Ferry Operators by number of responses and rating score (out of 100)							
According to	To be provided by	+ +	+	O	-	--	Total
26 Ports 52 Responses	Port Authority	12 (13)	8 (8.4)	1 (1.1)		1 (0.6)	21 (23.1)
	Port Operator	1 (1.1)	1 (1.1)		2 (2.1)		4 (4.2)
	Ferry Operator	1 (1.1)	1 (1.1)				2 (2.1)
	Government	16 (17)	7 (7.4)	1 (1.1)		1 (1.1)	24 (25.3)
	Private Third Party	8 (8.4)	9 (9.5)	5 (5.3)			23 (24.2)
	Combination	13 (14)	8 (8.4)				21 (22.1)
	Total	51 (54)	34 (36)	7 (7.3)	2 (2.1)	1 (1.1)	95 (100)
4 Regions 8 Responses	Port Authority						
	Port Operator						
	Ferry Operator						
	Government	5 (31.3)					5 (31.3)
	Private Third Party	1 (6.3)					1 (6.3)
	Combination	8 (50.0)	2 (12.5)				10 (62.5)
	Total	14 (88)	2 (12.5)				16 (100)
7 Ferry Operators 14 Responses	Port Authority		2 (7.1)	1 (3.6)			6 (21.4)
	Port Operator						
	Ferry Operator						
	Government	3 (10.7)	5 (17.9)		1 (3.6)		16 (57.1)
	Private Third Party	1 (3.6)	3 (10.7)	1 (3.6)			5 (17.9)
	Combination		1 (3.6)				1 (3.6)
	Total	14 (50)	11 (39)	2 (7.1)	1 (3.6)		28 (100)

+ + = very important
\+ = important
O = Neutral
\- = unimportant
-- = very unimportant

Table III: Infrastructre - Access/Exit

Ferry Port Terminal

The facilities and services provided at the ferry port terminal have been divided into basic facilities (see Table IV) and special facilities (see Table V).

The basic facilities and services are the terminal buildings, the terminal waiting area, terminal security, baggage handling, restaurants, cafeteria, and linkspans. Basic terminal facilities and services should, in the main, be provided by the port authorities (according to ports and ferries), or the port operators (according to regions). The preference for private third parties (for providing restaurants and cafeteria) was indicated by some port and ferry respondents.

There was complete agreement on the importance of linkspans by both the regions and the ferry operators, but no such agreement was found to exist when identifying the preferred provider. One port and one ferry operator indicated that the ferry operator should provide the linkspan.

All other port and ferry respondents gave the port authority as the preferred provider followed by the port operator. Three port respondents preferred a combination of providers, as did two regional governments. The ferry port terminal special facilities to be provided for children, disabled people, business travellers, motorists, and lorry drivers are generally seen as important, although a smaller number of respondents rates them as neutral, and a few as not important. Interestingly, a significant number of respondents prefer the ferry operators to provide these terminal facilities and services, in contrast to basic facilities. The majority, however, favour the port authorities or the port operators as providers.

The ferry crossing.

Facilities and services to be provided during the ferry crossing have also been divided into basic (see Table VI) and special (see Table VII) on-board facilities and services.
There was a high level of agreement among the respondents about basic on-board facilities (bar, shop, restaurant) both in importance and who should provide these services. The regions and ferry operators are unanimous in their preference of the ferry operator in providing these facilities and services. All, but one port respondent indicate the same preference. The importance ranges from very important to neutral. One ferry operator classified the basic on-board facility of a shop as unimportant.

Special on-board facilities were measured by the importance and provision of a swimming pool, a casino, a cinema, and a health club/spa. The majority of the respondents gave an importance rating of neutral or unimportant. It also received the largest number of very unimportant ratings of all ferry service offer components. The majority was also of the opinion that these services should be provided by the ferry operators. There is little enthusiasm for the use of independent third parties in the provision of either basic or special on-board facilities.

Ferry Port Terminal - Basic Facilities
Preferred providers and perceived importance
according to Ports, Regions and Ferry Operators
by number of responses and rating score (out of 100)

According to	To be provided by	+ +	+	O	-	--	Total
26 Ports 52 Responses	Port Authority	48 (27)	23 (13)	2 (1.1)	2 (1.1)		76 (43.4)
	Port Operator	15 (8.6)	7 (4.0)	12 (6.9)	1 (0.6)		35 (20.0)
	Ferry Operator	2 (1.1)	11 (6.3)	2 (1.1)	1 (0.6)		16 (9.1)
	Government	1 (0.6)			1 (0.6)		2 (1.1)
	Private Third Party	1 (0.6)	13 (7.4)	9 (5.1)	1 (0.6)		24 (13.7)
	Combination	5 (2.9)	16 (9.1)	1 (0.6)			22 (12.6
	Total	72 (41)	70 (40)	26 (15)	6 (3.4)	1 (0.6)	175 (100)
4 Regions 8 Responses	Port Authority	1 (5.0)	4 (20.0)				5 (25.0)
	Port Operator	4 (20.0)	2 (10.0)	2 (10.0)			8 (40.0)
	Ferry Operator		1 (5.0)				1 (5.0)
	Government			1 (5.0)			1 (5.0)
	Private Third Party						
	Combination	3 (15.0)	1 (5.0)	2 (5.0)			5 (25.0)
	Total	8 (40.0)	4 (20.0)	4 (20.0)			10 (100)
7 Ferry Operators 14 Responses	Port Authority	11 (23)	4 (8.2)	3 (6.1)			18 (36.7)
	Port Operator	6 (12.2)	3 (6.1)	2 (4.1)			11 (22.4)
	Ferry Operator	2 (4.1)	4 (8.2)	3 (6.1)	1 (2.0)		10 (20.4)
	Government						
	Private Third Party		5 (10.2)	1 (2.0)	3 (6.1)	1 (2.0)	10 (20.4)
	Combination						
	Total	19 (39)	16 (33)	9 (18.4)	4 (8.2)	1 (2.0)	49 (100)

+ + = very important
\+ = important
O = Neutral
\- = unimportant
-- = very unimportant

Table IV: Ferry port terminal - basic facilities

Ferry Port Terminal - Special Facilities Preferred providers and perceived importance according to Ports, Regions and Ferry Operators by number of responses and rating score (out of 100)							
According to	To be provided by	+ +	+	O	-	--	Total
26 Ports 52 Responses	Port Authority	15 (12)	14 (12)	6 (5.0)	1 (0.8)	1(0.8)	37 (30.6)
	Port Operator	7 (5.8)	15 (12)	8 (6.6)			30 (24.8)
	Ferry Operator	3 (2.5)	5 (12)	11 (9.1)	4 (3.3)		33 (27.3)
	Government						
	Private Third Party			2 (1.7)			2 (1.7)
	Combination	2 (1.7)	16 (13)	1 (0.8)			19 (15.7)
	Total	27 (22)	60 (50)	28 (23)	5 (4.1)	1 (0.8)	121 (100)
4 Regions 8 Responses	Port Authority						
	Port Operator	3 (30.0)	4 (40)				7 (70.0)
	Ferry Operator	2 (10.0)		1 (10.0)			3 (30.0)
	Government						
	Private Third Party						
	Combination						
	Total	5 (50.0)	4 (40)	1 (10.0)			10 (100)
7 Ferry Operators 14 Responses	Port Authority	1 (2.9)	5 (15)	1 (2.9)	1 (2.9)		8 (23.5)
	Port Operator	1 (2.9)	10 (29)				11 32.4)
	Ferry Operator	3 (8.8)	3 (8.8)	6 (17.6)	2 (5.9)		14 (41.2)
	Government						
	Private Third Party			1 (2.9)			2 (2.9)
	Combination						
	Total	5 (14.7)	18 (53)	8 (23.5)	3 (8.8)		34 (100)

+ + = very important
+ = important
O = Neutral
- = unimportant
-- = very unimportant

Table V: Ferry port terminal - special facilities

Ferry Basic On-board Facilities Preferred providers and perceived importance according to Ports, Regions and Ferry Operators by number of responses and rating score (out of 100)							
According to	**To be provided by**	+ +	+	O	-	--	Total
26 Ports 52 Responses	Port Authority						
	Port Operator						
	Ferry Operator	34 (44)	34 (44)	9 (11.5)			77 (98.7)
	Government						
	Private Third Party						
	Combination	1 (1.3)					1 (1.3)
	Total	35 (45)	34 (44)	9 (11.5)			78 (100)
4 Regions 8 Responses	Port Authority						
	Port Operator						
	Ferry Operator	8 (67)	2 (16.7)	2 (16.7)			12 (100)
	Government						
	Private Third Party						
	Combination						
	Total	8 (67)	2 (16.7)	2 (16.7)			12 (100)
7 Ferry Operators 14 Responses	Port Authority						
	Port Operator						
	Ferry Operator						21 (100)
	Government	11 (52)	5 (23.8)	4 (19.0)	1 (4.8)		
	Private Third Party						
	Combination						
	Total	11 (52)	5 (24)	4 (19.0)	1 (4.8)		21 (100)

+ + = very important
\+ = important
O = Neutral
\- = unimportant
-- = very unimportant

Table VI: Ferry basic on-board facilities

Ferry Port Terminal - Special Facilities Preferred providers and perceived importance according to Ports, Regions and Ferry Operators by number of responses and rating score (out of 100)							
According to	To be provided by	+ +	+	O	-	--	Total
26 Ports 52 Responses	Port Authority						
	Port Operator						
	Ferry Operator	5 (5.1)	24 (24)	25 (25)	23 (32)	17 (17)	94 (94.9)
	Government						
	Private Third Party					3 (3.0)	3 (3.0)
	Combination			2 (2.0)			2 (2.0)
	Total	5 (5.1)	24 (24)	27 (27)	23 (23)	20 (20)	99 (100)
4 Regions 8 Responses	Port Authority						
	Port Operator						
	Ferry Operator			6 (50.0)	(16.7)	1 (8.3)	9 (75.0)
	Government						
	Private Third Party						
	Combination		1 (8.3)	1 (8.3)		1 (8.3)	3 (25.0)
	Total		1 (8.3)	7 (58.3)	2 (16.7)	2 (16.7)	12 (100)
7 Ferry Operators 14 Responses	Port Authority						
	Port Operator						
	Ferry Operator		2 (17.7)	1 (3.8)	12 (46)	5 (19.2)	20 (76.9)
	Government						
	Private Third Party		1 (3.8)	2 (7.7)		3 (11.5)	6 (23.1)
	Combination						
	Total		3 (11.5)	3 (11.5)	12 (46)	8 (30.8)	26 (100)

+ + = very important
\+ = important
O = Neutral
\- = unimportant
-- = very unimportant

Table VII: Ferry port terminal - special facilities

Conclusion

The ferry service offer is provided by a number of different organisations. The various elements of the ferry service offer differ in perceived importance. This study has shown that agreement on both provider and importance is similar for some of the elements, but varies widely among other elements. For those elements where agreement is large, it can be concluded that this is the standard or core view of what a ferry service is to contain. This applies not only when setting new services, but equally when modifying existing ones.

Despite widespread agreement on the nature of provision of services, there are some areas where opinions differ, such as the provision of linkspans. In a multinational survey, there are likely to be not only differences in corporate culture, but also in national culture. The overall impression of the results is one of the 'middle way', where respondents overall are not strongly in favour of government involvement (for example, only 3 out of 244 responses indicate that government should provide basic terminal facilities such as terminal buildings at ports), nor are they in favour of a heavily devolved privatisation with focus on a limited core business (there is little support for the provision of services by independent third parties). Other areas of transport, sometimes as a result of privatisation, have had to reassess the nature of their core business and responsibilities.

References

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The competitive environment of a service industry: the example of the UK-Continent passenger sea ferry services

by

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The competitive environment of a service industry: the example of the U.K.–Continent passenger sea ferry services

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The paper examines an international service sector (passenger sea ferry services between the U.K. and continental Europe) from the perspective of its competitive environment. Porter's five forces model forms the basis of the analysis of the market illustrated by recent developments. Within this context the barriers to entry into and exit from the market are considered in detail. Recently, there have been many changes in market structure, and with increased competition, including that from the Channel Tunnel, it may be necessary to pool services. This will improve ferry competition with other forms of transport, but will require the brand awareness of ferries to shift from the ferry company to the ferry service offer. The service offer will need to be more clearly defined.

1. Background

The need for services to transport passengers by sea from the U.K. to Continental Europe has existed for a very long time, and irregular ferry services have been offered from Dover to the Continent since time immemorial. Regular passenger ferry services from the United Kingdom to the Continent have been in operation since the 1830s mainly as a result of the railways wanting to extend their services [1]. About one century later, on 15 April 1930, the Townsend brothers started the first regular car ferry service [2] from Dover to Calais. Other operators followed rapidly, as this enabled the growing number of motorists to travel by sea in the same vessel as their car; before this cars had to go separately by freighters, as passenger ferries were not allowed to carry them.

Over the last sixty years car ownership has grown dramatically. In 1993, 77.4 per cent of UK households owned a car [3], and the decision to take the car abroad for visits, holidays or business is made by more and more people. The actual quantity of ferry services bought and sold in 1992 on major U.K.—Continent ferry routes was 29.69 million passengers [4]. Passenger capacity deployed in the English Channel in January 1993 was 56384 on a total number of approximately 32 vessels trading between G.B. and France and Belgium [5]. In 1992, on the U.K.—Continent ferry services 3.4 billion passenger kilometres were recorded [4]. It is clear that the ferry service offer is not just the ferry, but includes both the port of departure and the port of destination: the route. The ferry routes have remained largely the same over the years. Evidence submitted to the U.K. Monopolies Commission [6] showed that cross-Channel car ferry services were provided by conventional vessels sailing between Dover and Calais/Boulogne/Dunkirk/Zeebrugge/Ostend, between

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van Holland/Ostend, between Felixstowe and Antwerp/Rotterdam, between Newhaven and Dieppe, between Southampton and Le Havre/Cherbourg, and between Ramsgate and Calais. Almost 20 years later the U.K.—Continent passenger ferry companies operated the same routes. The number of passengers carried on these main routes from 1988 until 1992 are shown in table 1. Passenger carryings on all routes are highly seasonal.

Whereas the cross-Channel routes have remained more or less the same, and additional routes have been mainly created for the longer distances, the ferry operators have changed considerably over the last 20 years. The main ferry operators in 1993 were P&O European Ferries, Stena Sealink, Brittany Ferries, Sally Line, S.N.C.F., Olau Line, and Regie voor Maritiem Transport. By contrast, in 1994 the four operators of cross-Channel car ferry services were the British Railway Board (operating conventional ferries under the trade name 'Sealink' and its hovercraft services under the trade name 'Seaspeed'), European Ferries Ltd, Southern

Table 1. Passengers U.K.—Continent 1988–1992 (numbers carried in thousands).

Origin	Destination	Operator	1988	1989	1990	1991	1992
Dover	Boulogne	P&O	303	980	1182	1081	1056
	Boulogne	Hoverspeed	560	568	529	434	218
	Calais	Hoverspeed	1180	1147	1127	1246	1231
	Calais	P&O	3000	5246	5790	6297	7412
	Calais	SNAT	4587	4262	3963	4207	5409
	Dunkerque	Stena	33	43	39	48	0
	Ostend	RMT	2097	1867	1895	1869	2170
	Zeebrugge	P&O	511	854	933	796	266
Felixstowe	Boulogne	Hoverspeed	0	0	0	0	538
	Boulogne	Stena	1110	1134	1219	1249	0
	Zeebrugge	P&O	358	408	402	458	472
Harwich	Esbjerj	DFDS	345	300	289	272	250
	Gothenburg	DFDS	280	258	237	245	216
	Hamburg	DFDS	195	196	207	205	203
	Hook of Holland	Stena	1013	1073	1037	1003	1134
Hull	Rotterdam	NSF	482	560	610	631	60
	Zeebrugge	NSF	253	323	380	405	404
Newcastle	Bergen	Color	87	92	88	119	134
	Esbjerj	DFDS	52	26	25	22	22
	Gothenburg	DFDS	27	24	23	23	22
Newhaven	Dieppe	Stena	862	923	833	723	738
Plymouth	Roscoff	Britanny	338	409	507	546	438
	Santander	Brittany	96	134	150	149	131
Poole	Cherbourg	Brittany	159	248	438	507	438
	Caen	Britanny	699	877	988	951	1098
	Cherbourg	P&O	575	639	601	656	633
	Le Havre	P&O	640	705	768	761	760
	St Malo	Brittany	396	455	499	486	440
Ramsgate	Dunkerque	Sally	1557	1474	1508	1730	1860
Sheerness	Vlissingen	Olau	680	671	804	851	806
Southampton	Cherbourg	P&O	1	2	0	238	521
		Total	22831	26255	27200	28303	29612

Source: Information Research Network (1993).

Ferries Ltd, Hoverlloyd Ltd, and Regie voor Maritiem Transport [6]. All of these ferry lines have been taken over by others or have formed new strategic alliances.

2. The competitive environment

Porter [7] made a major contribution to the understanding of the competitive environment by identifying the nature and intensity of competition within any industry and how it is determined by the interaction of the five key forces, which are threat of new entrants, bargaining power of buyers, bargaining power of suppliers, threat of substitute products, and internal rivalry among competitors. These are considered in the context of the markets associated with short sea ferry services.

2.1. *Threat of new entrants*

New entrants into the ferry market are encouraged or discouraged by both entry barriers and exit barriers. Entry barriers may be low but when it is difficult to exit the market easily the decision to enter the market may have to be abandoned. Major sources of barriers to entry have been identified by Porter [8] as economies of scale, product differentiation, capital requirements, one-time switching cost to the buyer of changing suppliers, access to marketing channels, cost, government policy, and expected competitor response.

2.2. *Economies of scale*

The requirement to have many ships or just one, or to have very large or small ships, varies from route to route; some services require frequent sailings (e.g. Dover—Calais), whereas other services have very infrequent services which cease to operate off-season (e.g. passenger services between Plymouth and Roscoff, France). Problems of scale economies can be overcome by pooling arrangements between operators, which allows them to provide a more frequent service on a particular route (e.g. Sally Line and the Regie voor Maritiem Transport on the Ramsgate—Ostend route).

2.3. *Product differentiation*

Product differentiation is often associated with brand awareness. In the U.K.—Continent ferry market, promotion of the different ferry companies has resulted in brand awareness among the public of operators' names (e.g. P&O), but the services are not generally perceived to be greatly different between operators of the same type of conventional ferries. First class operators are not able to demand premium prices, since customers are not willing to pay more for what is seen as essentially the same service, as can be illustrated by the August 1993 and January 1994 price war between Stena Sealink and P&O European Ferries on the Dover—Calais route. Brand awareness tends to be associated with shipping lines rather than services, except in the case of certain fast ferries (eg. Seacat).

Service levels and the number of facilities vary not only between operators but also within operators on the same route [9]. Ferry operators do not appear consciously to seek to differentiate their facilities (e.g. checking-in, bars, cabins). Although there is a degree of consistency amongst ferry operators regarding the total service on offer there are significant differences which cannot be explained by obvious variables, such as distance travelled, travel time, route, or even operating company. Because of the large indivisibilities of expenditure associated with the purchase of a new, or even refurbished ship, provision of many facilities may have much to do with the year of purchase, rather than with any specific marketing policy.

For a particular booking the influence of any single buyer is likely to be low. For example Brittany Ferries claim that no customer of whatever type has more than 3% of their business (Lloyd's List, 19 September 1992). P&O European Ferries reported 2 481 444 separate bookings in 1992, with an average number of 6000 bookings per day increasing to 12 000 per day during the peak season [10], although much of the business is through travel agents.

2.4. *Capital requirements*

Investment can be made in ships, terminals and shoreside facilities, and in port infrastructure. Usually ferry operators are involved with the investment in ships only, the terminals and other facilities including the infrastructure being provided by local or national port authorities. However some ferry companies own their port facilities, e.g. Stena Sealink in Dover, Harwich, Fishguard and Stanraer. Others own just the terminal and buildings. The size of the investment can vary from large (in the case of a specially designed newly built ship) to relatively small (when a ferry is purchased second-hand or chartered from another company). Dover Straits vessels have generally been new rather than second hand. Ports are often competing heavily to attract ferry services, and are willing to provide the terminals and facilities in exchange for port dues. An operator, thus, may not need to make any investments in infrastructure. Opening new routes may be more costly, particularly when the infrastructure does not exist, and local authorities are unwilling or unable to make the appropriate investments. This may deter the opening of a route altogether; for example a feasibility study by the Olau Line into a route from Falmouth in Cornwall to Spain showed that the investment required to provide the port facilities, aggravated by the poor road infrastructure leading to Falmouth and a possible sailing schedule of two or three times a week, was too big to guarantee a reasonable return [11].

Finance facilities are widely available in shipping, including bank credit of up to 100% with little collateral for a newly built ship, subsidies and grants from national and local governments, and partnerships with the governmental regions served by the ferry company. For instance, Brittany Ferries has created, since the 1980s, new ship-owning companies in which local authorities in its area of operation were invited to take a major capital stake. An example is Senecal (Société Économique Mixte d'Armement du Calvados), a company formed by the French governmental regions of Normandy and Calvados together with Brittany Ferries, which owns the ferry 'Duc de Normandie' and operates it on the route Portsmouth—Caen (Lloyd's List, 12 May 1992).

2.5. *Switching costs*

Switching costs are incurred when modifications to the existing service are made. Switching costs are low when changes on an existing route are made to the service level (e.g. number of sailings). The switching costs are also low when changing the number of vessels operating on a particular route, because of operational flexibility and the availability of vessels in the charter market. Cost are likely to be high when abandoning a route completely, and when establishing a new one, especially when the port infrastructure (e.g. terminal buildings, or access ramps) has to be written off, factors to consider.

2.6. *Access to marketing channels*
Access to the traditional, well-established marketing channels (mainly travel agents) is useful for a system of advance booking, but has little value for a system of 'turn up and go' (i.e. no advance booking) where customer awareness can only be achieved by national promotion. The 'turn up and go' policy of Eurotunnel may increase the demand for this approach on the ferries, which in turn may require a greater customer awareness of the route service rather than of the shipping line.

2.7. *Cost*
Modern technology is available at a cost. For instance, high speed catamarans with the latest equipment can be ordered at a variety of shipyards; conventional and existing vessels can be upgraded and refurbished to the latest requirements. The successful running of a ferry business can often be contracted out with the management of the ships undertaken by an independent ship management company for an all-in fee. The shops, restaurants, bars, and entertainment facilities can also be contracted out. The learning or experience curve for much of the service activity is therefore very low and the cost advantage is there from the start of the operation.

2.8. *Government policy*
National U.K. and European Union policies advocate competition and offer no formal barriers to entry. However, as mentioned earlier, regional governments may undertake joint ventures with ferry companies.

2.9. *Bargaining power of buyers*
The power of the buyers is determined by their concentration, the significance of their costs, the degree of differentiation of the service, the buyers' potential for earnings, and the degree of vertical integration.

2.10. *Concentration of buyers*
The ferry industry relies heavily for its bookings on travel agents. For example Brittany Ferries gets 62% of its business through travel agents (Lloyd's List, 23 September 1993). Nevertheless, no travel agents are able to dominate the marketing channel. P&O European Ferries has 8000 U.K. agents, 4000 French agents, 7500 German agents, 1060 Belgian agents, and 3100 Dutch agents booking with them (Powis 1993). Large customers for P&O European Ferries include the Automobile Association (AA), Caravan Club, Eurocamp, Keycamp, Royal Automobile Club (RAC), and Westbury Travel [10]. In 1991 Sealink Stena Line carried close to 11 million passengers, of which nearly 75 per cent booked through travel agents (Lloyd's List, 25 September 1992).

2.11. *Significance of buyer's cost*
The price of a ferry crossing varies dramatically but calculations usually depend on the following five factors: the country where the booking is made, the fare type, the market type and sector, the route, date and time of sailing, and the duration between outward and return legs. According to Powis [10] these factors will vary from having

a day return trip).

2.12. *Potential for earnings by buyers*
The level of bookings by travel agents determines the level of commission. Larger agents may be able to exert some pressure in low seasons or periods of low utilisation (e.g. night crossings) for higher margins or discounts.

2.13. *Potential for vertical integration*
Some ferry companies (Hoverspeed, Stena Sealink) own their own travel agencies. Brittany Ferries is an example of successful vertical integration. It was set up by farmers in Brittany wishing to sell and transport their produce to the U.K. market, combined farming with sea transport, and consequently controlling a larger part of the distribution channel. This freight-only ferry subsequently offered a regular passenger service.

2.14. *Suppliers*
The main equipment supplier categories for shipping in general, and for ferry services specifically, are ship-builders, engine manufacturers, and other component contractors. These suppliers compete heavily amongst themselves in the world market for business, particularly during the current period of general recession. In some countries the government provides support for its own ship-building and equipment supply industries. Ships also require bunkers (fuel) and stores at frequent intervals. The bunker market is international in nature but the ferries operating on a specific route are at a disadvantage if they are the only vessels calling into a specific port. Extra charges for refuelling may be incurred as well as higher prices for particular fuel types. A general strategy is to buy stores in bulk for the whole of the fleet, ensuring the maximum possible discounts and level of service.

Another type of supply to ferry companies is the port and associated facilities. Ports are keen to compete with each other to attract and retain the ferry business, as shown, for example, by the reduction of port charges in Dover of 10% in 1992 with cash rebates for higher traffic (Lloyd's List, 21 March 1993). Even ports on long established routes may not be competitive, as shown by the closure of the Boulogne route (5 January 1993) on which service P&O European Ferries carried 1 050 000 passengers, 151 000 tourist vehicles, and 2500 commercial vehicles during its last year in 1992. The closure lost the port of Boulogne a turnover of FF25m.

2.15. *Substitute products*
The key to evaluating the position of existing or potential substitute products is to examine the substitute in relation to the market's needs and wants [12]. The substitute is frequently an application of a new technology to an old task, for example fast ferries (high speed catamarans) replacing conventional ferry ships. The substitute may be technologically unstoppable, such as airplanes replacing ships for long distance travel. The only sensible response to such a major technological development is to reposition the industry product. Some passenger ships went from serving ocean travellers to serving the cruise market, so that their product shifted from travel and recreation to recreation only. The U.K. ferry industry has as its main substitutes the Channel Tunnel, the airlines and other shipping modes.

The Channel Tunnel can do what ferries do, but is fixed to one route only and lacks the flexibility in port of origin and port of destination. Figures vary but it is anticipated that the Channel Tunnel with its shuttle trains will take away over £300m from the ferries. Using 1992 estimates, an expected annual revenue of £633m is likely to be generated: £360m shuttle, 256m other trains, and 17m ancillary services. The managing director of Stena Sealink stated that half of the £600m Channel ferry business would be lost to the Tunnel. Based on existing market share P&O Ferries would lose £145m, Stena Sealink £45m, SNAT £45m, Sally Line £35m and Hoverspeed £30m (Lloyd's List, 1 March 1993).

The main disadvantage of airlines compared to ferries is that the motorists cannot take their vehicles with them. A comparison of air and sea travel (see table 2) shows a dramatic growth of air travel in the 1980s from the U.K. to all European destinations.

The traditional, conventional ferry which carries passengers and accompanying cars, foot passengers, coaches, and lorries, is a multi-functional vessel which can adapt fairly fast to changes in demand by reallocation of the multi-purpose spaces. Specialized vessels on designated routes e.g. passengers and motor cars only, or freight only, with driver facilities, will have a cost advantage over the conventional multi-purpose vessels. A trade-off between flexibility and cost has to be estimated for optimal configuration; for instance, the use of a formerly freight-only vessel to help in the peak season to carry the larger demand of passengers has been successfully adopted by ferry operators such as Brittany Ferries. Another example is the use of cargo ships with limited passenger capacity, such as the service to Helsinki provided by United Baltic from Hull and Finncarriers from Purfleet.

2.16. *Competitors*

Competition can be viewed from the industry's perspective with companies offering the same type of service, or the market's perspective with companies trying to satisfy the same type of customer need, or serve the same customer group. The former view

Table 2. U.K. passenger movements to Near Europe by air and sea.

	Market share (%) 1989		Growth (%) 1980–89	
Destination	Air	Sea	Air	Sea
France	8.8	22.4	107	36
Belgium and Luxembourg	2.0	3.4	67	−17
Netherlands	4.0	4.1	59	10
Germany	6.9	6.2	48	30
Spain and Portugal	20.4	2.0	116	74
Denmark	1.1	0.6	36	−22
Rest of Scandinavia	3.1	1.0	71	14
Austria	1.5	1.0	305	79
Italy	5.3	1.6	25	29
Switzerland	4.0	0.6	36	−22
Total	57.2	42.8	81	25

Source: Department of Transport (1991), *Transport Statistics Report* (London: HMSO).

industry [13]. This shows that the competitive dynamics are influenced initially by supply and demand, which in turn determine the industry structure, conduct, and performance. The latter view has been advocated by Levitt [14], giving as an example the railway companies which competed on the basis of the former view and looked at other railway companies as their main competitors, whereas they should have realized that the customer was looking for 'transport' and thus comparing trains with buses, planes and cars.

The intensity and rivalry among competitors, as identified by Porter [8] and Daems and Douma [15], is largely determined by the degree of concentration: the number of competitors and their respective market share, the degree of product differentiation, the development of the industry, the structure of costs, the size of capital investment in capacity variations, the size of overcapacity, the exit barriers, and the degree of uncertainty of technological and cost developments. Exit barriers identified are the need to sell assets, contracts and arrangements, political pressure, personnel, market share, vertical integration, and information and emotional barriers.

2.17. *Exit barriers*

The second-hand market or, as a last resort, the demolition market, is easily accessible. A wide network of shipbrokers, intermediaries dealing with the second-hand trade in ferries, will be able to get the best deal given the economic circumstances. Ship prices fluctuate heavily and a substantial loss or gain could be achieved. An alternative would be to charter the vessel out to interested parties. A limitation to these activities is that ferries are often specially designed for a particular route. For instance, the restriction on the length of vessels able to enter the docks in Hull, or the ramp configuration to enable embarkation and disembarkation of vehicles at all tides, or the number of passenger cabins and other facilities required, determine the suitability of the ships on other routes, with or without substantial modifications. This, in turn, influences the time it takes to sell the ship and the price it may fetch.

It is far more difficult to sell the shore-based facilities, unless a competitor is interested, which would be unlikely if the current operator had to cease operating the route because of low demand. In return for certain concessions from governments, local or national, such as sole operating rights on a particular route, or subsidies and grants received, it may not be possible to stop operating a route entirely. A similar difficulty occurs when pooling arrangements are to be modified. For example, in January 1992 Hoverspeed asked for a local council loan of £500 000 (Kent County Council £400 000 and Shepway District Council £100 000) for its Folkestone—Boulogne Seacat service (Lloyd's List, 10 January 1992).

Employment regulations may also hinder a fast and cheap exit. Redundancy payments may exceed the gains made from moving out of a low return or loss-making market. For example, during January to August 1992, severance payments for the Stena Sealink reorganization came to SKr219m (Lloyd's List, 25 February 1993).

In order to maintain an overall presence or share in the market it may sometimes be better to maintain a low return or loss-making route. Concern about the retail market in the Channel may also delay exit from the market. Retailers (e.g. travel agents) are often affiliated and rely on the ferry service for their survival.

... profits and losses may not reveal the extent of the losses and why they occur. For instance, when Stena bought Sealink a few years ago, they suffered heavy losses in the U.K. market almost threatening the whole of their company. They were then compelled to introduce a three part plan consisting of reducing costs, increasing investments in new ships, terminals and routes, and implementation of a business plan resulting in staff reductions of over 1800 out of a total of 6000 employees, closure of the Folkestone—Boulogne route, a wage freeze until 1993, and renegotiation of employment terms for the remaining staff, with the co-operation of the unions and without strikes in return for a profit sharing scheme. Staff costs now represent 26% of turnover (in 1990 they were 41%), and productivity on the Dover—Calais route has gone up by 25% (Lloyd's List, 11 March 1993).

Some ferry companies are still under family control, often traditional shipping families, so that human sentiments influence the decisions to sell ships and close routes. For example, the Olsson family controls 60.5% of the share capital and 80.2% of the voting rights of Stena Line (Lloyd's List, 25 February 1993).

3. Summary and conclusions

The U.K.—Continent ferry industry is an important, rapidly changing, highly competitive, and unpredictable business. Although the particulars of routes (e.g. frequency, type of ship) change frequently, the routes themselves remain fairly static. The paper has illustrated a number of barriers to entry and exit associated with the sector. Changes in operators on routes, nevertheless, do take place. A systematic approach to marketing has tended to be neglected by the sector with scant attention paid to brand awareness associated with the service. Instead, the brand name is usually associated with the shipping company. Little attention is paid to consistency in the service offer. The opening of the Channel Tunnel is likely to compel the ferry operators to adopt a more professional marketing approach to maintain market share. Some ferry operators already pool services and this is likely to increase entry and exit barriers, but, at the same time, allow greater route and service flexibility within the ferry operating system. The brand awareness will need to refer to the pooled service offer rather than to individual ferry companies.

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