

RAPPORT 1215

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STX OSV

Supplier Analysis



MØREFORSKING
MOLDE



Høgskolen i Molde
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Short Summary

Previous analysis has shown that the five STX OSV shipyards in Norway had a purchase share of turnover of 84 percent and 77 percent in 2009 and 2010, respectively, and Norwegian suppliers constituted 67 percent and 66 percent of total purchased value during those same years. The supplier part of the maritime industry has become the largest group of actors. To elaborate and verify own supplier strategies, STX OSV contacted Møreforskning Molde (MFM) to perform studies on empirical financial data of regional shipbuilding suppliers. During the past few years, STX OSV has developed or acquired its own supplier companies within the design, electro installation, piping and accommodation areas.

MFM has been gathering empirical data from regional maritime suppliers since 1987.

The first part of the report discusses the successful development of this industry during the past 25 years, with STX OSV becoming the largest shipbuilder and owner of a comprehensive group of supplier companies.

The study on empirical data concentrated on ship equipment suppliers, which comprises the largest subgroup. Further categorisation is based on assigned scores for product complexity and competence intensity. The analysis proves that supplier companies with complex products and the highest competence showed improved growth and profitability. Smartness pays off!

The last part of the report uses the methods and theories of Dr Peter Kraljic to analyse and classify suppliers according to supply risk and profit impact. The main findings show that as much as 83 percent of total purchasing value is categorised as strategic items that demand close co-operation with suppliers. Relevant purchasing strategies for different categories of suppliers are discussed.

Preface

STX OSV is the largest Norwegian shipbuilding group. The company operates five yards in Norway and shipbuilding activities in Romania, Vietnam and Brazil. During the past few years, this industry group also entered into supplier activities, and ship design, ship installation activities and ship equipment have become considerable aspects of its current activities.

To elaborate and verify own supplier strategies, STX OSV contacted Møreforskning Molde (MFM) to perform studies on empirical financial data of regional shipbuilding suppliers.

The two parties created a common project team consisting of:

- Anne Seth;
- Sasan Moghaddam;
- Terje Ona; and,
- Ronny Furstrand

from STX OSV and

- Oddmund Oterhals, Research Director Logistics, MFM (project leader);
- Bjørn Guvåg, Associated Professor, Molde University College; and,
- Gøran Johannessen, researcher, MFM.

The project received sponsorship from the Research Council of Norway through the VRI programme and is partly funded by STX OSV through a combination of cash payment and project work.

The report was edited by Oddmund Oterhals and Bjørn Guvåg (theoretical platform, maritime cluster, discussion and conclusions). Gøran Johannessen (empirical study) and Sasan Moghaddam (strategic analysis of suppliers) contributed by writing parts of the report.

The authors are solely responsible for all viewpoints, analyses and conclusions.

Molde, December 2012

Oddmund Oterhals, project leader
On behalf of the authors

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1 INTRODUCTION – BACKGROUND

1.1 Background

STX OSV is a key player in the Norwegian shipbuilding industry, constituting approximately 40 percent of total turnover from Norwegian shipyards. The period since the middle of the 1990s has been characterised by global sourcing and an increasing amount of purchases from low-cost countries. At the same time, however, focus on integration and cooperation with local suppliers has increased. In 2011, MFM and STX OSV conducted a study that showed that as much as 66 percent of total purchasing costs are derived from Norwegian suppliers, and a close cooperation exists between shipbuilding activities and suppliers. During the past few years, STX OSV entered into both design and supplier services through a combination of establishing own industrial activities and by acquiring suppliers. This change from a focus on shipbuilding and outfitting toward more design and supplier activities was based on purchasing strategies that STX OSV wanted to verify through a common study with the research team from MFM.

Since the late 1980s, MFM has been gathering systematic financial data within the regional maritime cluster in Møre and Romsdal County. These time series data show the evolution of a supplier industry that has strengthened over time. Today, from a global perspective, this ship equipment industry is the strongest part of the maritime cluster.

1.2 Main objectives

STX OSV's main objective is to achieve a better understanding of the supplier industry as an input to the development of own purchasing strategies and the scope of own participation in supplier activities. Evolution paths, status and trends regarding growth and profitability for the supplier segment of the industry form a better foundation for own strategic judgments.

This study represented an opportunity for MFM to engage in a comprehensive analysis of evolution paths for separate groups of suppliers according to chosen principles of classification.

Because this shipbuilding group is a leading global and national actor within the offshore and specialised vessel shipping segment, these results will also be of interest in a broader scope.

1.3 Research topics and approach

The starting point of this study goes back to the analysis of STX OSV's suppliers that MFM performed (Oterhals, Johannessen and Hervik 2011). This study showed that the calculated the Norwegian proportion of purchased goods by STX OSV constituted 67 percent and 66 percent of total purchased goods in 2009 and 2010, respectively. Total purchases for 2009 and 2010 came to 84 percent and 77 percent, respectively, of the net turnover during those years. The Møre and Romsdal supplier industry delivered as much as 42 percent of the total supply.

A high proportion of regional sourcing, along with the on-going value chain configuration debate, led to a desire for a more thorough analysis of good and services suppliers to the shipbuilding industry in general and to STX OSV in particular.

In addition to managing a single company, the focus of the last decade has shifted toward what is known as supply chain management. The ability to categorise, organise and manage relationships with suppliers (and customers) in the best possible manner is important to managing a company's supply chain.

During the past 25 years, MFM has carried out analysis of the maritime industry in Møre and Romsdal county (the Møre and Romsdal maritime cluster¹). During the same period, a strong and international competitive supplier industry emerged. In 2010, the supplier industry contained 155 companies and represented NOK 20.3 billion in turnover. The MFM database provides the foundation for the analysis of the developmental characteristics and structure of the maritime supplier industry.

STX OSV sought to enrich its knowledge base on the status and trends in supplier companies with regard to, for example, development in turnover, profitability and growth, among others. Together with STX OSV's own purchase-supplier database, this knowledge created the foundation for strategic judgment and initiative in relation to both the configuration of the value chain and the development of analytically sound supplier strategies.

According to Van Weele (2005), the purchasing function traditionally encompasses the buying process. The focus is on structuring and continuously improving the purchasing processes within the organisation and between the organisation and its suppliers.

Because the proportion of the value of purchased goods in relation to the total value of a product often ranges from 50 to 90 percent (77 percent in STX OSV in 2010), purchasing obviously has a considerable effect on a company's profitability and can contribute to improvements in the bottom line in several ways (Van Weele 2005, Brynhildsvoll and Abrahamsen 2002, De Boer, Labro and Morlacchi 2001).

Together with internal data from STX OSV and data from MFM, this paper draws on well-known theoretical models and concepts and shows how these constructions can help organise and manage buyer-supplier relationships at STX OSV. Theory is used as the foundation for categorising suppliers and outlining and tailoring purchasing strategies for the suppliers investigated. The strategies, along with buyer-supplier-specific theory, serves as a framework for how multiple buyer-supplier relationships at STX OSV may be categorised, organised and managed.

The importance of this work is reflected in Lambert, Cooper and Pagh (1998), who claimed that the successful integration and management of key business processes across members of a supply chain determines the ultimate success of a single enterprise. The purpose for developing purchasing and supply strategies is related to the importance of influencing the balance of power in a buyer-supplier relationship and to take advantage of the proximity and the relationship's governance structure allowed by the cluster. The concept of a purchasing portfolio provides results that can be used to develop and implement differentiated purchasing strategies for different supplier relationships (Gelderman and van

¹ The term 'cluster' is used to describe a geographic concentration of interconnected businesses, suppliers, customers and related institutions within an industry.

Weele 2002, Kraljic 1983). The purchasing portfolio approach is a guide for developing, implementing and managing purchasing strategies. Not all buyer–supplier relationships are managed similarly. Even though the purchasing portfolio matrix is based on the notion that a customer exerts maximum purchasing power whenever he or she can (Harrison and van Hoek 2005), a broad understanding exists that buyer–supplier relationships should be handled in many different ways (Gelderman and van Weele 2002).

Regarding operational professionalism, purchasing portfolio analysis has become the dominant approach and the Kraljic matrix has become the standard (Gelderman and van Weele 2005). The Italian shipyard Fincantieri is referred to as a state-of-the-art shipyard in supply chain management (SCM) because of its use of supplier portfolio management and the Kraljic model (Mello and Strandhagen 2010).

The Kraljic contribution is a two-dimensional model that measures supply risk and profit impact. Appendix 1 provides a brief explanation of the Kraljic methodology.

A discussion on the factors used to measure the supply risk dimension and the profit impact dimension has existed and will always exist. The discussion concerns the factors to measure, how many factors to measure and the weighting of the factors.

No simple blueprint exists for a portfolio analysis application. Gelderman and van Weele (2003) provide a thorough discussion of this theme.

Chapter 5 describes the approach of this study. The factors and the weightings were subject to several discussions and changes were made. As they stand, the factors are the results that reflect an approximation based on healthy and professional judgments.

The Kraljic matrix has been used to categorise the products according to the SFI² product classification and on suppliers as such. This paper discusses only the results for the SFI groups.

Strategies are discussed as a result of categorisation of products and/or suppliers into the four quadrants in the Kraljic matrix strategies. Many approaches exist to tailor the strategies to the different quadrants. In chapter 5 (table 2), strategies are linked to the different quadrants based on Caniels and Gelderman (2005), Gelderman and van Weele (2003) and Fleischer et al. (1999).

During the process of categorising and classifying suppliers and products and, accordingly, allocating appropriate purchasing strategies, another method – in addition to the purchasing portfolio matrix – may be used to outline or adjust the importance of different suppliers and products and to correct and/or support the findings of a purchasing portfolio analysis. The method, known as ABC analysis or the ABC technique (Brynhildsvoll and Abrahamsen 2002), typically focuses on only one dimension, purchasing cost. To map the supplier base properly, another dimension – the importance of the supplier – was introduced.

This study conducted an evaluation of the 121 key suppliers using ABC analysis. All suppliers were categorised as A (key), B (good for relationships) and C (insignificant importance) suppliers based on a qualitative assessment by a group of key purchasing staff (chapter 5.2).

² SFI is a product categorisation system for the shipbuilding industry.

The next step for STX OSV to perform was a discussion of the results from the numerical step of the portfolio matrix analysis and the ABC analysis, and to propose and adopt a suitable strategy for each supplier, including suggestions for how to organise its different supplier relationships.

Evaluating each supplier and finding suitable strategies was accomplished by using the available resources for comparison and evaluation, such as the ABC analysis, portfolio matrix weighting and STX OSV guidelines and objectives.

1.4 The report

The next part of the report contains an overview and description of the contributing actors and the evolution of the total shipbuilding industry in Møre and Romsdal from 1987 until today. This description shows the impressive development of a world-leading industrial cluster based on co-creation of value between regional shipowners, ship designers, suppliers and shipbuilders.

Chapter 3 contains a description of the actual supplier classifications to analyse the individual development and status for separate groups of suppliers. The main classification principles chosen were based on the classical value chain principles and a classification based on product complexity and competence intensity.

Chapter 4 presents the main empirical analysis of this study. This chapter uses the classification of suppliers from chapter 3 and the empirical data from regional maritime suppliers gathered since 1987 to analyse empirical financial data on regional shipbuilding suppliers.

The next section presents a strategic analysis of STX OSV's suppliers based on the theoretical framework provided by Kraljic's purchasing portfolio matrix (Kraljic, 1983). This matrix categorises suppliers based on their supply risk and effect on profits.

The final part of the report contains a brief discussion of the findings and results from this project work.

2 DEVELOPMENT OF THE MARITIME CLUSTER

This chapter presents background information and trends in the maritime industry. This information does not claim to represent the entire maritime industry in Norway or, for that matter, the global maritime industry. First, the information represents a part of the data that was collected and analysed by MFM over the last 20 years. The data also represent and depict the emergence of the maritime cluster or industry in Møre and Romsdal county.

The maritime industry, primarily located in the northwest region of Norway, has managed the transition from a traditional shipbuilding industry with low to medium complexity and competence to medium to high complexity and competence. The industry went from design and production of traditional fishing boats and ferries at the end of the 1970s to the engineering and production of advanced factory trawlers, research vessels and other vehicles, to the highly complex multifunctioning and multipurpose offshore vessels of today.

The industry has shown a remarkable ability to be innovative and competitive, representing the high-end market of the offshore vessel shipbuilding industry.

All over the world, countries, industries and companies are striving to participate in the world's value creation processes and – not the least – the processes to capture the value being created. Throughout the world, the debate about outsourcing has continued for years but became more audible and open after the research projects ended up in the publication, *The Competitive Advantage of Nations* (Porter, 1990). In subsequent years, many countries, including Norway, carried out national research projects to investigate their national competitive advantages and subsequently attempted to define industries that were competitive (Reve, Lensberg and Grønhaug 1992). The Norwegian project concluded that the shipbuilding industry, Norway's oldest competence-based industry, probably was the best example of a highly competitive, knowledge-based industrial cluster.

Today's knowledge-based shipbuilding industry consists of several geographically spread – and product-oriented or specialised – clusters. The maritime industry located around Akershus and the Oslofjord specialises in shipping. In Rogaland, the activity is concentrated around the petroleum and offshore industries. All actors are present in the industry, from Hordaland in the south to Møre and Romsdal in the north. Møre and Romsdal represent the largest industrial maritime region in Norway, excluding the petro/offshore industry (Hervik and Jackobsen 2001). In 2009, the total turnover in the Møre and Romsdal county maritime industry was approximately NOK 50 billion.

Since 1988, Møreforsking Molde (MFM) has performed analysis of the maritime cluster in Møre and Romsdal. This work and the subsequent database are, as mentioned in the research approach (1.3), the foundations of the analysis in this report. Empirical data from these studies from MFM forms the basis for the statistics and comments presented in this document.

As everyone who has been working in or close to the maritime industry knows, the industry's growth during the past twenty years has been remarkable. Although the industry experienced setbacks during short periods, it recovered quickly each time and resumed its growth. The two deepest and most serious setbacks of this century occurred from 2000 to 2004 and from 2008 to 2011. During the first period, Norwegian wages and elements related to the exchange rate weakened its competitive position. Moreover, the disappearance of subsidies to the Norwegian shipbuilding industry in 2000 caused a subsequent decline in orders and production at the shipyards. The most recent decline in

orders and subsequent production during 2008 was caused by the worldwide financial crisis, funding problems and the subsequent cost of funding.

However, the shipyards were also somewhat lucky. High demand for oil and high oil prices triggered demand for exploring new oil fields and for exploiting existing oil fields and new findings. All of these drivers had a positive influence on the demand for offshore vessels.

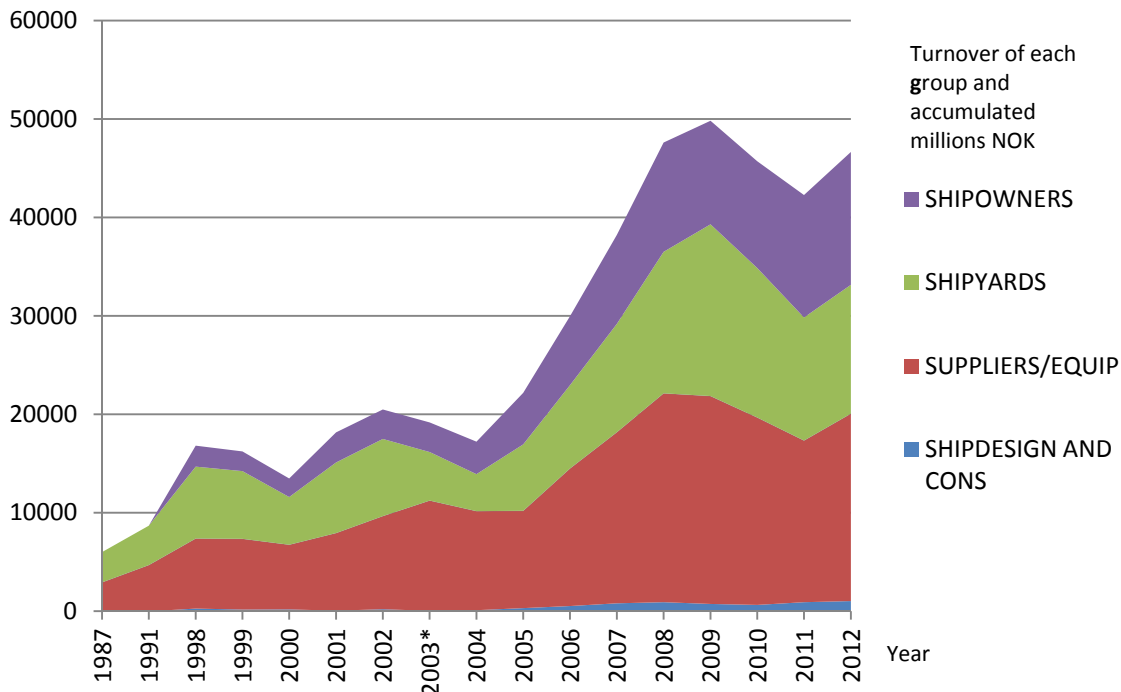


Figure 2.1 Turnover of different value creator groups in the maritime cluster in Møre and Romsdal (1987–2012) in millions

During the past 25 years, total turnover increased from approximately NOK 10 billion to nearly NOK 50 billion in 2009. At first glance, although the different actors or groups of value creators in the value-creation network appeared to have taken an equal share of the industry's growth, this was not the case during the region over a certain period.

Figure 2.2 illustrates how the value creation³ and the growth in value creation were shared throughout the years. Value creation shares changed among the different actor groups during the period. Shipowners went from creating 12 percent of the value in 1998 to nearly 27 percent in 2011. Suppliers have almost the same proportion of value created today as they did in 1998, whereas the shipyards' proportion of value created declined significantly, from close to 45 percent in 1998 to approximately 30 percent in 2011.

Although the figures are only descriptive in nature, they still have some explanatory power. Explanations of the development presented are provided in subsequent section. One will understand that suppliers as a group have gained competitive strength over the years. The number of companies increased, total turnover increased and suppliers became more

³ Turnover was used as an approximation to value creation while it would have been more correct to use total salary + profit.

independent of shipyards in the region. Therefore, suppliers became highly competitive in the global arena within the specialised vessels offshore segment and in other, often high-end segments within the shipbuilding industry.

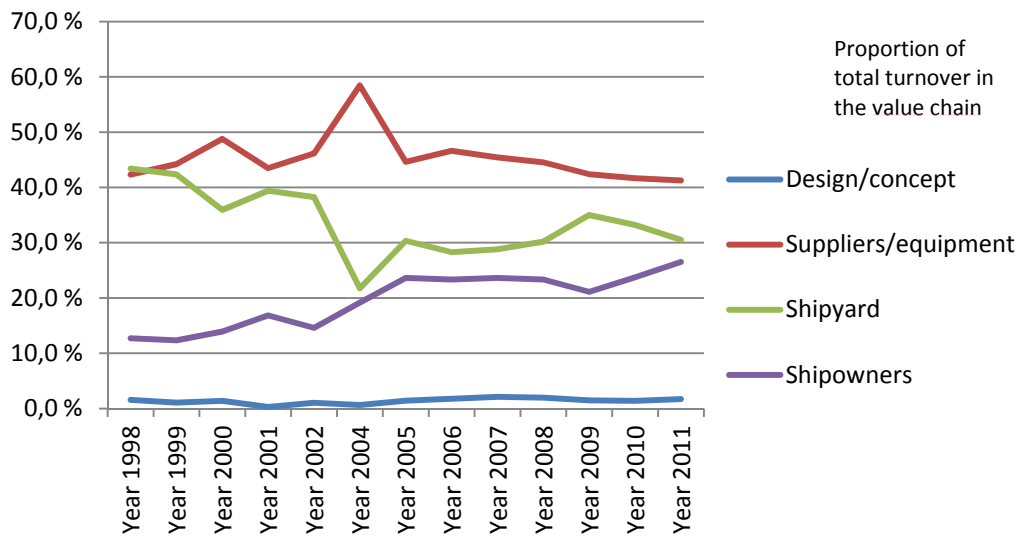


Figure 2.2 Proportion of total value (expressed by turnover) by different groups of value creators in the maritime industry

For a long time, the shipbuilding industry was well integrated and shipyards performed most of the value-added activities. During the 1980s and 1990s, much of the disaggregation or disintegration of the shipyards occurred, and activities were outsourced. These developments partly laid the foundation for the rich, healthy and highly competitive supplier industry that exists today. The value creation process was reconfigured and a strong, competitive value creation network emerged. The outside specialists proved themselves to be more cost effective and responsive in the production of components and in services. In many cases, clusters are a better alternative to vertical integration. A fast-changing environment can render vertical integration inefficient, ineffective and inflexible (Porter 1990).

The disaggregation of the previously integrated shipyards seems to have strengthened the competitive position of the supplier group as a whole and of the individual companies within the group.

The reconfiguration processes are constantly on-going. The in- and outsourcing strategies, as well as the on and offshoring strategies, both influence the dynamics of value creation and value capturing and constitute the same. Since the real emergence of the offshore shipbuilding cluster 30 years ago, some key development characteristics of significant importance fostered the evolution of the maritime cluster in Møre and Romsdal county.⁴

- First, the number of shipowners providing offshore services increased. For instance, the 13 shipowner companies in 1998 increased to 19 in 2010. A characteristic

⁴ Offshoring is a relatively new concept, and is defined as the movement or relocation of a business process at a company in one country to the same or different company in a different country. Outsourcing is the movement of internal business processes to an external organisational unit (Manning, Massini and Lewin 2008).

feature of shipowners is their close downstream relationships with actors of offshore oil and gas exploitation.

- The milieu of naval architects took a leading international position by exporting more than 50 percent of services in 2012. Naval architects also play a mediator role between shipowners and shipyards.
- The shipyards showed a remarkable increase in turnover and productivity based on a combination of outsourcing labour-intensive work, utilisation of global sourcing and professionalization of project execution. This change resulted in an organisational transformation (reconfiguration) from a labour-intensive to a knowledge-based industry.
- During this period, the supplier segment of the shipbuilding industry developed competitive strength (scope and scale) and is today the largest and most significant actor, with 60 percent export share, in this industry.
- During the same period, this industry became global and attracted international actors in all parts of the value chain (for example, Rolls Royce and STX OSV).

Figure 2.3 shows how the value captured (the profit margin) differs among the various groups of value creators and over time. At a macro level, profits fluctuated from changes in trading conditions that affected demand and prices for different goods and services. At a micro level, profits were influenced by the capabilities, strategies and performances of the individual companies. Between these extremities, the industry and the cluster that included all of the actors upstream and downstream in the chain or network of value-creating activities influenced the profits of the focal company.

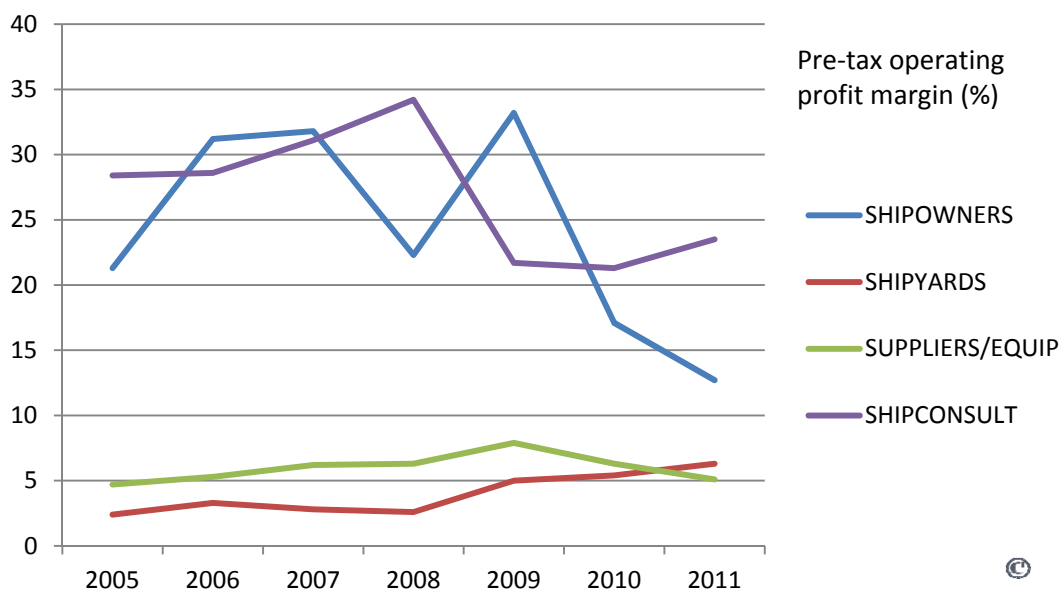


Fig 2.3 Profit margin in different groups of value creators within the maritime industry

Over time, the shipyards experienced systematically significantly lower profit margins than suppliers. The year 2010 was the first year in which the shipyards in aggregate had higher profit margins than the supplier group. Both the shipyards and the suppliers experienced significantly lower profit margins than shipowners, ship consultancies and design companies. Despite the claim or proposition that being part of a cluster allows companies to more productively source inputs; access information, technology and needed institutions; coordinate with related companies; and measure and motivate improvement,

the different groups of value creators have not equally shared this competitive advantage with respect to profit margins.

The diagrams show that the largest maritime cluster in Norway has been successful, as judged by several metrics. The growth in value creation has been remarkable and all sectors in the industry have been profitable even though great variations exist between the different sectors in the value-producing network and between companies within the different sectors.

Some of the drivers behind this successful development are recognised and presented. Understanding the key drivers of the past is also important to understanding the industry's future requirements, the individual companies and the companies' strategy processes.

At present, this industry is facing challenges particularly from the development of new and enhanced shipbuilding capacity in Asia. Moreover, this capacity is currently largely targeting the offshore segment and is certain to, after a while, target its high-end sector. The shipbuilding industry in our region is already facing fierce competition in the lower end of the market, indicating that the actors must decide whether to face this competition or focus product and production on the high end of the market. Focusing on the high end will, of course, reduce the total market size and further affect all actors within the cluster in different ways.

However, as competition intensifies from continuing globalisation, the requirements of the actors within the cluster and for the clusters increase. Individual companies, the cluster in which individual companies belong and the governance structure between companies will face or, more precisely, now face new challenges.

In many circumstances, the cluster as a way of organising transactions may prove to be a more effective governance structure than both the market and the company's internal hierarchy. As previously noted, Porter (1998) argued that a fast-changing environment can render vertical integration inefficient, ineffective and inflexible.

Through its long-lasting growth and profitability, the maritime cluster proved its strength. Excluding the fishery segment, the maritime cluster in 2012 consisted of more than 200 companies. Figure 2.4 shows the number of companies, turnover, profit margin and number of employees for all value creation categories in the cluster.

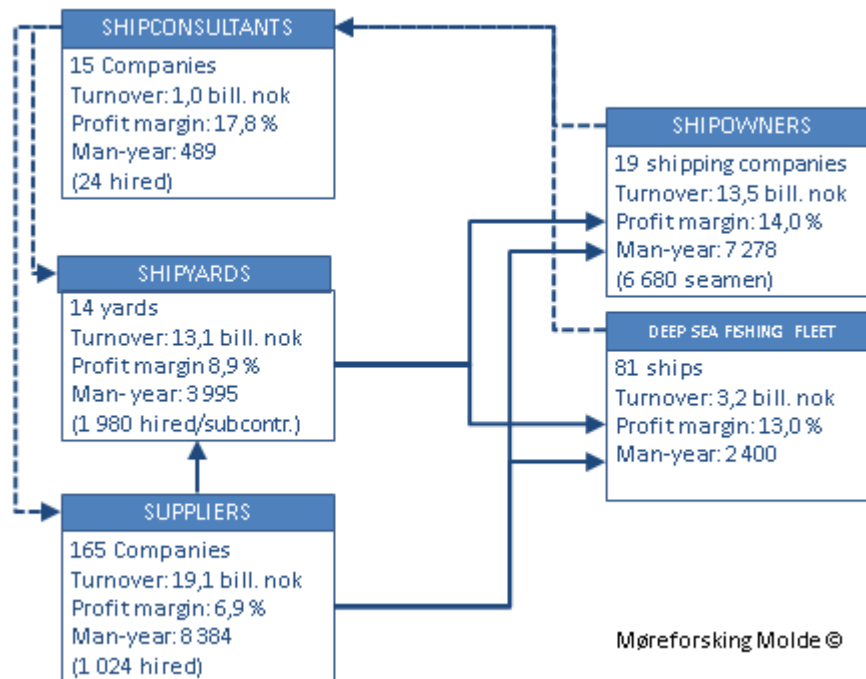


Fig 2.4 Overview of value creators in the maritime cluster, 2012 (Møreforsking Molde)

The industry is considerable, with total 2012 turnover of NOK 43 billion (excluding the deep-sea fishing fleet). The cluster dimension indicates a close relationship between members or companies in the cluster. Interaction improves the competitive advantages in the entire value-producing network. When the totality within an industrial cluster exceeds a 'critical mass', all actors are influenced positively through many different linkages, such as economies of scale, recruitment of key personnel and skilled labour, innovations from customers with knowledge, high demand in every part of the network and sound competition. Given network transparency and a relatively limited industry, an effective network emerges by considering educational background, geographic distances and information flow between the actors. Such a network positively influences knowledge development and learning, innovative capability, capacity and adaptability.

Many forms of relationships exist between companies, but most often one thinks of economic transactions and the evidence of transactional relationships found in the buying behaviour between companies in a cluster. Figure 2.5 shows the economic transactions between the companies in the maritime cluster in Møre and Romsdal during 2011.⁵

⁵ Møreforsking Molde

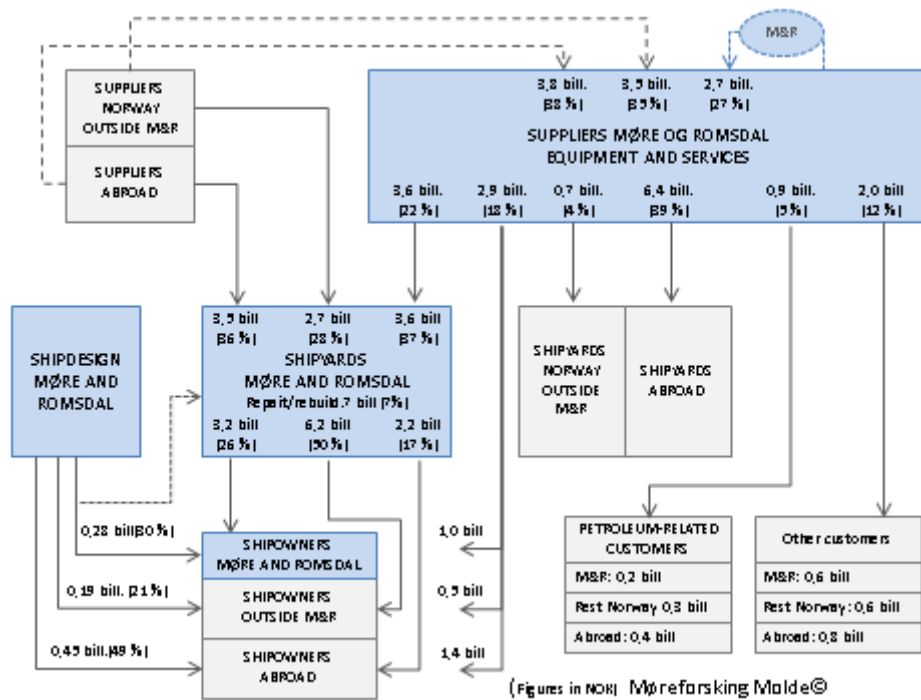


Figure 2.5 Economic interaction in the maritime industry in Møre and Romsdal in 2011.

In 2011, shipowners in Møre and Romsdal created only 26 percent of the shipyard’s turnover. This proportion fluctuates from year to year but was considerably higher in 2008 (44 percent) and in 2009 (36 percent). The proportion of shipbuilding turnover from shipowners in Norway outside Møre and Romsdal was 50 percent. If repair and rebuilding activities of shipyards are also counted, approximately 85 percent of the turnover was from deliveries to Norwegian companies, although a considerable portion of these delivers was to outside the Møre and Romsdal cluster. In many ways, the design companies play an important role as mediators in the interplay among shipowners, shipyards and suppliers. They often develop and sell design services to shipowners that subsequently choose both shipyard and packages of equipment, and then call for tenders. Thirty percent of the design companies’ turnover came from shipowners within Møre and Romsdal.

The proportion of activities and subsequent turnover related to foreign companies increased during the past ten years. During a growing market and for the same period, the supplier industry maintained its share of value creation for 15 years at 42 percent in 1998 and 41.6 percent in 2011, and the shipyards’ portion of value creation declined from 42.6 percent in 1998 to 30.5 percent in 2011. Therefore, even though a significant portion of the supply to shipyards in Møre and Romsdal came from suppliers in the region (22 percent), the supplier industry became more global and more independent of the shipbuilding industry in the region. In contrast, 22 percent of the deliveries from suppliers in Møre and Romsdal accounted for 37 percent of the total supply to shipyards in the county. Norwegian suppliers outside Møre and Romsdal delivered 28 percent of the supply, indicating that, altogether, Norwegian suppliers delivered 65 percent of purchased goods to shipyards in Møre and Romsdal.

STX OSV’s sourcing from Norwegian suppliers was in line with the average for the entire industry, whereas sourcing from regional suppliers was somewhat higher (42 percent) (Oterhals, Johannessen and Hervik 2011).

Figure 2.5 and the text show the relationships between the key actors manifested as economic transactions with respect to co-producing value in the Møre and Romsdal maritime industry.

The maritime cluster may be perceived as a value-producing network or a co-producing value network that, as a whole, is almost continually generating value through its different actor groups and individual companies that strive to create their portion of total value and capture their portion of the value created. This perception contributes to and simultaneously expresses the dynamics of the industry.

3 CLASSIFICATION OF SUPPLIERS

The MFM database contains more than 200 maritime-related companies. In 2010, as many as 162 of these companies were classified as suppliers, and the remainder were classified as shipowners, design companies and shipyards. Therefore, the supplier group is the most comprehensive and diversified. If 15 design companies are added, then this study analyses a total of 177 suppliers.

The first attempt to classify the suppliers was based on a traditional supply chain distribution. Table 3.1 shows that each company may have several classifications, typically engineering, ship equipment production and construction service. Therefore, the activities between the groups are distributed by percentage to, in a way, obtain a kind of relative weighting for each category.

The capital equipment group consists of suppliers of production equipment and tools for the industry.

Table 3.1 Number of companies within each supplier category

*** Total number of companies related to this category**

**** Relative number of companies within this category**

Supplier category	Representations*	Relative no**
Design and engineering	49	34
Steelwork – hull	1	0.5
Ship equipment supplier	141	116
Construction service provider	35	21
Capital equipment	8	5

For the purpose of this study, companies including ship equipment supply were found to be most interesting and had the most relevant content. Therefore, the remainder of the analysis concentrated on a further classification of equipment suppliers and based on product complexity (PC) and competence intensity (CI).

Each equipment supplier company in the database was assigned a low, medium or high score from 1 to 3 to reflect each of the two attributes, PC and CI. Figure 3.1 shows this classification and denomination, where 1.1 indicates low product complexity and low competence intensity. Combining these two attributes as the mean of PC+CI results in a classification illustrated as A, B, C, D and E in figure 3.1.

Assigning this combined score for (PC,CI) results in a distribution, as illustrated in figure 3.2, that shows the relative number of companies (and total number of occurrences) in each square.

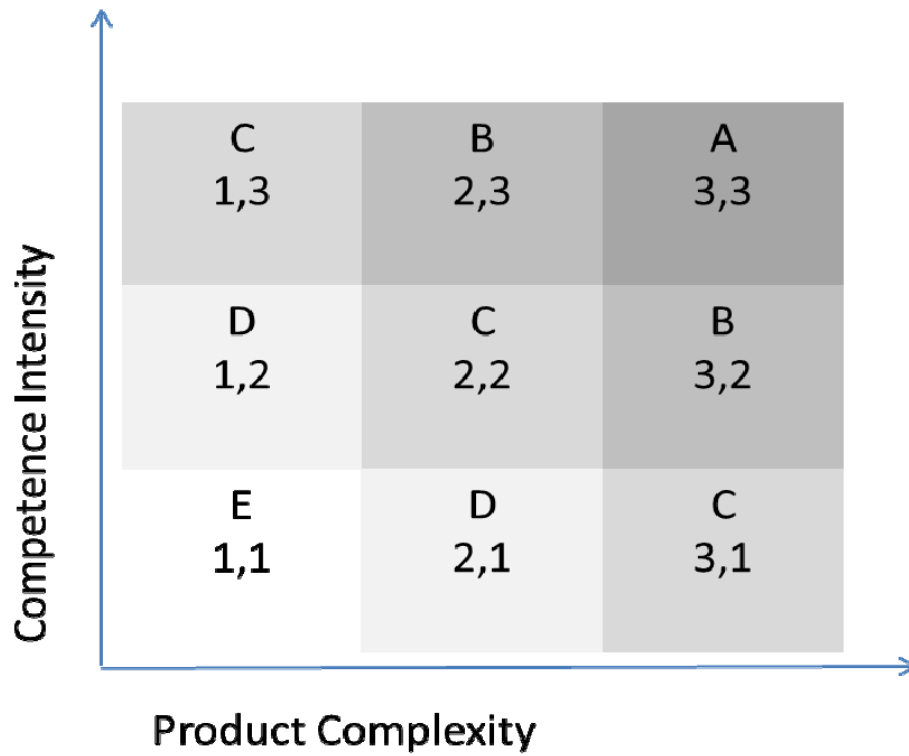


Figure 3.1 Classification and denomination of equipment suppliers

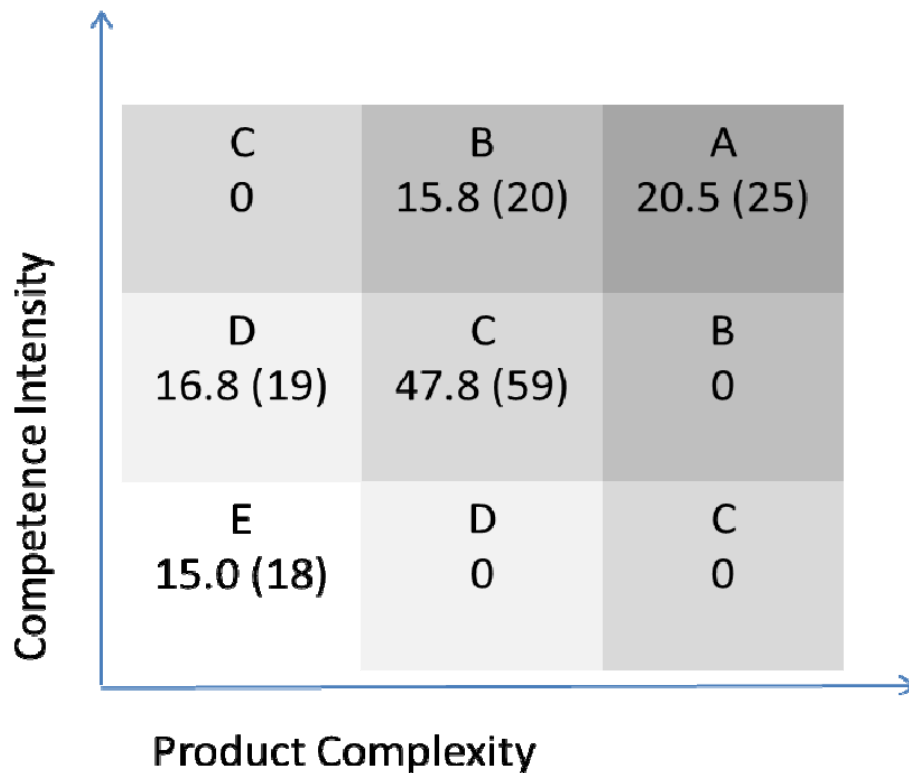


Figure 3.2 Relative (and absolute) number of companies assigned to each category of equipment suppliers

This classification of ship equipment suppliers results in the distribution of companies shown in table 3.2.

Table 3.2 Distribution of equipment suppliers according to the A–E scale

	A	B	C	D	E	Total
Absolute number of companies	25	20	59	19	18	141
Relative number of companies	20.5	15.8	47.8	16.8	15.0	116

4 ANALYSIS OF EMPIRICAL DATA

This chapter analyses empirical financial data from regional shipbuilding suppliers based on the classification of suppliers from chapter 3 and empirical data on regional maritime suppliers collected since 1987.

Figure 4.1 illustrates the turnover for regional shipbuilding suppliers for the period 2000–2010. In figure 4.1, suppliers are classified into five main categories according to previous value chain studies. One hundred and seventy-seven suppliers operated in 2010, and the largest category was 141 equipment suppliers. Supplier turnover increased during 2000–2002 and declined in 2003. Turnover again increased rapidly from 2004 to 2008 and then flattened in 2009. Supplier turnover in 2009 was approximately NOK 22 billion, more than twice the amount in 2005. In 2010, turnover decreased to approximately NOK 20 billion. The curves representing the five main categories follow a similar pattern. Equipment suppliers increased their turnover during 2005–2009 from NOK 8.8 billion to NOK 18.3 billion. The corresponding amounts for design and development indicate an increase from NOK 0.85 billion to NOK 2.4 billion and an increase from NOK 0.42 billion to NOK 1.2 billion for construction service providers. The three aforementioned categories more than doubled their turnover during 2005–2009. Moreover, steelwork, hull and capital equipment increased their turnover during the same period, but not by as much as the equipment suppliers and design, development and construction service providers.

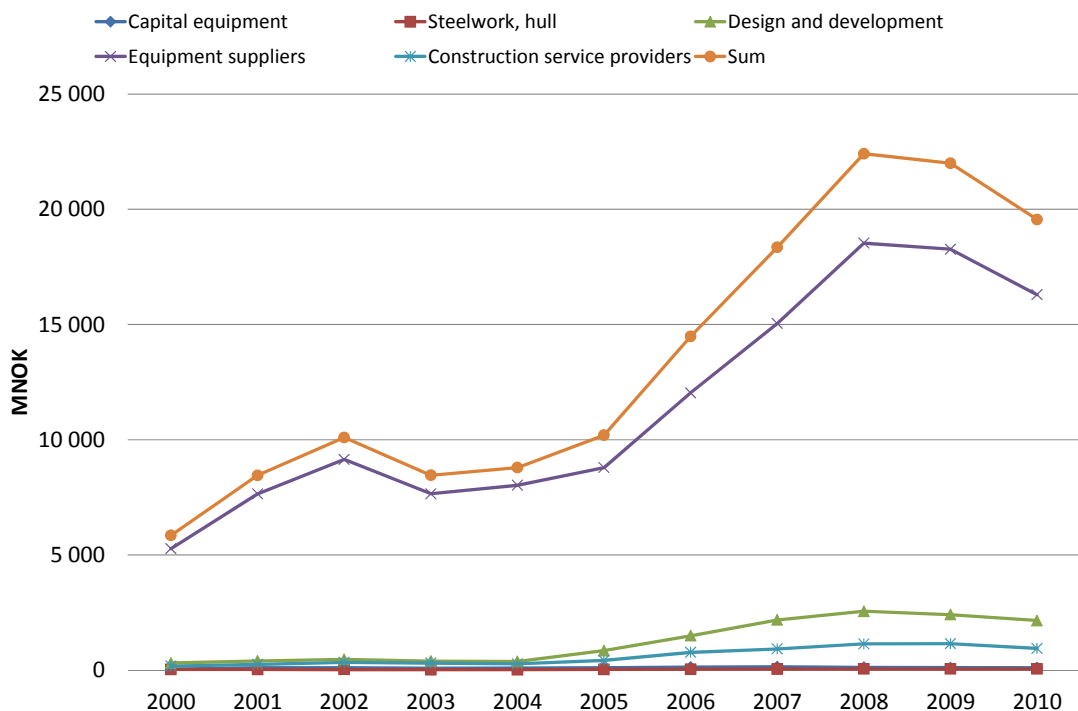


Figure 4.1 Shipbuilding suppliers (n = 177, year 2010) – turnover from Møre and Romsdal for the period 2000–2010- millions of NOK

Figure 4.2 presents a frequency diagram that shows the distribution of the average annual growth rate (as of 31 December 2010) for the 177 suppliers in the population. In Figure 4.2, the median value is represented by company number 89, with a corresponding average annual growth rate of 11 percent. As many as 93 suppliers, or more than half the suppliers

in the population, had an average annual growth rate between 0 percent and 14 percent. Figure 4.2 also shows that two suppliers had an average annual growth rate less than 10 percent and 17 suppliers had an average annual growth rate higher than 80 percent.

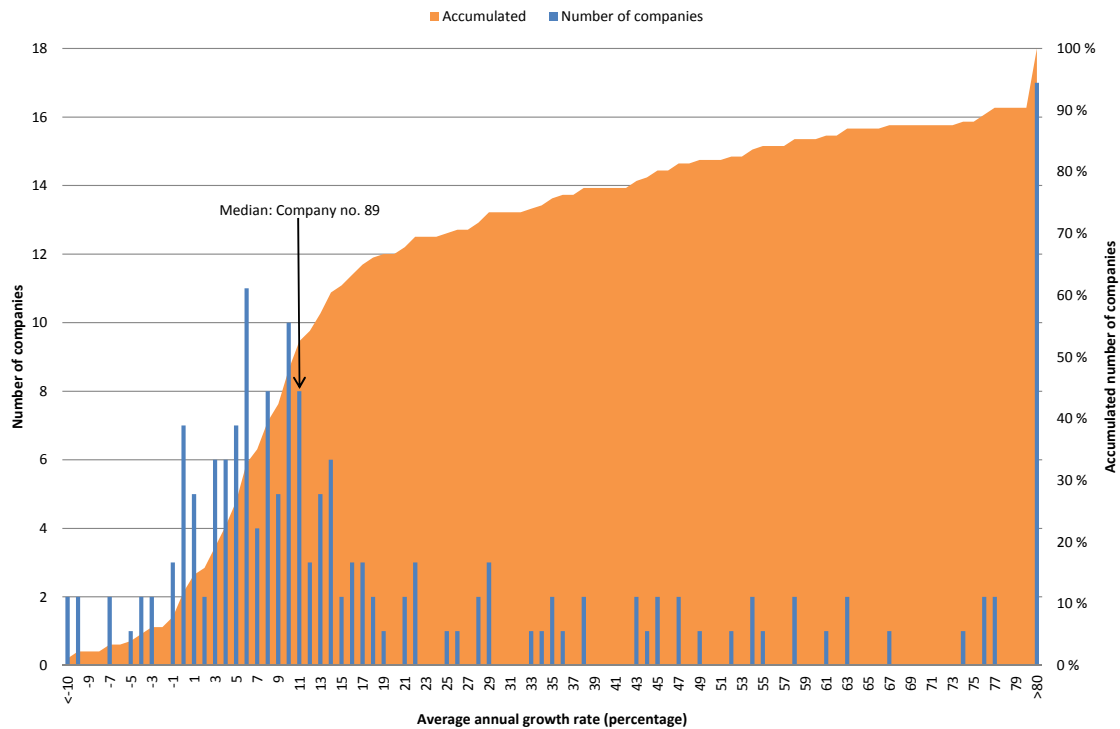


Figure 4.2 Shipbuilding suppliers (n = 177, year 2010) – average annual growth rate as of 31 December 2010

Figure 4.3 presents a frequency diagram that illustrates the distribution of 2010 pre-tax profit margin for the 177 suppliers in the population. The chart shows that 87 suppliers had a pre-tax profit margin of between 0 percent and 10 percent, or almost half the suppliers in the population. Twenty-two suppliers had a pre-tax profit margin less than 10 percent and 16 suppliers had a pre-tax profit margin higher than 20 percent.

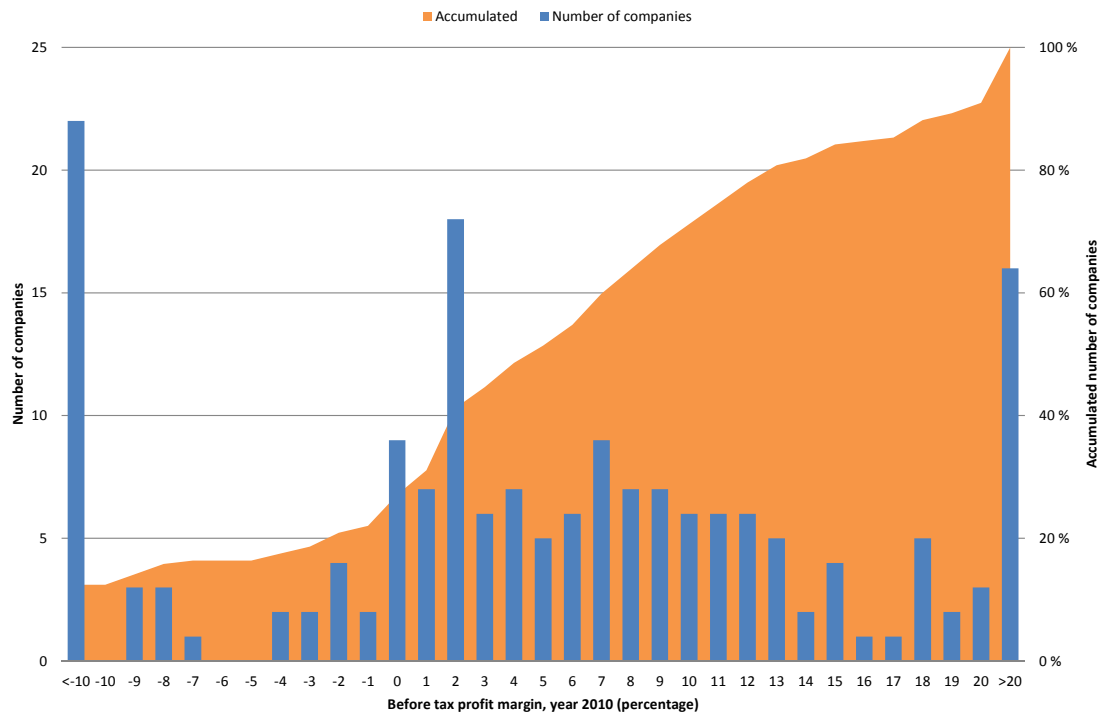


Figure 4.3 Shipbuilding suppliers (n = 177, year 2010) – pre-tax profit margin

Figure 4.4 presents the development in the proportion of companies related to equipment during 2000–2010. Figure 4.4 and the next five figures show the equipment suppliers arranged in five groups, A (high end), B, C, D and E (low end), according to the classification of suppliers from chapter 3. In 2000 and 2010, the number of equipment suppliers was 82 and 116, respectively. This number peaked in 2007–2008 at 121 equipment suppliers. Overall, the trend indicates a steady growth in the number of equipment suppliers throughout these years. Furthermore, Figure 4.4 illustrates that group C is the largest with 48 companies in 2010, almost twice as many as the second largest group, A (high end), with 21 companies. The three smaller groups B, D and E (low end) are almost equally sized, with between 15 and 17 companies each during 2010.

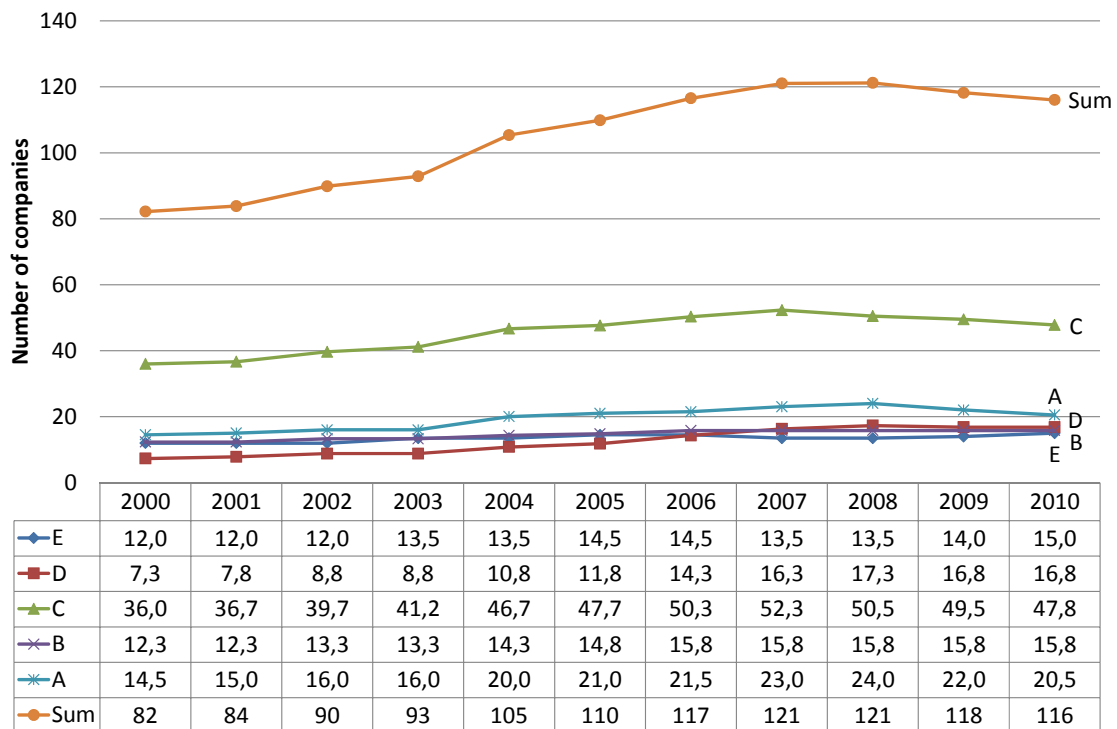


Figure 4.4 Equipment suppliers (n = 116, year 2010) – number of companies during 2000–2010

Figure 4.5 displays the turnover for equipment suppliers during 2000–2010. The total curve is identical to the curve representing the equipment suppliers in figure 4.1. Category A (high end) of equipment suppliers represents the group with the largest turnover, and a significant proportion of this turnover originated from a few large companies. From 2000 to 2002, the A suppliers grew their turnover from approximately NOK 3 billion to NOK 6.2 billion, followed by a decline in turnover in 2003 to approximately NOK 5.2 billion and then a phase of steadiness during the next two years. From 2005 to 2009, the A suppliers experienced rapid growth in turnover, with 2009 turnover of NOK 12.5 billion, more than double that of 2005. A suppliers' turnover then declined in 2010 to NOK 10.8 billion, a 13.4 percent decline in turnover in one year. The A suppliers constituted approximately 66 percent of total equipment supplier turnover during 2010. The other groups experienced a substantial increase in turnover during 2000–2010, and in 2010 the turnover for these groups ranged from NOK 0.6 billion for the smallest group E to NOK 2.3 billion for the second largest group C.

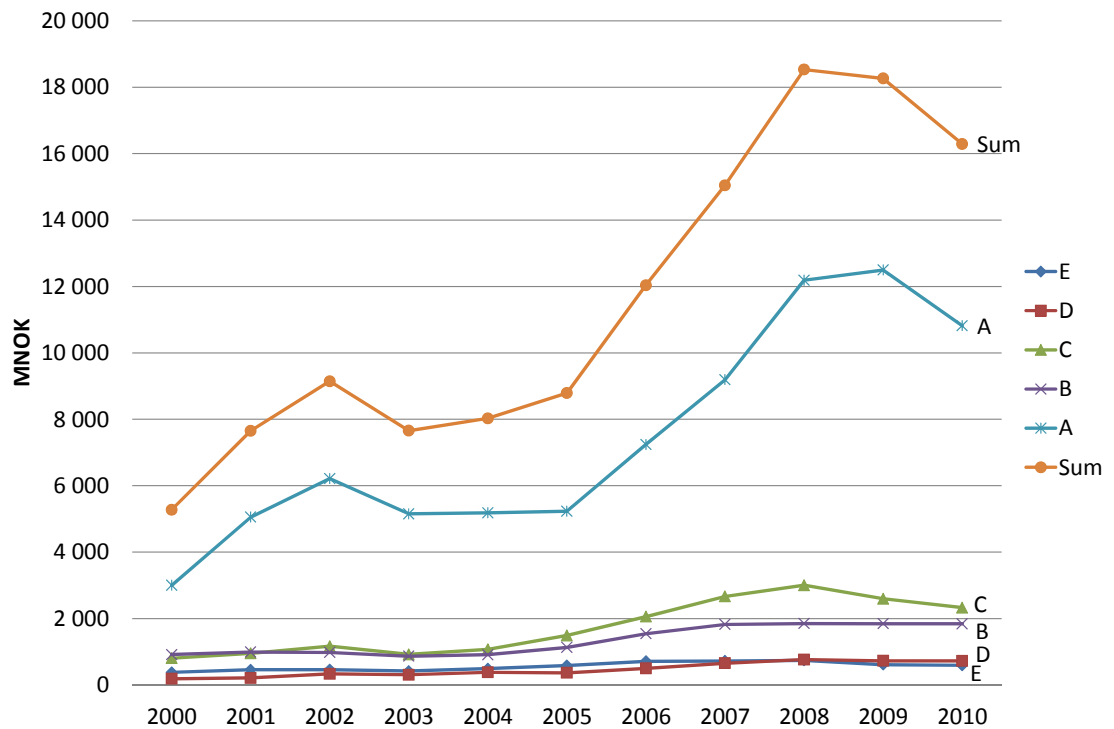


Figure 4.5 Equipment suppliers (n = 116, year 2010) – turnover during 2000–2010

Figure 4.6 shows pre-tax profits for equipment suppliers during 2000–2010. The total pre-tax profit curve follows approximately the same pattern as the total turnover curve in figure 4.5. Pre-tax profits increased from 2000–2002, then decrease in 2003, followed by another increase until 2009 and a decline from 2009 to 2010. The total curve for pre-tax profits for all equipment suppliers has a positive value through the entire period. Again, group A is by far the largest group in terms of pre-tax profits, and a significant proportion of this pre-tax profit originated from a few large companies. This group had 2000 pre-tax profits of NOK 0.2 billion and hit an all-time high in 2009 of NOK 1.3 billion, before experiencing a decline in 2010 to NOK 1.1 billion. Group A equipment suppliers constituted approximately 77 percent of the total pre-tax profits for all equipment suppliers in 2010. Groups B through E also experienced growth in pre-tax profits during 2000–2010. In 2010, groups A through E came out in chronological order, from group A with the largest pre-tax profits to group E with the smallest pre-tax profits.

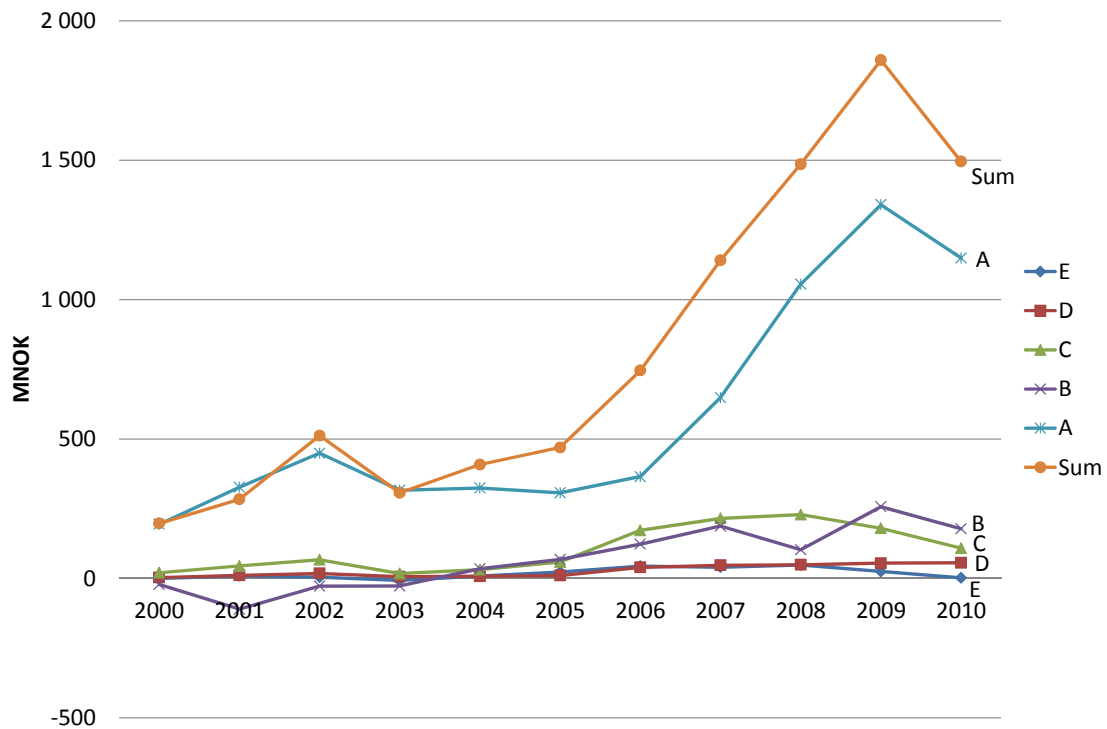


Figure 4.6 Equipment suppliers (n = 116, year 2010) – pre-tax profits during 2000–2010

Figure 4.7 displays the pre-tax profit margin for equipment suppliers during 2000–2010. The average curve describing pre-tax profit margins for all equipment suppliers fluctuated between 4 percent and 6 percent during 2000–2005 and between 5 percent and 10 percent during 2005–2010. All five categories experienced positive pre-tax profit margins during 2004–2010. Group A's best years were 2009 and 2010, with pre-tax profit margins of 11 percent in both years. Group B's pre-tax profit margins were volatile during 2000–2010, with a peak in 2009 at 14 percent and a trough in 2010 at 10 percent. Group C stagnated during the past couple of years, and its pre-tax profit margin in 2008 and 2010 were 5 percent and 8 percent, respectively. Group D had one of its best years in 2010 with a pre-tax profit margin of 8 percent. Group E experienced a pronounced decline in pre-tax profit margin during the past couple of years from a peak of 7 percent in 2008 to 0 percent in 2010.

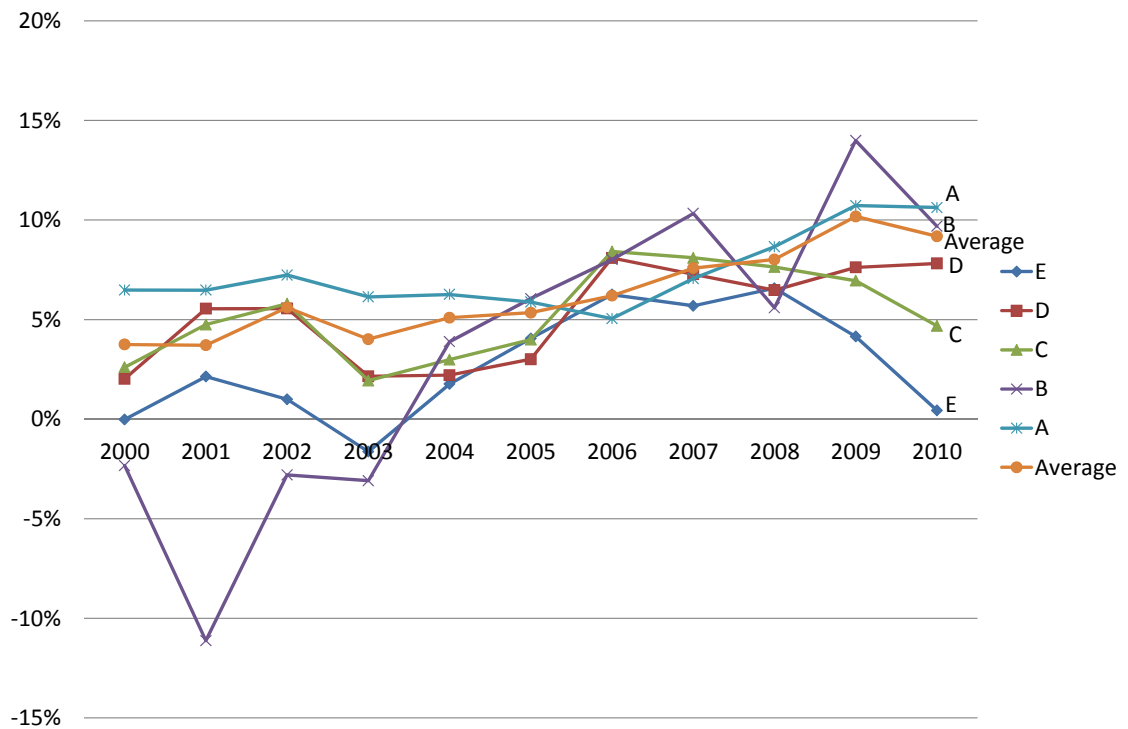


Figure 4.7 Equipment suppliers (n = 116, year 2010) – pre-tax profit margins during 2000–2010

Figure 4.8 illustrates turnover per man-year for equipment suppliers during 2000–2010. The average curve for turnover per man-year for all equipment suppliers fluctuated between NOK 1.2 and 2.0 million during 2000–2005 and between NOK 1.7 and 3.0 million during 2005–2010. Turnover per man-year (average curve) in 2010 was NOK 3.0 million, or approximately 1.7 times higher than in 2005. Group A experienced rapid growth in turnover per man-year since 2005. In 2010, turnover per man-year was NOK 4.3 million, more than twice as high as in 2005. Group B experienced a rather steady-state phase during the past four years, and 2010 was its best year with turnover per man-year of NOK 1.9 million. Group C had a peak turnover per man-year in 2008 at NOK 2.3 million, which declined to NOK 2.1 million in 2010. Group D experienced steady growth in turnover per man-year since 2005 and was NOK 1.7 million in 2010. Group E's turnover per man-year was volatile during 2000–2010, with the best years being 2007 and 2008 when turnover per man-year was NOK 2.8 million. Group E's turnover per man-year declined to NOK 1.6 million in 2010.

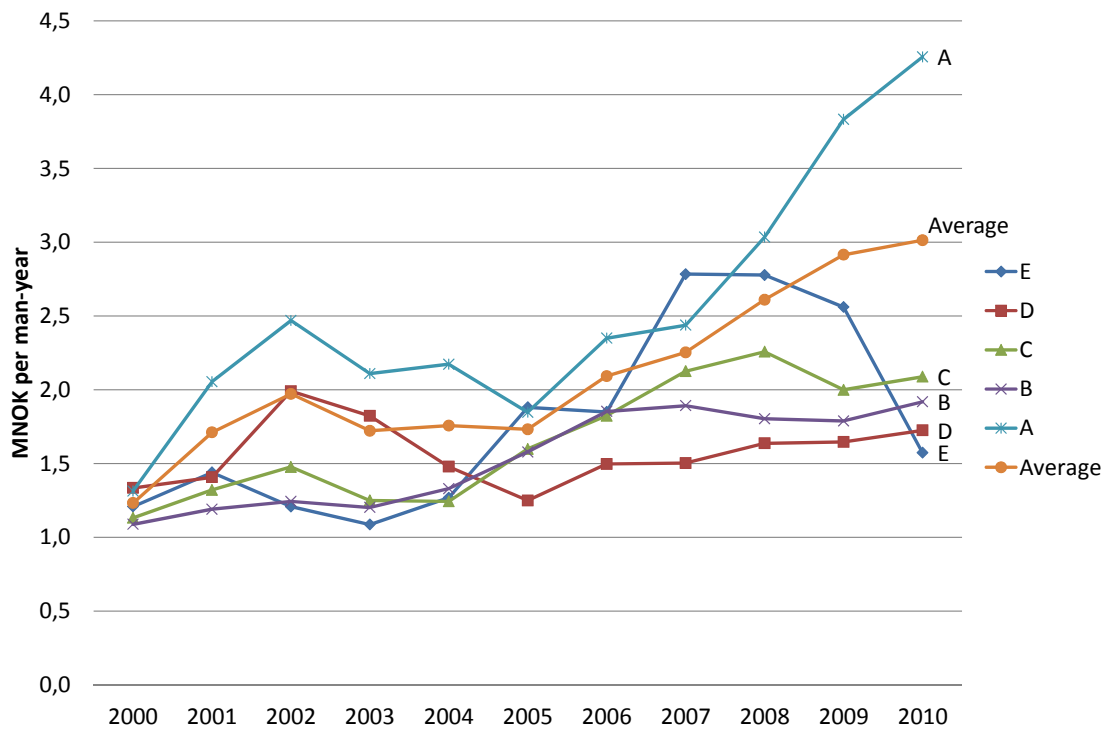


Figure 4.8 Equipment suppliers (n = 116, year 2010) – turnover per man-year during 2000–2010

Figure 4.9 shows pre-tax profits per man-year for equipment suppliers during 2000–2010. The average curve describing pre-tax profits per man-year for all equipment suppliers fluctuated between NOK 0.05 and 0.11 million during 2000–2005 and between NOK 0.09 and 0.30 million during 2005–2010. Pre-tax profits per man-year (average curve) in 2010 were NOK 0.28 million, or approximately 3.1 times higher than it was in 2005. Group A experienced rapid growth in pre-tax profits per man-year since 2005. In 2010, pre-tax profits per man-year were as high as NOK 0.45 million, more than four times the amount in 2005. Pre-tax profits per man-year for group B were volatile during 2000–2010. The peak was NOK 0.25 million in 2009 and the trough was NOK 0.19 million in 2010. Pre-tax profits per man-year for group C declined during the past couple of years, at NOK 0.10 million and NOK 0.17 million during 2010 and 2008, respectively. Group D had one of its best years in 2010, with pre-tax profits per man-year of NOK 0.13 million. Pre-tax profits per man-year for group E were volatile during 2000–2010; the best year was 2008 at NOK 0.18 million and then declined to NOK 0.01 million in 2010.

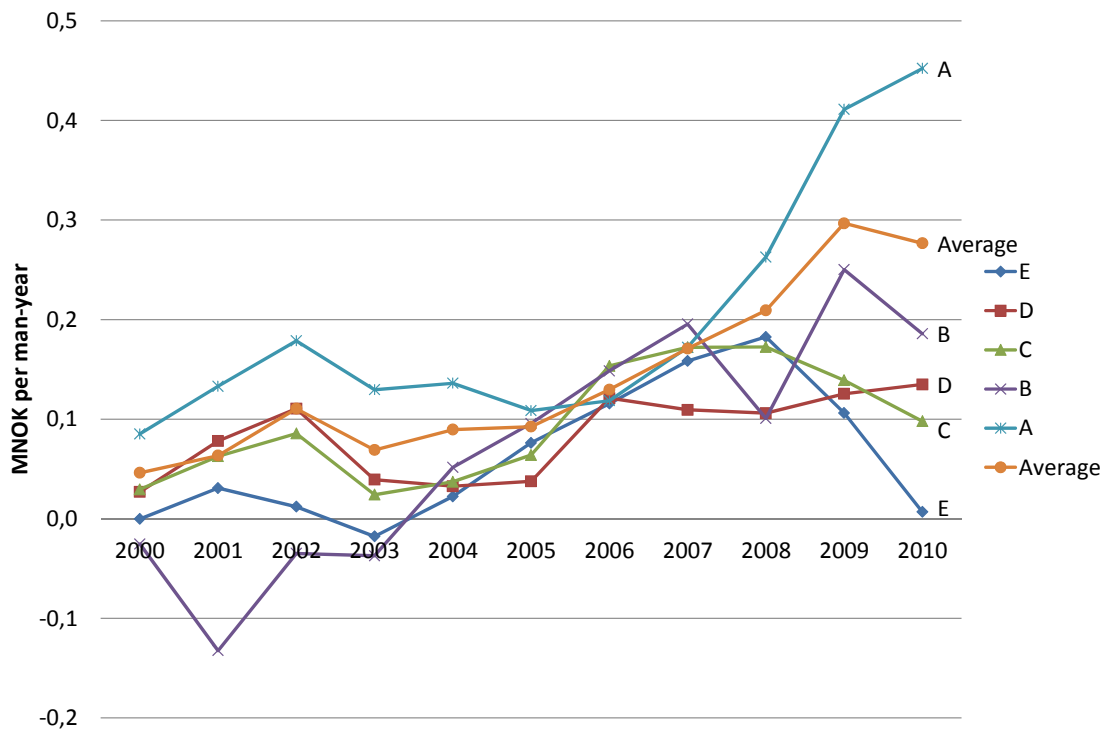


Figure 4.9 Equipment suppliers (n = 116, year 2010) – pre-tax profits per man-year during 2000–2010

In addition to the figures presented in this chapter, the figures created from this strategic supplier analysis that are not presented in the main section of this final report are available in Appendix 3.

This chapter presented figures from the empirical analysis of suppliers. Figure 4.1 showed turnover during 2000–2010 for all 177 suppliers using a classification based on previous value chain studies. Although the turnover declined during the past couple of years (2009–2010), the overall trend represents a growing supplier industry. Figures 4.2 and 4.3 illustrated the average annual growth rate and pre-tax profit margins for 2010 for all suppliers. In further work, the largest group (equipment suppliers) from the initial classification, which consisted of 116 companies (a relative number), was further classified into five groups: A (high end), B, C, D and E (low end). Figures 4.4 to 4.9 showed the number of companies, turnover, pre-tax profits, pre-tax profit margins, turnover per man-year and pre-tax profits per man-year for 2000–2010 based on the A–E classification. Group C was the largest group in terms of number of companies, whereas group A had the largest turnover and pre-tax profits. With respect to pre-tax profit margins, turnover per man-year and pre-tax profits per man-year, the evolution over time of the curves describing the groups fluctuated. Again, group A seemed to stand out as the group with the largest pre-tax profit margins, turnover per man-year and pre-tax profits per man-year during most of 2000–2010.

5 STRATEGIC ANALYSIS OF SUPPLIERS

No company can allow purchasing to lag behind other departments in acknowledging and adjusting to worldwide environmental and economic changes. Such an attitude is not only obsolete but also costly.

-Peter Kraljic

Introduction

Purchasing has become one of the most critical activities of a manufacturing business. It is a key strategic activity for achieving a high quality, great variety, low-cost and rapidly delivered end product.

With STX OSV's (henceforth also referred to as 'the company') stand in the market as a reliable shipbuilder of highly specialised offshore vessels, continuous performance of the company's suppliers is crucial. Such continuity requires that the different purchasing departments have a thorough understanding of the market. By gaining such an understanding, the departments will in turn be able to increase efficiency at all levels of activity and within all areas of responsibility.

The vast majority of the purchasing takes place at the company's different shipyards. Consequently, establishing common strategies is important to secure healthy purchasing activities. To do this, developing and implementing strategies as standards or guidelines is an essential step to securing the desired value creation.

Purpose

This analysis aims to derive purchase strategies for STX OSV's different suppliers and supplier groups. Previous studies (Fleischer et al. 1999) showed that significant opportunities are created from deriving and implementing such purchasing strategies.

More specifically, this analysis aims to enable the development of solid purchasing strategies, including:

- Separating strategically important suppliers from less important suppliers and
- Considering different purchasing strategies.

Framework

To gain an overview of different suppliers' positions on STX OSV, this analysis takes the following three steps:

1. Mapping product groups based on the SFI Group System⁶;
2. Mapping the suppliers within each product category; and
3. Presenting available and potential supplier strategies.

First, the product groups are separated into different categories based on certain characteristics, which is discussed further in the next section. Thereafter, the analysis moves down to the supplier level to evaluate each separate supplier and its position with

⁶ SFI is a common code for the flow of information between enterprises within the maritime and offshore industry. In STX OSV, each product group has a designated SFI code. This code is used throughout the system regarding purchases, installations, bookings and other functions. SFI codes have been used to secure easy implementation and an understanding of the derived results.

respect to the company. Developing strategies is comprehensive work and requires an overview of each of the relevant suppliers and the available opportunities. Therefore, this analysis rounds off by presenting the possible plans available, enabling the reader to take appropriate and suitable actions.

5.1 Mapping product groups

This section is built on the framework provided by Kraljic's purchasing portfolio matrix (Kraljic, 1983). Kraljic's portfolio matrix categorises suppliers based on their supply risk and profit impact. To evaluate these two variables, the following criteria were applied:

Supply risk:

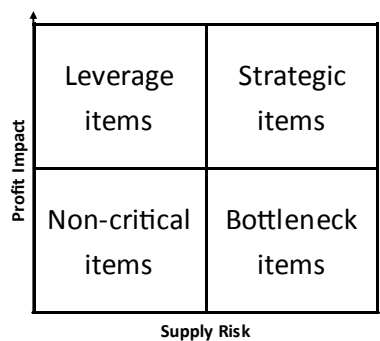
- Product availability (20%)
- Number of potential suppliers (20%)
- Switch costs (20%)
- Consequence of delay (20%)
- Competitive structure (20%)

Profit impact:

- Economic impact (50%)
- Impact on end product quality (50%)

Each of the product groups (SFI) was evaluated by assigning a rank of 1 to 10 for each of the previously noted criteria. No reason existed to weight any criteria higher than others; consequently, equal weights were assigned. Furthermore, the economic impact was evaluated on the share of total purchase.⁷ The remaining criteria were ranked based on qualitative assessments.

On the basis of the two variables' final score, each product group was placed in a category based on Kraljic's matrix:



Figur 5.1 Kraljic's Matrix

By using the criteria and their respective weights as previously listed, the SFIs were ranked as follows in Table 5.1:

⁷ Economic impact is based on purchase volumes from 2011. After running the analysis with aggregated data, it has become apparent that the 2011 numbers are the most representative.

Table 5.1 Outline of ranking procedure ⁸

SFI	Description	Supply Risk					Profit Impact			Matrix category	
		Product availability	Nr. of potential suppliers	Switch cost	Consequence of delay	Competitive structure	Average score	Economic impact	Impact on end product quality		Average score
		3	3	2	4	2	2,8	7	1	4	NCI
		5	5	8	4	7	5,8	8	7	7,5	SI
		4	4	5	5	5	4,6	5	7	6	LI
		4	3	3	6	5	4,2	7	6	6,5	LI
		1	2	2	2	2	1,8	7	6	6,5	LI
		7	7	8	8	5	7	9	9	9	SI

Categorisation results

By following this procedure, each product group is assigned a specific score for the two variables for supply risk and profit impact. Using these data, the results are plotted in a matrix corresponding to that of 5.1, the actual matrix:

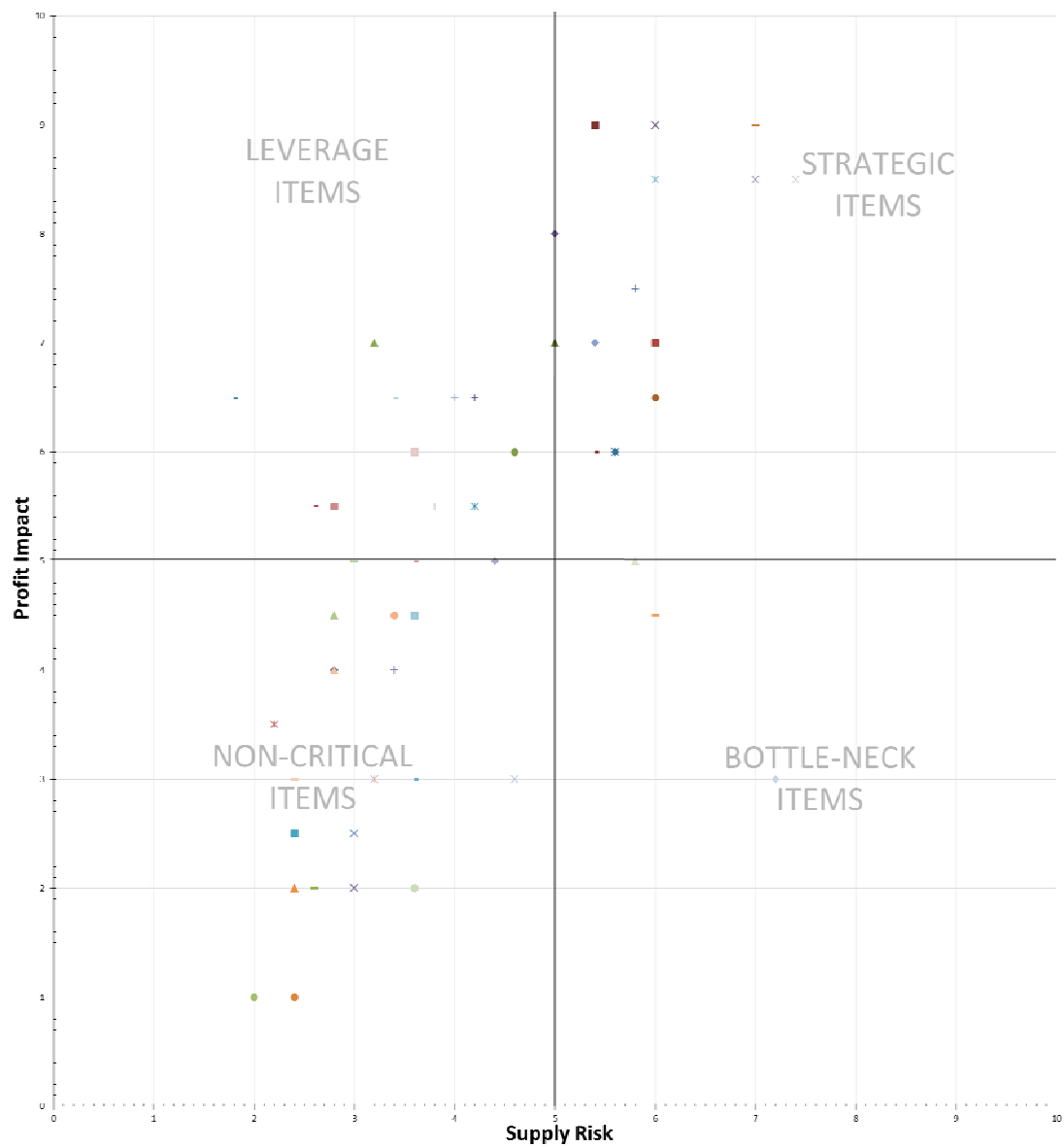


Figure 5.1 Kraljic's matrix

⁸ SI = Strategic items, LI = Leverage items, BNI = Bottleneck items, NCI = Non-critical items.

Figure 5.1 illustrates the categorisation of all purchased products and services of STX OSV based on the level of supply risk and the degree of profit impact. Appendix 1 provides a thorough explanation of the different categories (in other words, the theoretical framework of the Kraljic methodology). For each of the different categories, distinctive purchasing approaches (in other words, strategies) are required. Step 3 provides these different approaches.

The key findings from Kraljic’s methodology are as follows:

- SFIs categorised as strategic items constitute 83 percent of all purchase volume for STX OSV.
- Forty percent of all SFIs are classified as non-critical items, but they make up only five percent of total purchases.
- Most non-critical items are in the SFI-group ‘equipment for crew and passengers’.
- In terms of purchase volume, strategic items dominate the SFI groups ‘machinery, main components’ and ‘ship systems’.

5.2 Mapping of suppliers

As a supplement to Kraljic’s matrix that evaluated products and services at the SFI level, the 121 key suppliers were evaluated using the ABC methodology. The ABC methodology categorises suppliers based on their significance to STX OSV and used two main dimensions:

- Value (based on purchase volume) and
- Importance of supplier (based on a qualitative assessment).

For these two dimensions, certain criteria were used as fundamentals. These criteria are as follows:

Value:

- A – Purchase exceeding NOK 30 million
- B – From NOK 9 million to NOK 30 million
- C – Purchase below NOK 9 million

Importance of supplier:

- A – Key supplier
- B – Good-to-have relations
- C – Insignificant importance

These criteria imply nine possible combinations. Each supplier’s score is categorised correspondingly, as illustrated in Table 5.2.

Table 5.2 ABC matrix

A			
B			
C			
	C	B	A

The ABC analysis primarily backs the findings from Kraljic’s matrix in that suppliers of strategic items are of high strategic importance. However, certain deviations exist.

Key findings

- Ninety percent of suppliers of strategic items are ranked as AA suppliers.
- One supplier is ranked as an AA supplier despite supplying a non-critical item.
- Two suppliers of strategic items are ranked as having no strategic importance as a result of long-term relationships/partnerships with one of their competitors, making the specific supplier unimportant.

When looking at implementing different approaches recommended for suppliers in the different categories, these deviations must be considered to avoid any missteps.

important, if possible. Because these products easily cause holdups, creating backup plans is essential.

For leverage items, the situation is quite different. As supply risk decreases, purchasing power increases correspondingly. More suppliers are available from which to choose, which in turn increases bargaining power. Therefore, active vendor selection is preferred, whereas any form of long-term agreement should be avoided.

For non-critical items, the key word is standardisation. Optimising order volumes and processing is desirable. Standardised processes will increase cost and time efficiency and minimise any room for error.

These explanations of the different categories are not sufficient without a market evaluation (Kraljic, 1983). The preceding analysis focused solely on specific items and suppliers, and did not account for some suppliers having greater market strength and influence than STX OSV. As a result, the opportunities to implement the desired strategies are limited. Suppliers with more market strength than STX OSV have most often gained their position from shipowners' preferences for their products. This factor is difficult to influence. Therefore, the previous categorisation and the presented strategies and approaches available are only guidelines and cannot be implemented without a closer look at the specific supplier/buyer power balance.

As apparent from this discussion, a wide range of approaches is available, which easily makes the available options seem somewhat difficult to follow. To avoid this situation and to give the reader an understanding of the approaches available, Appendix 2 lists the ten best practices for strategy mechanisms.

Summary

STX OSV's suppliers were analysed for the purpose of improving purchasing activities within the company and identifying strategic suppliers and items. The main findings are as follows:

- The vast majority of purchase volume is in the category of strategic items, which represents a set of key products with high supply risk and profit impact. For STX OSV, a long-term perspective is essential. For some of these items, the company has already positioned itself through specific subsidiaries, whereas for other items, the company depends on partnerships and close relationships with its suppliers.
- For non-critical items, STX OSV needs to seek ways to consolidate purchasing across its shipyards to achieve quantity discounts.
- Certain companies that supply strategic items are viewed as having no strategic importance to STX OSV. In contrast, certain suppliers of non-critical items are viewed as having high strategic importance. Treating AA suppliers differently and with a more consistent emphasis on relationships is of strategic importance. Furthermore, CC-suppliers of strategic or bottleneck items should be evaluated for possible closer relationships.

6 SUMMARY AND FINDINGS

The main objective of this study was more to provide knowledge and an understanding of the supplier segment of the maritime industry than to derive purchasing strategies for STX OSV. Therefore, this discussion of the results is kept to a descriptive level. We believe that this analysis will serve as a useful platform for STX OSV when it engages in further strategic planning.

The first part of this report describes the successful maritime industry within Møre and Romsdal county. Turnover and profitability have shown remarkable progress over several decades, and today the industry is a world leader within the offshore service niche. More than 200 companies had a total turnover of NOK 43 billion in 2011. Based on this development of a diversified cluster of different categories of companies, STX OSV has become the largest shipbuilding actor and participates in ship design and certain supplier domains. A better understanding of this common progress for the overall cluster helps understand its drivers and mechanisms for further strategic planning.

The next chapter narrows the study's focus to suppliers and ship equipment suppliers in particular. These suppliers represent the largest and most diversified group of actors within the cluster, and this study seeks useful classification attributes to understand the part that is most successful regarding turnover, growth and profitability. According to an initial classification using supply chain decomposition, a classification of suppliers was developed based on an assigned level of product complexity and intensity of competence. Naturally, this classification is related to the hypothesis that companies with higher product complexity and greater intensity of competence are more successful.

The next chapter aimed at studying turnover growth and profitability for certain categories of suppliers. With an annual growth rate of 11 percent during the past 10 years and average annual profits between 7 and 10 percent, the supplier group has proven to be a successful part of the maritime industry, with the largest share of total turnover.

When assigning a score for product complexity and intensity of competence to each equipment supply company, companies with the highest score proved to experience the highest growth and be the most profitable. Turnover per man-year in group A for 2010 was two times the turnover for each of the other groups and pre-tax profits per man-year was close to twice the average. Smartness pays off!

Chapter 5 utilised the theories of Dr Peter Kraljic to analyse and classify suppliers of STX OSV regarding supply risk and profit impact. The main finding shows that as high as 83 percent of total purchasing value is categorised as strategic items. Non-critical items constitute 40 percent of SFI items but only 5 percent of purchase value. This result illustrates the necessity for close co-operation or partnerships with strategic suppliers and, in some cases, acquisitions should be assessed. The rest of the chapter summarised the relevant supplier strategies for each supply category.

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Appendix 1

Kraljic's purchasing portfolio matrix

This section aims to provide a short explanation of the Kraljic-methodology.

The purchasing portfolio concept provides results that can be used to develop and implement differentiated purchasing strategies towards different purchasing relationships. The objective is to find the cheapest products in some cases, but if the availability of some products is uncertain, the objective is to secure supply or, as Kraljic explains it, to minimise supply risk and make the most out of buying power.

Supply risk is measured against product availability, number of potential suppliers, supplier switching costs, competitive structure of the supply markets, make or buy opportunities, storage risks and product substitutes. *Profit impact* is measured through material costs, purchase volume, percentage of total purchasing costs and impact on end-product quality on the item purchased.

Non-critical products are more or less standardised and with many substitutes available in the market. Purchasing of non-critical products should be organised with the objective of maximising ordering process efficiency. Typical examples include cleaning materials, office supplies and maintenance supplies.

Leverage products with relatively standard quality, like non-critical items, can be obtained from various suppliers. However, these items represent a higher share of the end product's cost price and, therefore, have a higher profit impact. Typical examples include steel and aluminium profiles.

Bottleneck products represent limited value but can only be obtained from one supplier. The supplier will dominate the relationship. A typical example is spare parts.

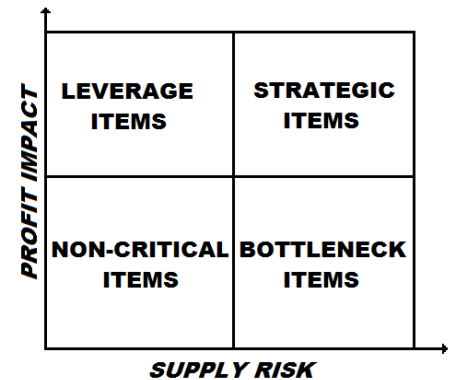
Strategic products are high-tech, high volume products. They are often customised and available from only one supplier and represent a significant share of the end-product price.

Measuring profit impact and supply risk in real life is rather vague and diffuse. There are three main approaches to this problem:

The consensus method is a process of reasoning and discussion.

One-by-one method – the financial value spent on each product/supplier represents the calculated profit impact, and supply risk is usually estimated from the number of alternative suppliers; hence, only one key variable is chosen to represent each dimension.

The weighted factor score method – includes a number of factors for each dimension.



Appendix 2

Strategy mechanisms – 10 best practices

1. Frame agreements

A frame agreement is a type of long-term agreement to provide material at a fixed price or to provide material based on some framework that determines a fair price. A frame agreement need not be an exclusive agreement with the supplier; it simply avoids the need to conduct extensive negotiations regarding price and conditions, which are essentially pre-negotiated. The most important advantage of the frame agreement is that it increases certainty by both the customer and the supplier. Thus, the shipyard can produce bids to owners with the confidence that they know what their price will be, and that they will be able to produce those bids in less time and for less cost. Equally, little or no time is spent in negotiations after contract award, meaning that more time is available to design and build the ship. On the supplier side, the volume of business that it can expect is more predictable and, hence, can make capital and other decisions with less risk.

2. Consolidated purchasing

Consolidated purchasing includes consolidating purchases of different items from one supplier and, alternatively, consolidating purchase of one (like or similar) item from a number of suppliers. Such purchasing also includes how the consolidation is organised: yard specific or for the entire corporation.

The benefits are greater internal efficiency of the purchasing function, greater purchase volume from a given supplier and enabling closer relationships with suppliers that involve more open and honest communication. Through lower costs, fewer purchase orders, better delivery performance and better supplier responsiveness, consolidation leads to reduced costs.

3. Integrated customer/supplier teams

Teams are created to solve problems, develop designs, eliminate waste and create joint technology roadmaps. The teams are located at a single location with access to computers and facilities as any other employee. These teams then work together to make improvements to supplier prices, quality and/or delivery performance.

4. Integration of suppliers

Companies regarded as excellent in supply chain management tend to treat their non-commodity suppliers and themselves as a single business entity. The result is to integrate suppliers into the customer firm's processes, and can include involving suppliers in design or explicitly in shipyard planning.

5. Lowest total cost selection

The lowest total cost idea is that everything involved in supplier selection and management, in receipt and installation of the supplier's product and in support of the end item after delivery that involves the supplier's product represents a cost that should be added to the supplier's product cost to arrive at the total cost associated with that supplier. Competing suppliers are ranked on the basis of total cost, and the one showing the lowest amount is selected. Supplier quality is an element; some companies measure quality performance such as numbers of defects by assessing the economic cost to the

company. To be effective, this approach requires detailed records of the quality performance of a supplier.

6. Supplier continuous improvement

Most companies have some form of target for costs, quality and delivery; however, companies that insist on a more formal continuous improvement effort by the supplier appear to realise greater performance benefits. Cost control/reduction targets are often negotiated, especially when long-term agreements are involved.

7. Supplier training

Many world-class commercial companies offer training in many areas to their suppliers, including business, management and technical topics, and make such training available on a continuing basis to most suppliers at no charge or at a fee that covers certain administrative expenses, such as travel costs and training material. Some companies do this by organising supplier conferences.

8. Develop new suppliers

If a suitable supplier is not available, a company may want to help create a new company to assist an existing company develop the capability to act as one of its suppliers. This way, the company gains more than its competitors because the supplier has learned its system rather than its competitors'; hence, greater compatibility and closer relationships are developed.

9. Supplier management inventory

A supplier manages inventory when it is responsible for ensuring that customers' inventory is kept over certain minimum levels without individual orders from a particular customer.

10. Turnkey suppliers

A turnkey supplier is one who provides a complete system based on a set of requirements from the customer. The supplier designs and builds the system and installs it where it is supposed to work.

Appendix 3

Figures from the strategic supplier analysis

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Number of companies											
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Capital equipment	2,5	3,0	3,0	3,0	3,0	4,0	4,5	4,5	5,0	5,0	5,0
Steelwork, hull	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5
Design and development	15,8	17,5	20,0	23,5	24,5	29,0	31,1	35,6	34,3	34,3	34,1
Equipment suppliers	82,2	83,9	89,9	92,9	105,4	109,9	116,5	121,0	121,2	118,2	116,0
Construction service providers	16,0	18,2	20,7	23,2	24,7	25,7	26,3	25,3	25,0	23,0	21,3
Sum	117	123	134	143	158	169	179	187	186	181	177
Proportion of companies per category											
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Capital equipment	2%	2%	2%	2%	2%	2%	3%	2%	3%	3%	3%
Steelwork, hull	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Design and development	14%	14%	15%	16%	15%	17%	17%	19%	18%	19%	19%
Equipment suppliers	70%	68%	67%	65%	67%	65%	65%	65%	65%	65%	66%
Construction service providers	14%	15%	15%	16%	16%	15%	15%	14%	13%	13%	12%
Sum	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Turnover (from M&R), MNOK											
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Capital equipment	49	107	108	84	89	105	135	148	124	115	109
Steelwork, hull	37	34	40	18	21	30	42	52	55	55	56
Design and development	313	404	469	394	377	849	1 492	2 183	2 557	2 412	2 153
Equipment suppliers	5 273	7 654	9 142	7 655	8 026	8 790	12 037	15 047	18 532	18 265	16 292
Construction service providers	179	254	339	309	277	424	776	923	1 140	1 151	945
Sum	5 851	8 454	10 098	8 459	8 790	10 199	14 482	18 353	22 408	21 998	19 555
Profit before tax, MNOK											
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Capital equipment	1	3	-0	1	1	8	11	9	9	10	13
Steelwork, hull	1	1	3	0	1	2	3	5	3	4	7
Design and development	27	36	47	11	31	119	231	363	472	521	304
Equipment suppliers	198	284	513	307	409	470	746	1 141	1 486	1 859	1 496
Construction service providers	7	19	22	12	13	23	43	46	57	114	117
Sum	233	344	585	332	455	621	1 034	1 564	2 028	2 509	1 937
Before tax profit margin											
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Capital equipment	2%	3%	0%	1%	2%	7%	8%	6%	7%	9%	12%
Steelwork, hull	4%	4%	8%	2%	3%	5%	6%	9%	6%	7%	13%
Design and development	8%	9%	10%	3%	8%	14%	15%	17%	18%	22%	14%
Equipment suppliers	4%	4%	6%	4%	5%	5%	6%	8%	8%	10%	9%
Construction service providers	4%	7%	7%	4%	5%	5%	6%	5%	5%	10%	12%
Sum	4%	4%	6%	4%	5%	6%	7%	9%	9%	11%	10%
Man-year (permanent employee)											
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Capital equipment	31	83	77	64	56	58	57	51	49	56	55
Steelwork, hull	22	22	20	20	20	20	18	18	15	15	15
Design and development	339	399	423	430	402	581	691	877	970	1 029	1 033
Equipment suppliers	4 279	4 472	4 636	4 446	4 568	4 676	5 146	5 710	5 997	5 447	4 991
Construction service providers	275	338	391	408	384	434	500	496	557	540	514
Sum	4 946	5 313	5 547	5 368	5 429	5 768	6 411	7 151	7 588	7 087	6 609
Man-year (hired personnel)											
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Capital equipment						2	2	-	-	1	1
Steelwork, hull						13	10	13	13	10	10
Design and development						191	330	388	448	578	303
Equipment suppliers						400	607	968	1 103	818	416
Construction service providers						140	234	322	409	391	319
Sum						745	1 182	1 690	1 973	1 797	1 049
Total man-year (permanent employee & hired personnel)											
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Capital equipment	31	83	77	64	56	60	58	51	49	57	56
Steelwork, hull	22	22	20	20	20	33	28	30	28	25	25
Design and development	339	399	423	430	402	771	1 021	1 265	1 418	1 606	1 337
Equipment suppliers	4 279	4 472	4 636	4 446	4 568	5 075	5 753	6 678	7 100	6 266	5 407
Construction service providers	275	338	391	408	384	574	734	817	967	931	833
Sum	4 946	5 313	5 547	5 368	5 429	6 513	7 593	8 841	9 561	8 884	7 658
Turnover (from M&R) per man-year, MNOK per man-year											
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Capital equipment	1,57	1,30	1,41	1,32	1,58	1,75	2,32	2,91	2,56	2,04	1,95
Steelwork, hull	1,71	1,60	1,99	0,89	1,06	0,93	1,51	1,74	1,99	2,21	2,23
Design and development	0,92	1,01	1,11	0,92	0,94	1,10	1,46	1,73	1,80	1,50	1,61
Equipment suppliers	1,23	1,71	1,97	1,72	1,76	1,73	2,09	2,25	2,61	2,91	3,01
Construction service providers	0,65	0,75	0,87	0,76	0,72	0,74	1,06	1,13	1,18	1,24	1,13
Sum	1,18	1,59	1,82	1,58	1,62	1,57	1,91	2,08	2,34	2,48	2,55
Profit before tax per man-year, MNOK per man-year											
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Capital equipment	0,03	0,04	-0,00	0,01	0,03	0,13	0,18	0,18	0,19	0,18	0,24
Steelwork, hull	0,07	0,06	0,16	0,01	0,04	0,05	0,10	0,15	0,12	0,16	0,29
Design and development	0,08	0,09	0,11	0,03	0,08	0,15	0,23	0,29	0,33	0,32	0,23
Equipment suppliers	0,05	0,06	0,11	0,07	0,09	0,09	0,13	0,17	0,21	0,30	0,28
Construction service providers	0,02	0,06	0,06	0,03	0,03	0,04	0,06	0,06	0,06	0,12	0,14
Sum	0,05	0,06	0,11	0,06	0,08	0,10	0,14	0,18	0,21	0,28	0,25

Figure A3.1 Shipbuilding supplier data – key figures

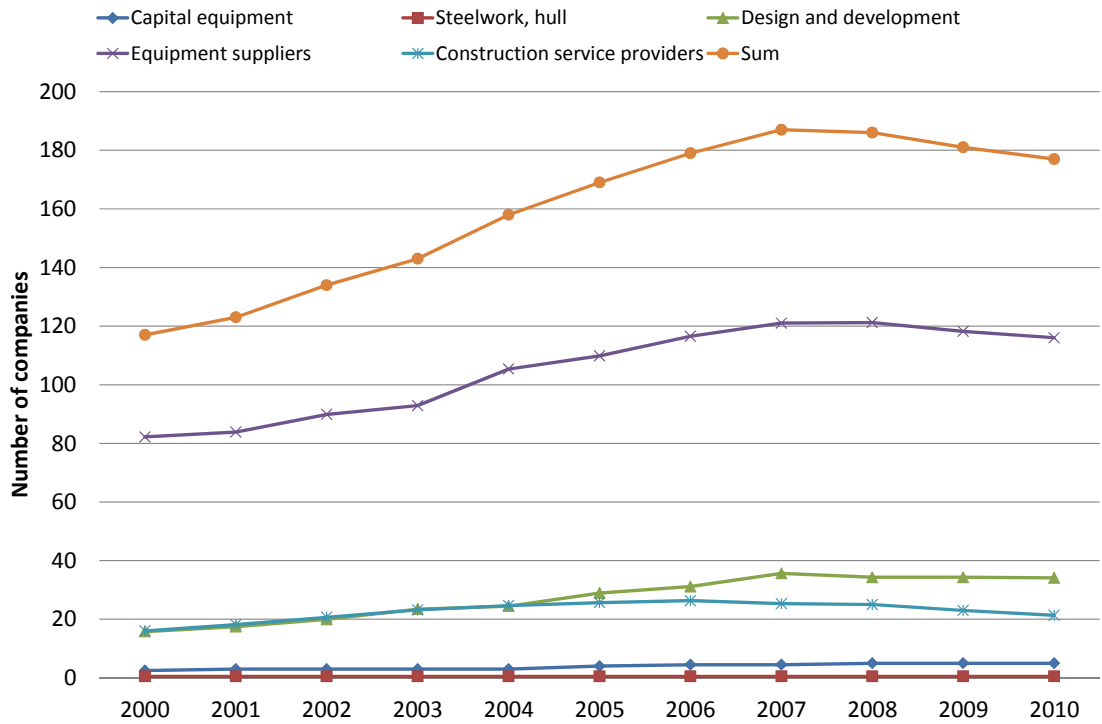


Figure A3.2 Shipbuilding suppliers (n = 177, year 2010) – number of companies for the time period 2000–2010

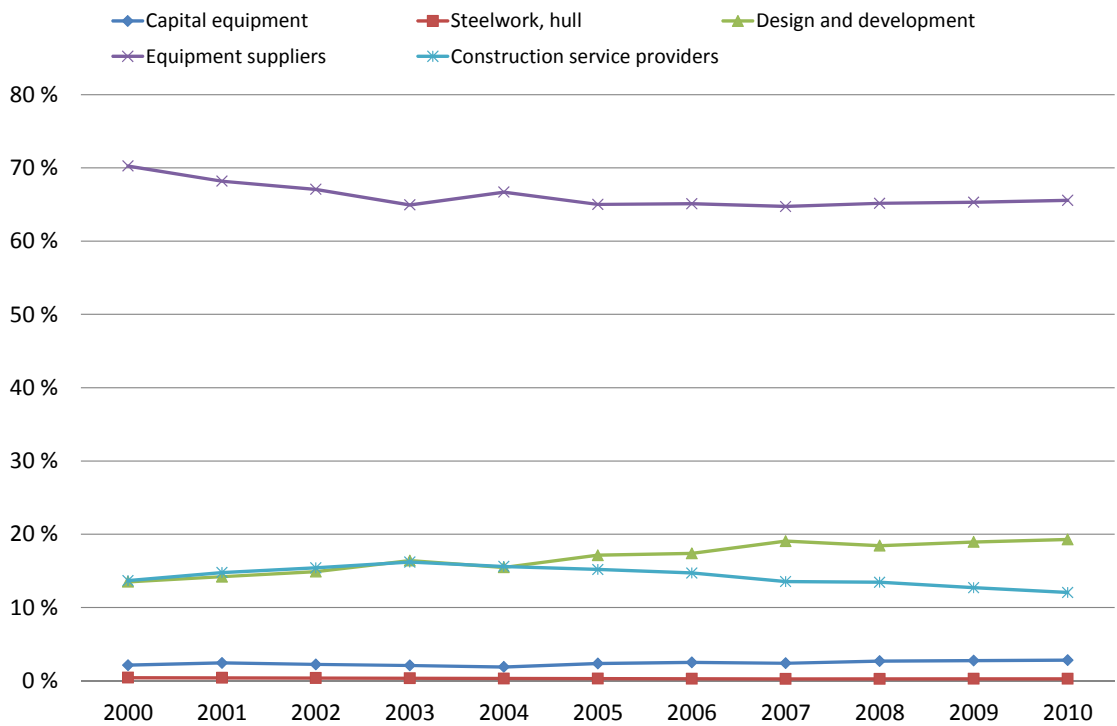


Figure A3.3 Shipbuilding suppliers (n = 177, year 2010) – proportion of companies per category, 2000–2010

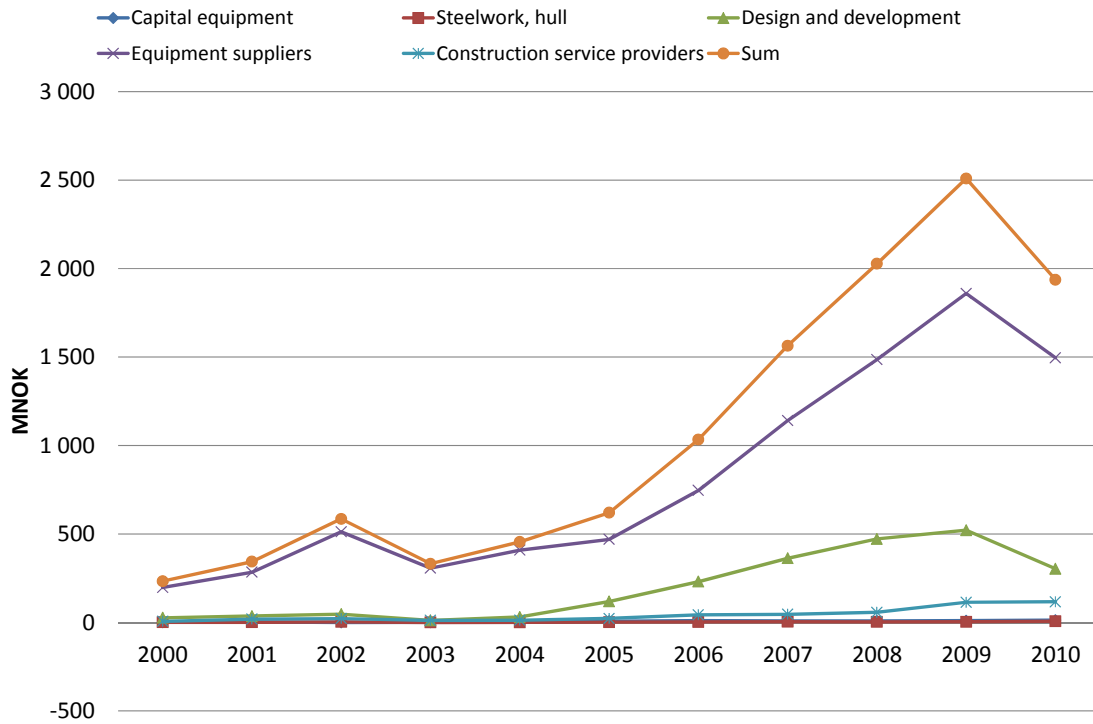


Figure A3.4 Shipbuilding suppliers (n = 177, year 2010) – pre-tax profits, 2000–2010

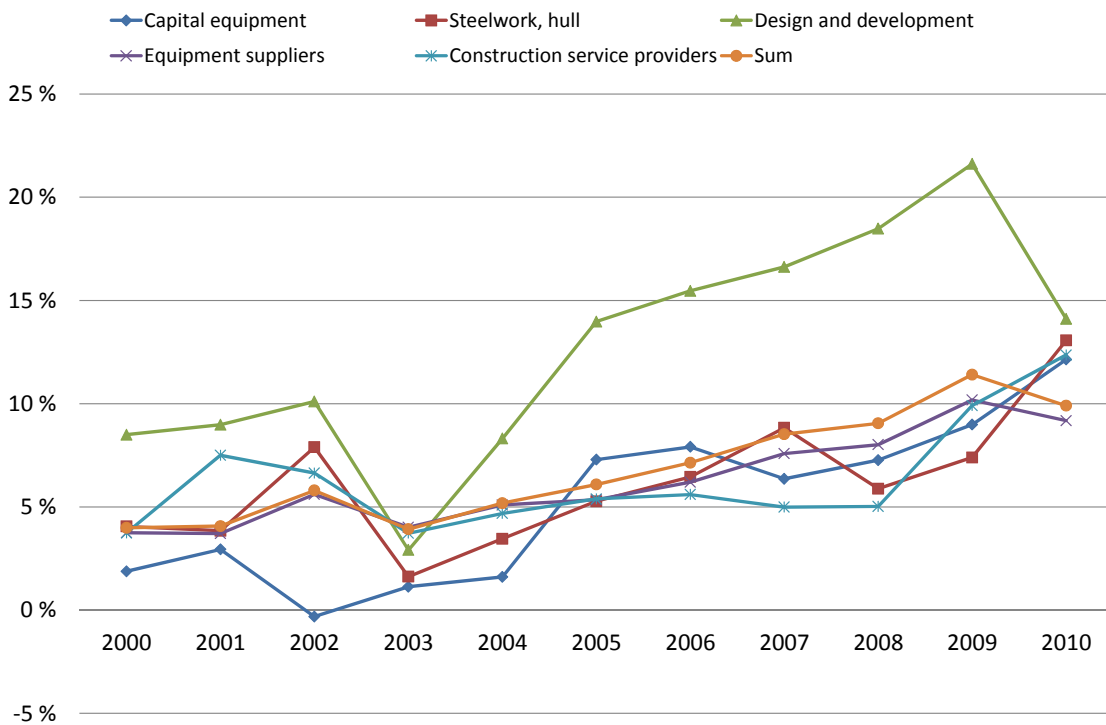


Figure A3.5 Shipbuilding suppliers (n = 177, year 2010) – pre-tax profit margin, 2000–2010

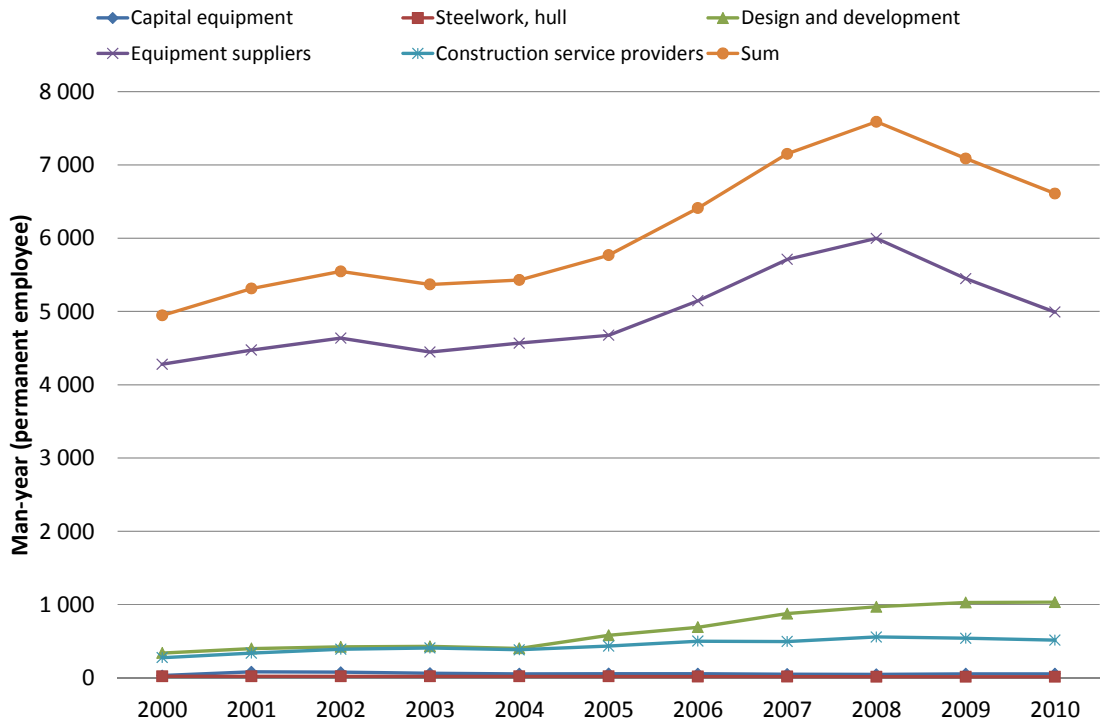


Figure A3.6 Shipbuilding suppliers (n = 177, year 2010) – number of man-years (permanent employees), 2000–2010

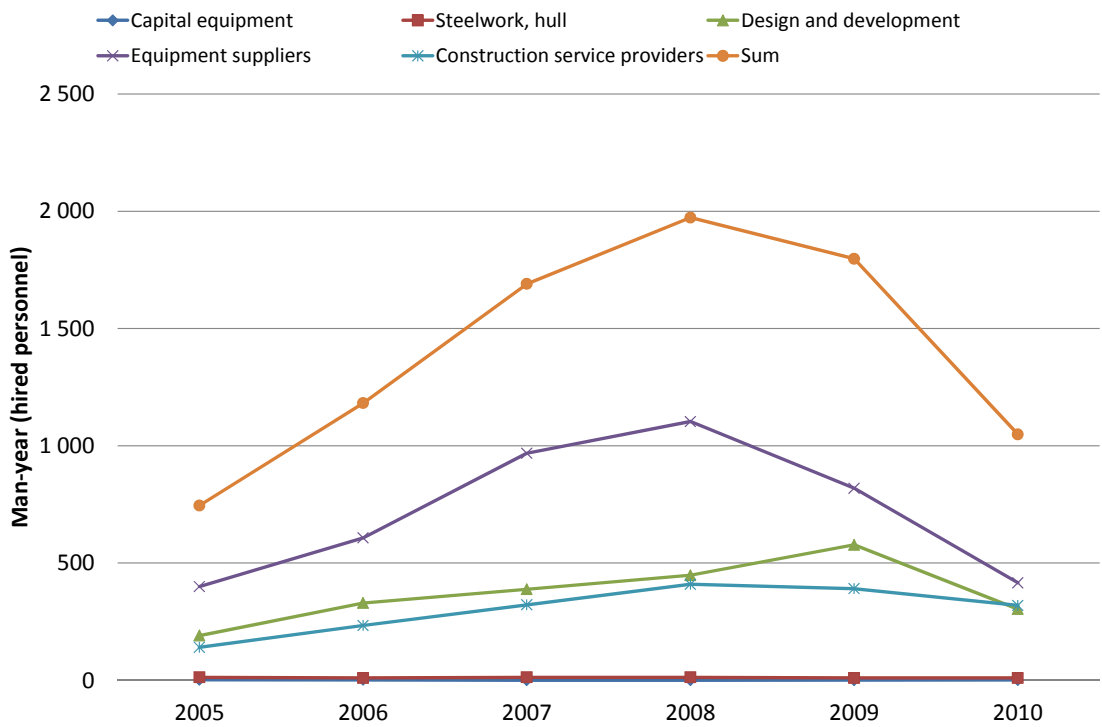


Figure A3.7 Shipbuilding suppliers (n = 177, year 2010) – number of man-years (hired personnel), 2005–2010

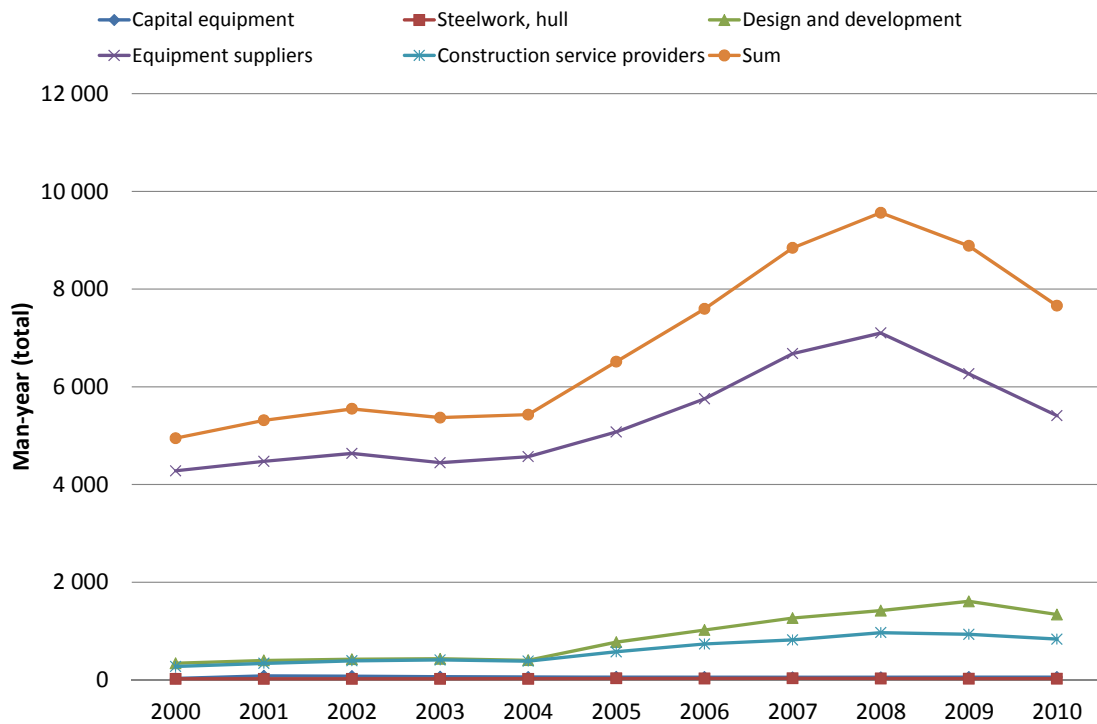


Figure A3.8 Shipbuilding suppliers (n = 177, year 2010) – number of man-years (permanent employee and hired personnel), 2000–2010

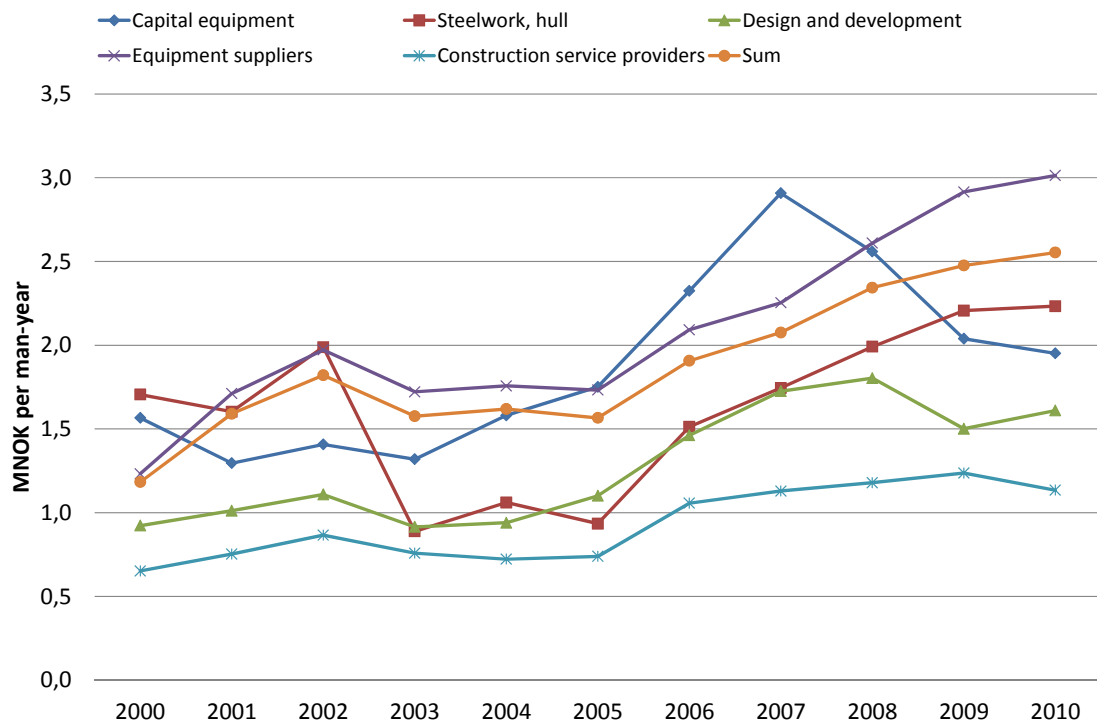


Figure A3.9 Shipbuilding suppliers (n = 177, year 2010) – turnover per man-year, 2000–2010

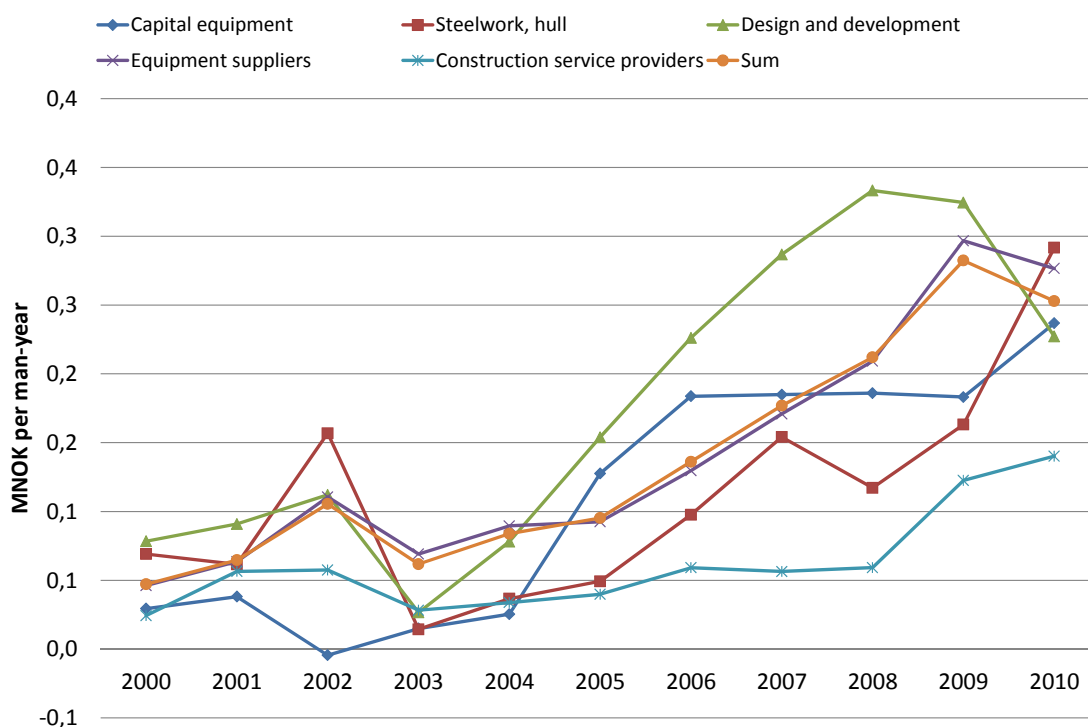


Figure A3.10 Shipbuilding suppliers (n = 177, year 2010) – pre-tax profits per man-year, 2000–2010

Table 1a Category	Before tax profit margin, year 2008			Before tax profit margin, year 2009			Before tax profit margin, year 2010		
	<0	[0,10]	>10	<0	[0,10]	>10	<0	[0,10]	>10
Capital equipment	1,0	2,5	1,5	1,5	1,5	2,0	0,5	2,5	2,0
Steelwork, hull		0,5			0,5				0,5
Design and development	6,3	11,3	16,6	3,5	9,8	21,0	5,2	13,5	15,5
Equipment suppliers	17,8	67,8	35,5	25,5	57,8	34,9	31,2	58,4	26,5
Construction service providers	6,8	9,8	8,3	5,5	8,3	9,2	2,2	12,7	6,5
Total no. of companies	32	92	62	36	78	67	39	87	51

Table 1b Relative frequencies Category	Before tax profit margin, year 2008			Before tax profit margin, year 2009			Before tax profit margin, year 2010		
	<0	[0,10]	>10	<0	[0,10]	>10	<0	[0,10]	>10
Capital equipment	3%	3%	2%	4%	2%	3%	1%	3%	4%
Steelwork, hull	0%	1%	0%	0%	1%	0%	0%	0%	1%
Design and development	20%	12%	27%	10%	13%	31%	13%	15%	30%
Equipment suppliers	56%	74%	57%	71%	74%	52%	80%	67%	52%
Construction service providers	21%	11%	13%	15%	11%	14%	6%	15%	13%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 2a Category	Average annual growth rate		
	<0	[0,15]	>15
Capital equipment	1,0	2,5	1,5
Steelwork, hull		0,5	
Design and development	1,5	15,0	17,7
Equipment suppliers	7,5	67,9	40,7
Construction service providers	4,0	9,2	8,2
Total no. of companies	14	95	68

Table 2b Relative frequencies Category	Average annual growth rate		
	<0	[0,15]	>15
Capital equipment	7%	3%	2%
Steelwork, hull	0%	1%	0%
Design and development	11%	16%	26%
Equipment suppliers	54%	71%	60%
Construction service providers	29%	10%	12%
Total	100%	100%	100%

Figure A3.11 Shipbuilding supplier data – pre-tax profit margin and average annual growth rate as of 31 December 2010

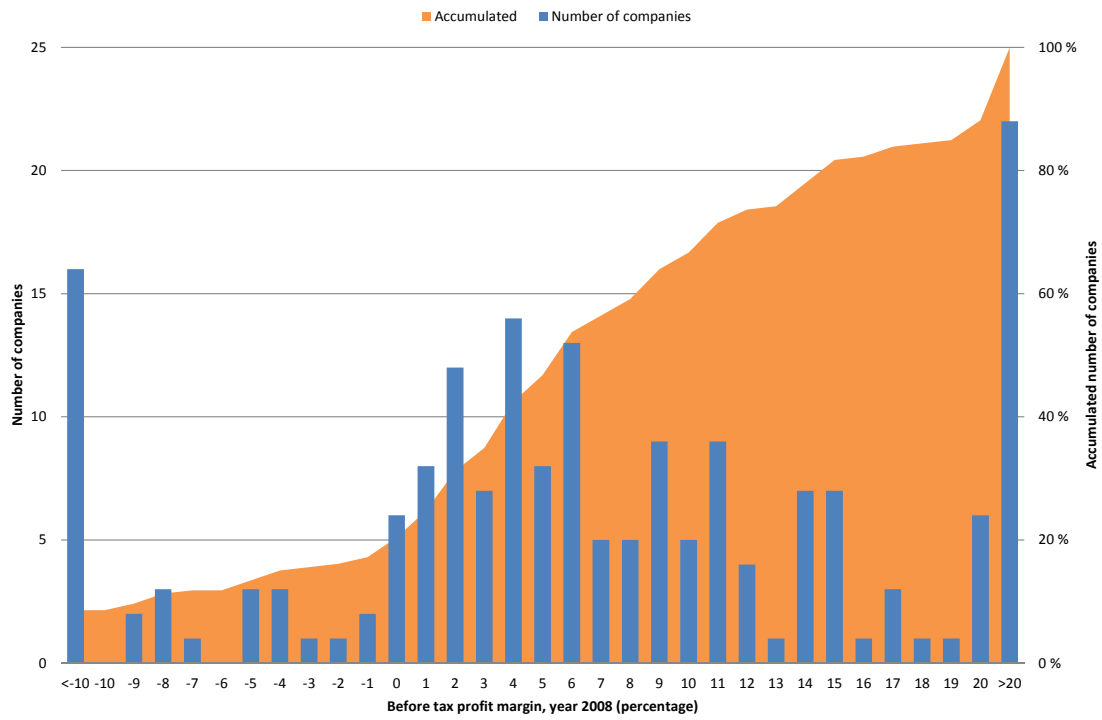


Figure A3.12 Shipbuilding suppliers (n = 186, year 2008) – pre-tax profit margin, 2008

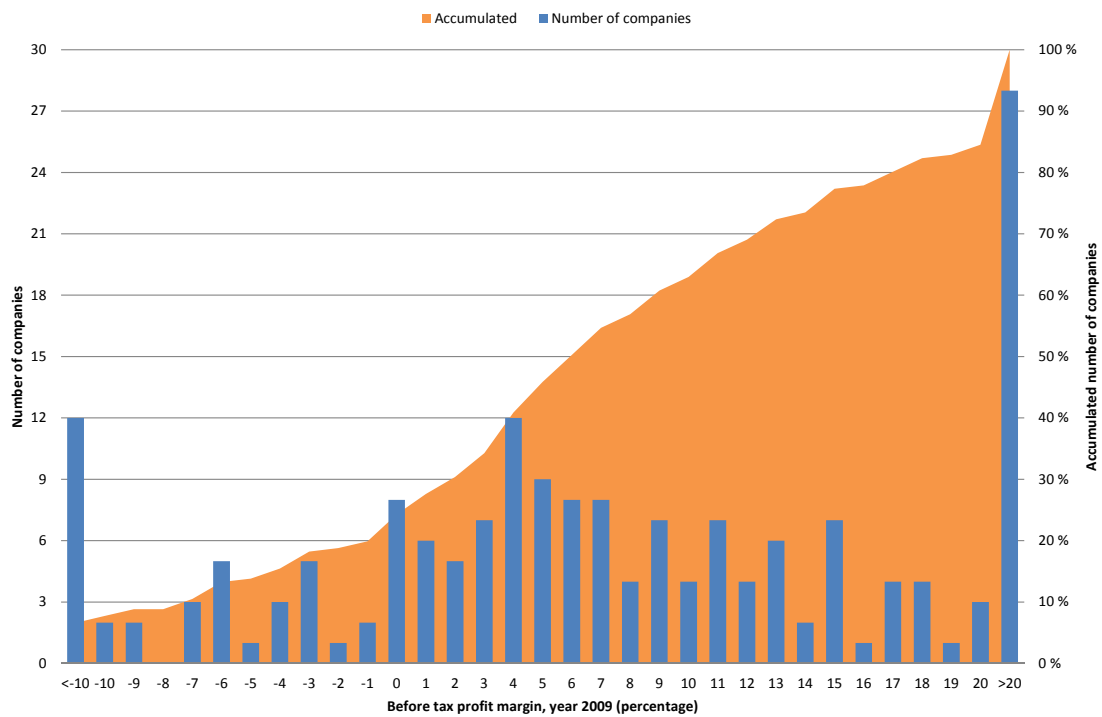


Figure A3.13 Shipbuilding suppliers (n = 181, year 2009) – pre-tax profit margin, 2009

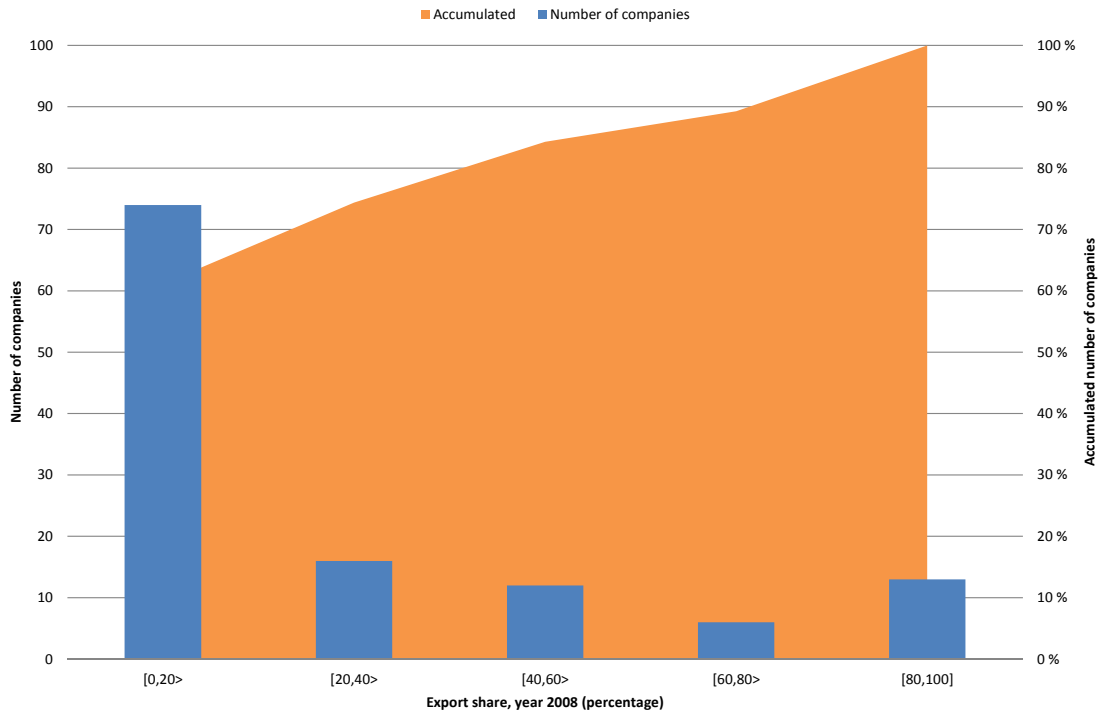


Figure A3.14 Shipbuilding suppliers (n = 121, year 2008) – export share and number of companies, 2008

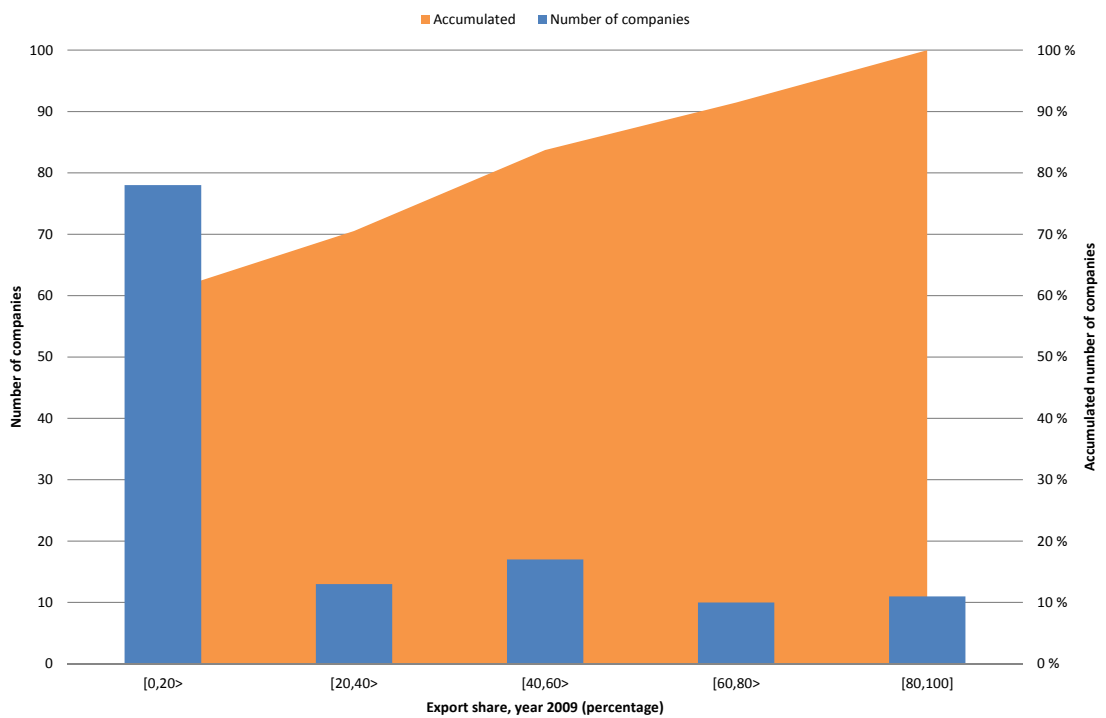


Figure A3.15 Shipbuilding suppliers (n = 129, year 2009) – export share and number of companies, 2009

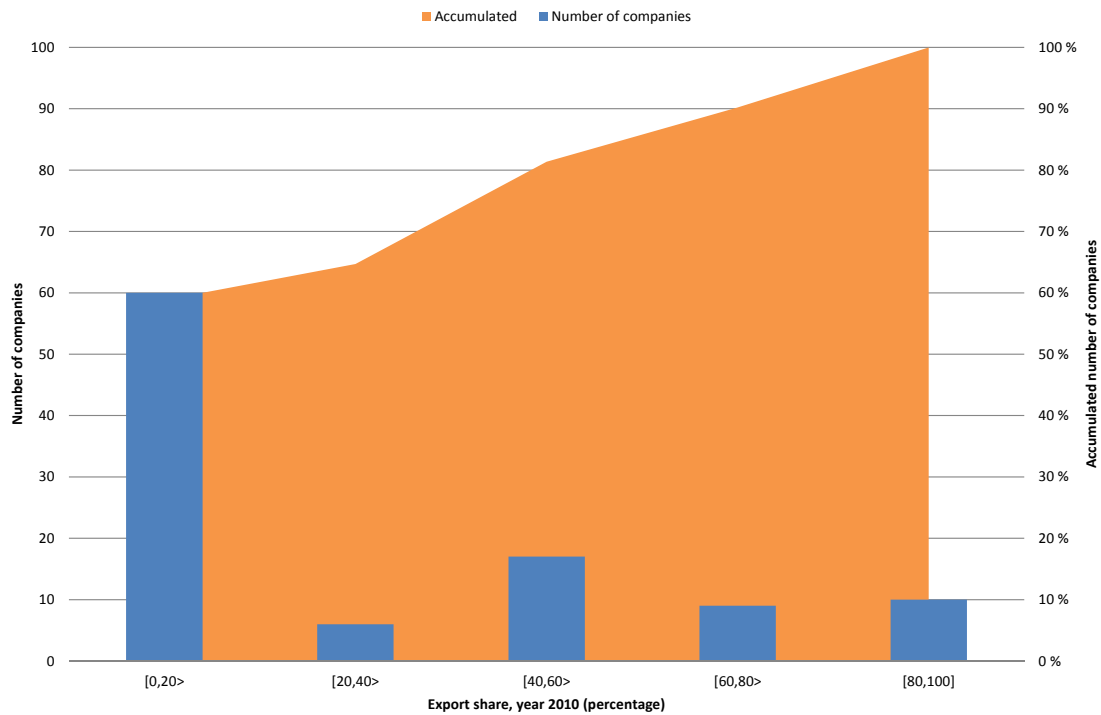


Figure A3.16 Shipbuilding suppliers (n = 102, year 2010) – export share and number of companies, 2010

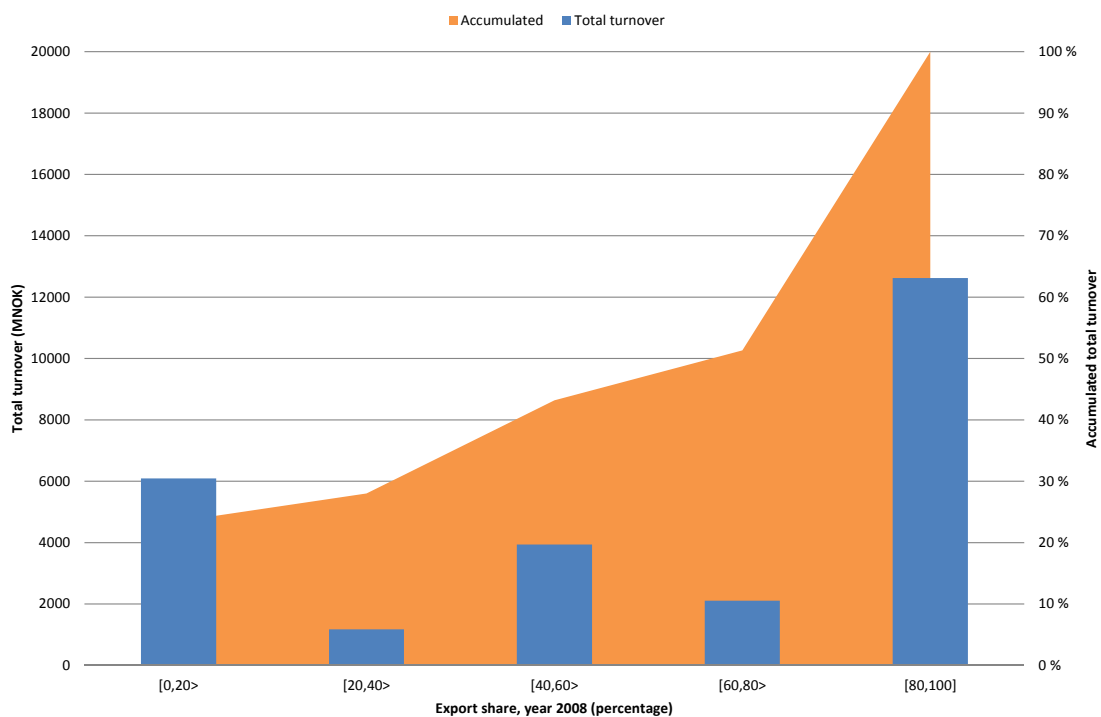


Figure A3.17 Shipbuilding suppliers (n = 121, year 2008) – export share and total turnover, 2008

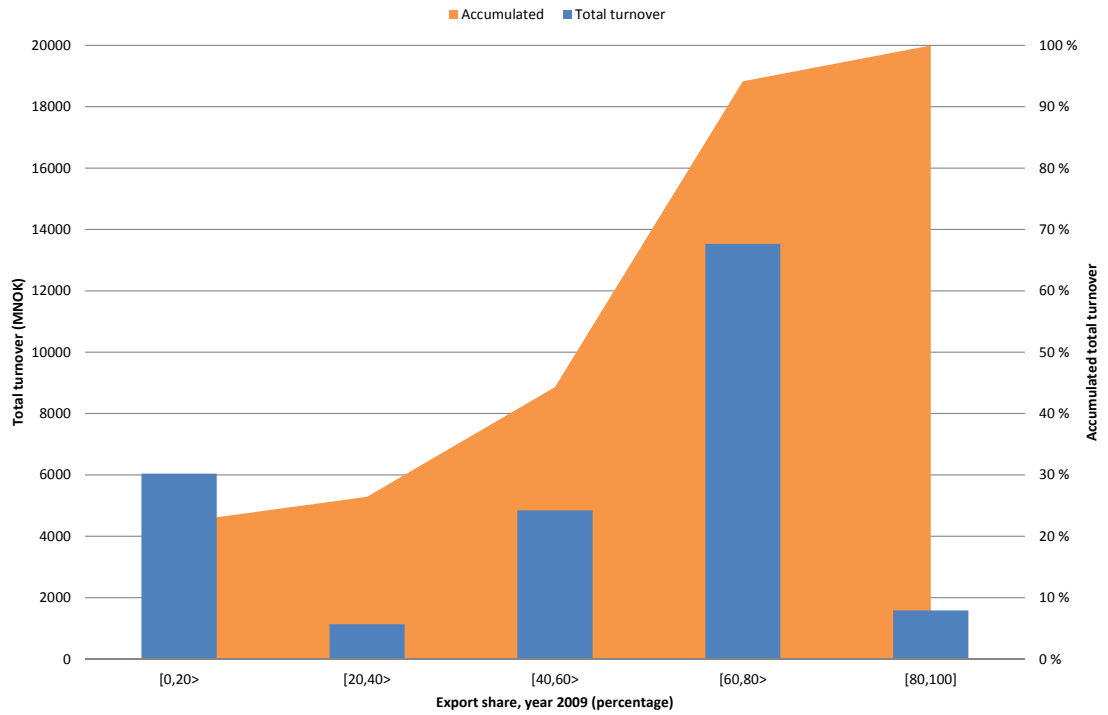


Figure A3.18 Shipbuilding suppliers (n = 129, year 2009) – export share and total turnover, 2009

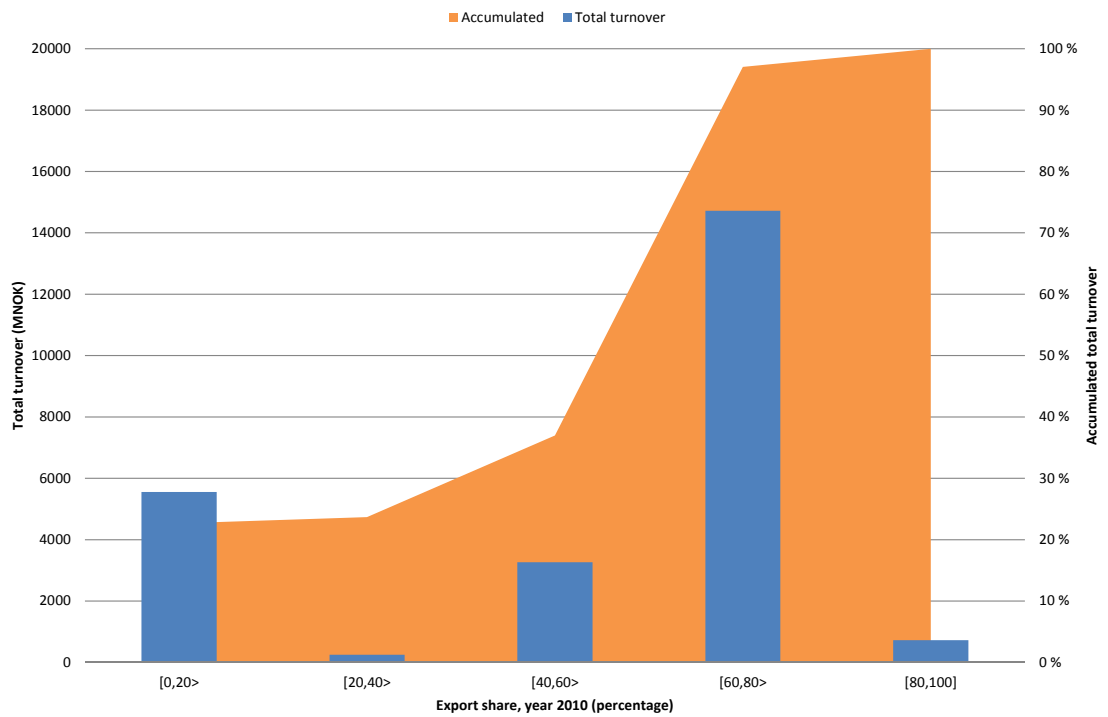


Figure A3.19 Shipbuilding suppliers (n = 102, year 2010) – export share and total turnover, 2010

Number of companies

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
E	12,0	12,0	12,0	13,5	13,5	14,5	14,5	13,5	13,5	14,0	15,0
D	7,3	7,8	8,8	8,8	10,8	11,8	14,3	16,3	17,3	16,8	16,8
C	36,0	36,7	39,7	41,2	46,7	47,7	50,3	52,3	50,5	49,5	47,8
B	12,3	12,3	13,3	13,3	14,3	14,8	15,8	15,8	15,8	15,8	15,8
A	14,5	15,0	16,0	16,0	20,0	21,0	21,5	23,0	24,0	22,0	20,5
Sum	82	84	90	93	105	110	117	121	121	118	116

Proportion of companies per category

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
E	15 %	14 %	13 %	15 %	13 %	13 %	12 %	11 %	11 %	12 %	13 %
D	9 %	9 %	10 %	10 %	10 %	11 %	12 %	13 %	14 %	14 %	15 %
C	44 %	44 %	44 %	44 %	44 %	43 %	43 %	43 %	42 %	42 %	41 %
B	15 %	15 %	15 %	14 %	14 %	13 %	14 %	13 %	13 %	13 %	14 %
A	18 %	18 %	18 %	17 %	19 %	19 %	18 %	19 %	20 %	19 %	18 %
Sum	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %

Turnover (from M&R), MNOK

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
E	375	454	458	416	488	583	709	719	736	609	589
D	184	210	331	303	380	362	496	652	762	725	721
C	803	950	1 164	919	1 069	1 489	2 054	2 664	3 000	2 594	2 325
B	913	987	978	866	906	1 128	1 540	1 821	1 849	1 841	1 841
A	2 998	5 054	6 211	5 151	5 183	5 228	7 239	9 190	12 185	12 496	10 816
Sum	5 273	7 654	9 142	7 655	8 026	8 790	12 037	15 047	18 532	18 265	16 292

Profit before tax, MNOK

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
E	-0	10	5	-7	9	24	44	41	48	25	3
D	4	12	18	7	8	11	40	47	49	55	56
C	21	45	68	18	32	60	173	216	229	180	109
B	-21	-110	-27	-27	35	68	123	188	103	258	178
A	194	327	450	316	325	307	365	649	1 055	1 341	1 149
Sum	198	284	513	307	409	470	746	1 141	1 486	1 859	1 496

Before tax profit margin

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
E	0 %	2 %	1 %	-2 %	2 %	4 %	6 %	6 %	7 %	4 %	0 %
D	2 %	6 %	6 %	2 %	2 %	3 %	8 %	7 %	6 %	8 %	8 %
C	3 %	5 %	6 %	2 %	3 %	4 %	8 %	8 %	8 %	7 %	5 %
B	-2 %	-11 %	-3 %	-3 %	4 %	6 %	8 %	10 %	6 %	14 %	10 %
A	6 %	6 %	7 %	6 %	6 %	6 %	5 %	7 %	9 %	11 %	11 %
Average	4 %	4 %	6 %	4 %	5 %	5 %	6 %	8 %	8 %	10 %	9 %

Total man-year

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
E	311	316	380	383	385	310	384	259	265	238	375
D	138	149	166	166	257	290	331	434	466	440	418
C	709	719	788	735	860	931	1 126	1 253	1 329	1 297	1 113
B	839	829	787	721	682	715	831	962	1 025	1 030	960
A	2 282	2 460	2 515	2 442	2 385	2 830	3 081	3 770	4 016	3 261	2 542
Sum	4 279	4 472	4 636	4 446	4 568	5 075	5 753	6 678	7 100	6 266	5 407

Turnover (from M&R) per man-year, MNOK per man-year

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
E	1,21	1,44	1,21	1,09	1,27	1,88	1,85	2,78	2,78	2,56	1,57
D	1,33	1,41	1,99	1,82	1,48	1,25	1,50	1,50	1,64	1,65	1,73
C	1,13	1,32	1,48	1,25	1,24	1,60	1,82	2,13	2,26	2,00	2,09
B	1,09	1,19	1,24	1,20	1,33	1,58	1,85	1,89	1,80	1,79	1,92
A	1,31	2,05	2,47	2,11	2,17	1,85	2,35	2,44	3,03	3,83	4,26
Average	1,23	1,71	1,97	1,72	1,76	1,73	2,09	2,25	2,61	2,91	3,01

Profit before tax per man-year, MNOK per man-year

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
E	-0,00	0,03	0,01	-0,02	0,02	0,08	0,12	0,16	0,18	0,11	0,01
D	0,03	0,08	0,11	0,04	0,03	0,04	0,12	0,11	0,11	0,13	0,13
C	0,03	0,06	0,09	0,02	0,04	0,06	0,15	0,17	0,17	0,14	0,10
B	-0,03	-0,13	-0,03	-0,04	0,05	0,10	0,15	0,20	0,10	0,25	0,19
A	0,09	0,13	0,18	0,13	0,14	0,11	0,12	0,17	0,26	0,41	0,45
Average	0,05	0,06	0,11	0,07	0,09	0,09	0,13	0,17	0,21	0,30	0,28

Figure A3.20 Equipment supplier data – key figures

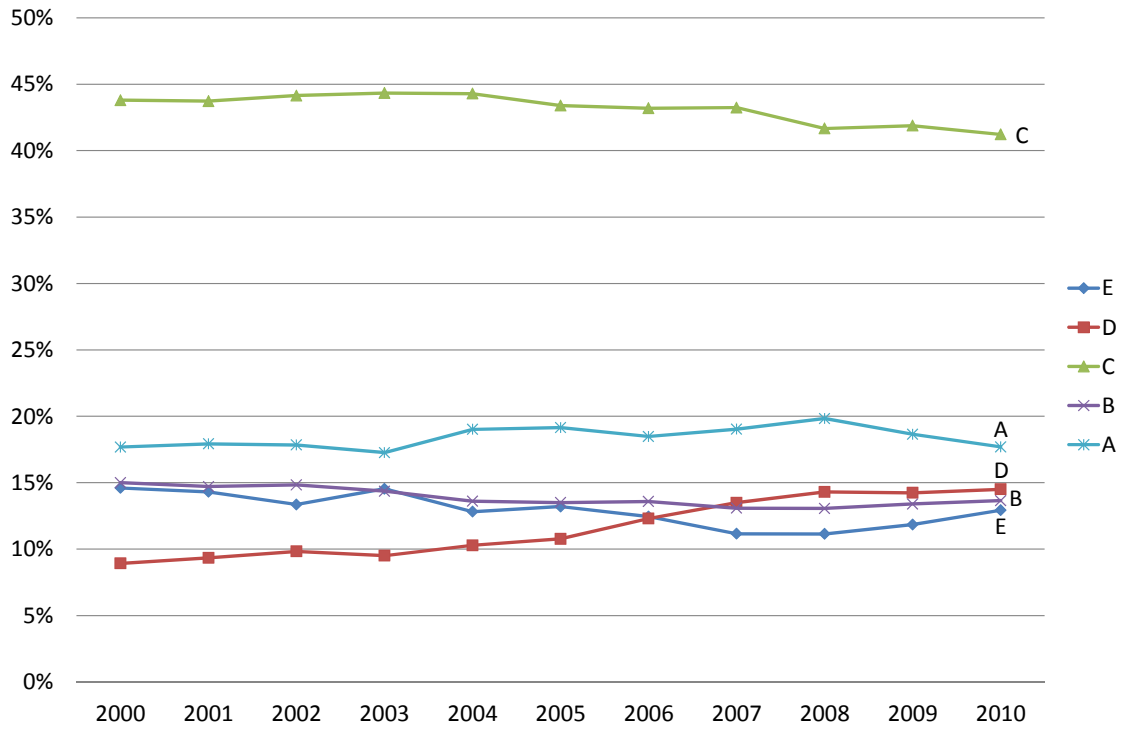


Figure A3.21 Equipment suppliers (n = 116, year 2010) – proportion of companies per category, 2000–2010

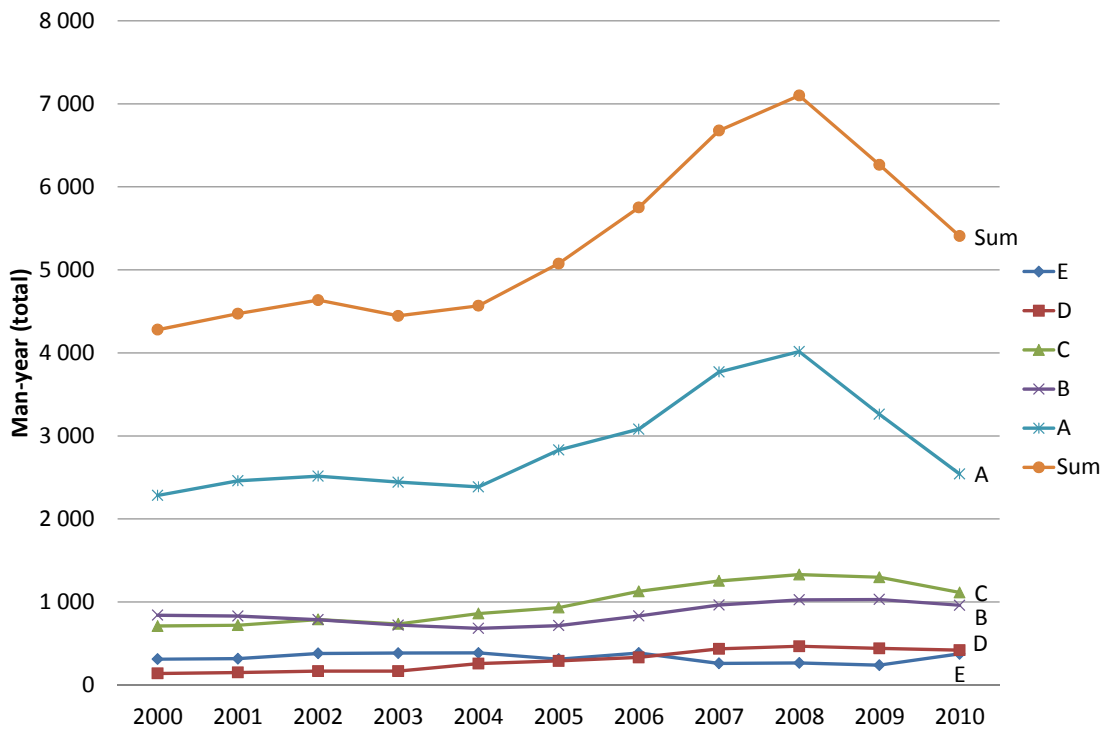


Figure A3.22 Equipment suppliers (n = 116, year 2010) – number of man-years (total), 2000–2010

Table 1a Category	Before tax profit margin, year 2008			Before tax profit margin, year 2009			Before tax profit margin, year 2010		
	<0	[0,10]	>10	<0	[0,10]	>10	<0	[0,10]	>10
E	1,5	8,0	4,0	5,5	5,0	3,5	6,5	7,5	1,0
D	1,5	11,0	4,8	2,5	8,5	5,8	3,5	8,5	4,8
C	8,5	27,5	14,5	11,5	28,5	9,5	13,3	27,2	7,3
B	1,3	8,5	6,0	1,0	10,0	4,8	4,5	6,5	4,8
A	5,0	12,8	6,2	5,0	5,8	11,2	3,3	8,7	8,5
Total no. of companies	18	68	36	26	58	35	31	58	26

Table 1b Relative frequencies Category	Before tax profit margin, year 2008			Before tax profit margin, year 2009			Before tax profit margin, year 2010		
	<0	[0,10]	>10	<0	[0,10]	>10	<0	[0,10]	>10
E	8 %	12 %	11 %	22 %	9 %	10 %	21 %	13 %	4 %
D	8 %	16 %	14 %	10 %	15 %	17 %	11 %	15 %	18 %
C	48 %	41 %	41 %	45 %	49 %	27 %	43 %	47 %	28 %
B	7 %	13 %	17 %	4 %	17 %	14 %	14 %	11 %	18 %
A	28 %	19 %	17 %	20 %	10 %	32 %	11 %	15 %	32 %
Total	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %

Table 1c Category	Before tax profit margin, year 2008			Before tax profit margin, year 2009			Before tax profit margin, year 2010		
	<0	[0,10]	>10	<0	[0,10]	>10	<0	[0,10]	>10
E	5	507	224	242	310	58	140	419	31
D	115	526	121	121	440	163	41	486	194
C	80	2 166	754	155	1 944	494	355	1 705	265
B	298	1 381	171	6	794	1 041	189	776	875
A	578	9 418	2 190	221	7 167	5 108	174	7 792	2 851
Turnover	1 076	13 998	3 459	745	10 655	6 864	898	11 177	4 216

Table 2a Category	Average annual growth rate		
	<0	[0,15]	>15
E	1,5	11,5	2,0
D	1,0	9,3	6,5
C	2,0	26,3	19,5
B	2,0	9,5	4,3
A	1,0	11,2	8,3
Total no. of companies	8	68	41

Table 2b Relative frequencies Category	Average annual growth rate		
	<0	[0,15]	>15
E	20 %	17 %	5 %
D	13 %	14 %	16 %
C	27 %	39 %	48 %
B	27 %	14 %	11 %
A	13 %	17 %	20 %
Total	100 %	100 %	100 %

Table 2c Category	Average annual growth rate		
	<0	[0,15]	>15
E	10	473	107
D	26	605	90
C	41	1 230	1 053
B	36	1 136	668
A	20	1 800	8 997
Turnover	133	5 244	10 915

Figure A3.23 Equipment supplier data – pre-tax profit margin and average annual growth rate as of 31 December 2010

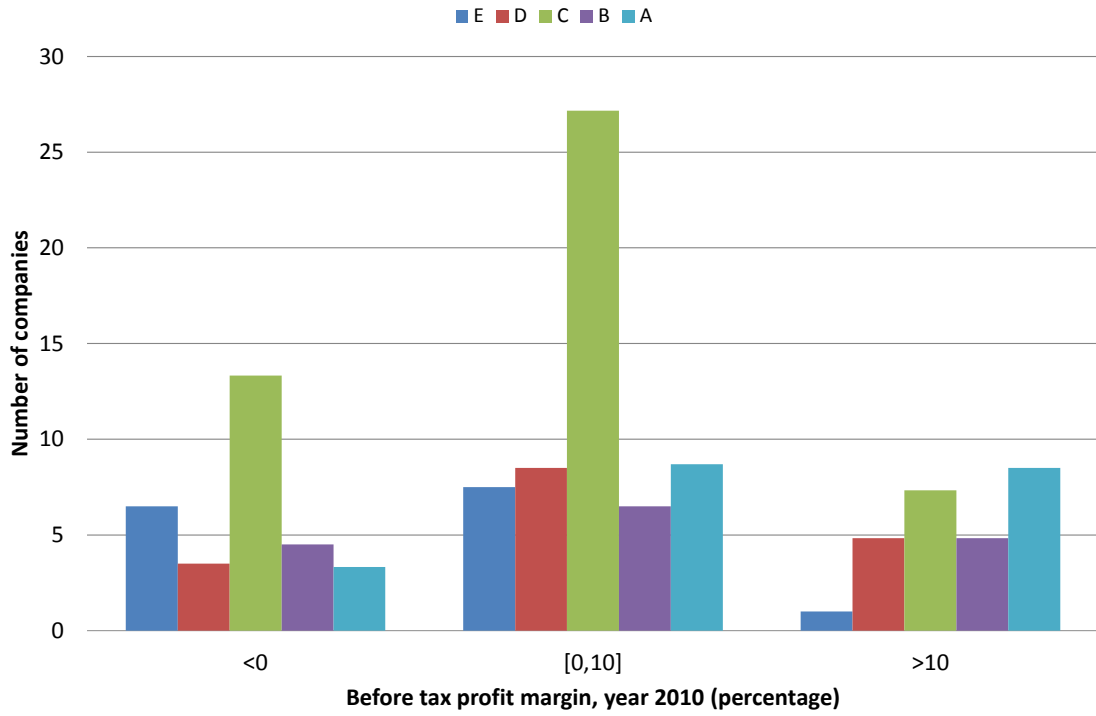


Figure A3.24 Equipment suppliers (n = 116, year 2010) – pre-tax profit margin and number of companies, 2010

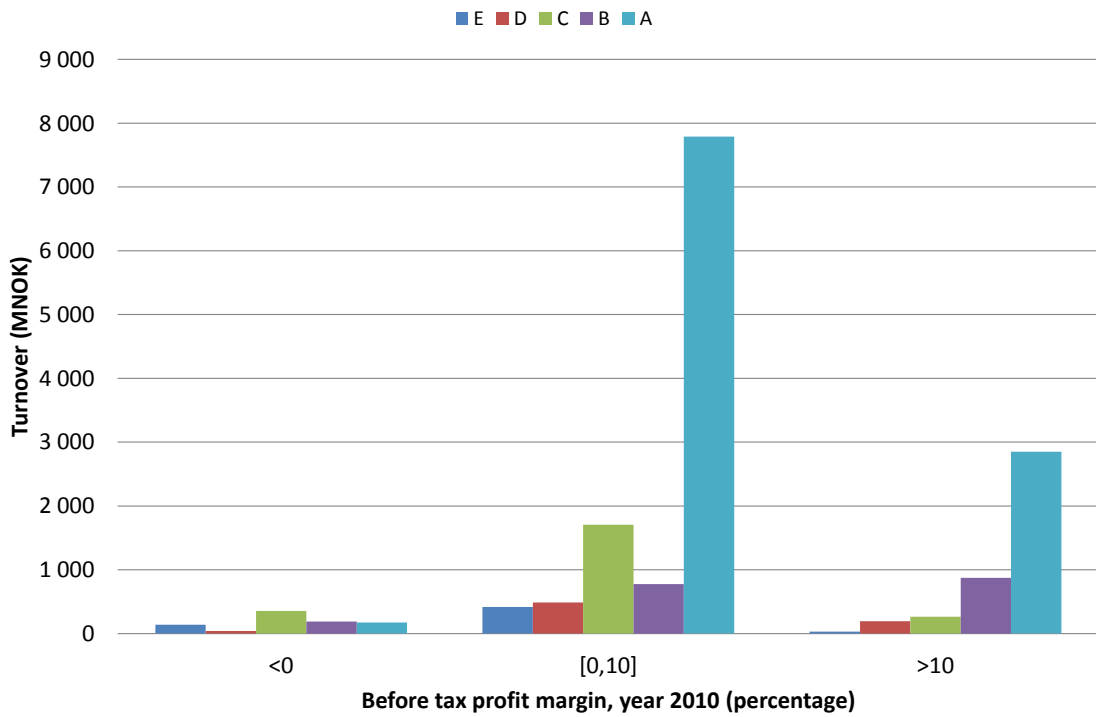


Figure A3.25 Equipment suppliers (n = 116, year 2010) – pre-tax profit margin and turnover, 2010

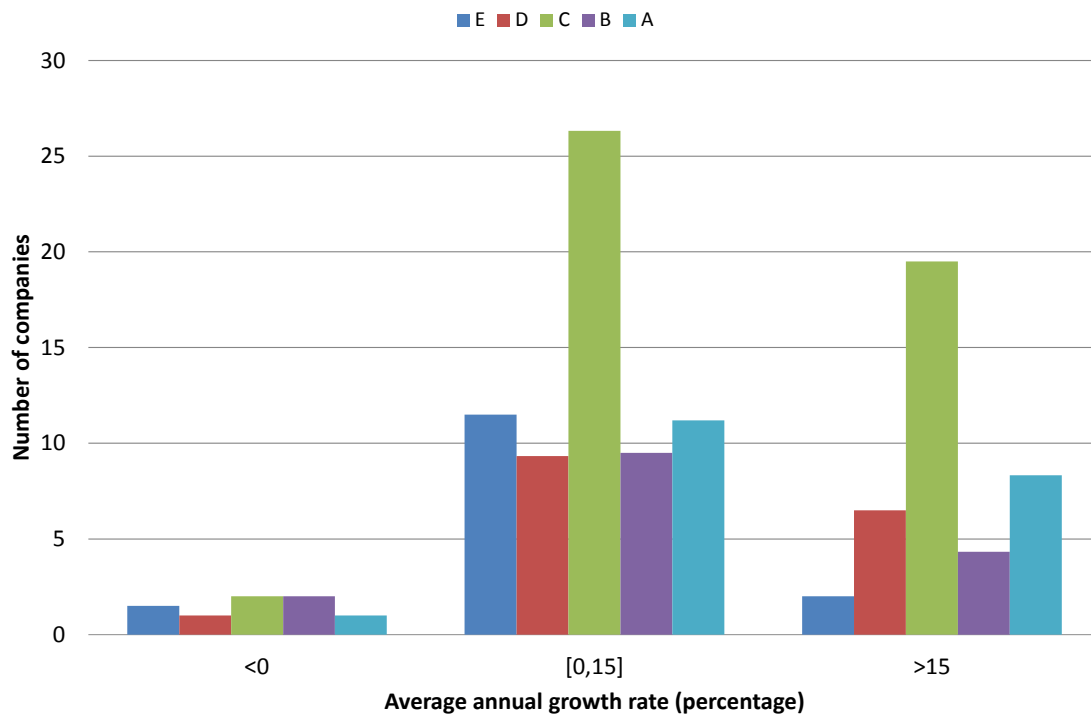


Figure A3.26 Equipment suppliers (n = 116, year 2010) – average annual growth rate as of 31 December 2010 and number of companies, 2010

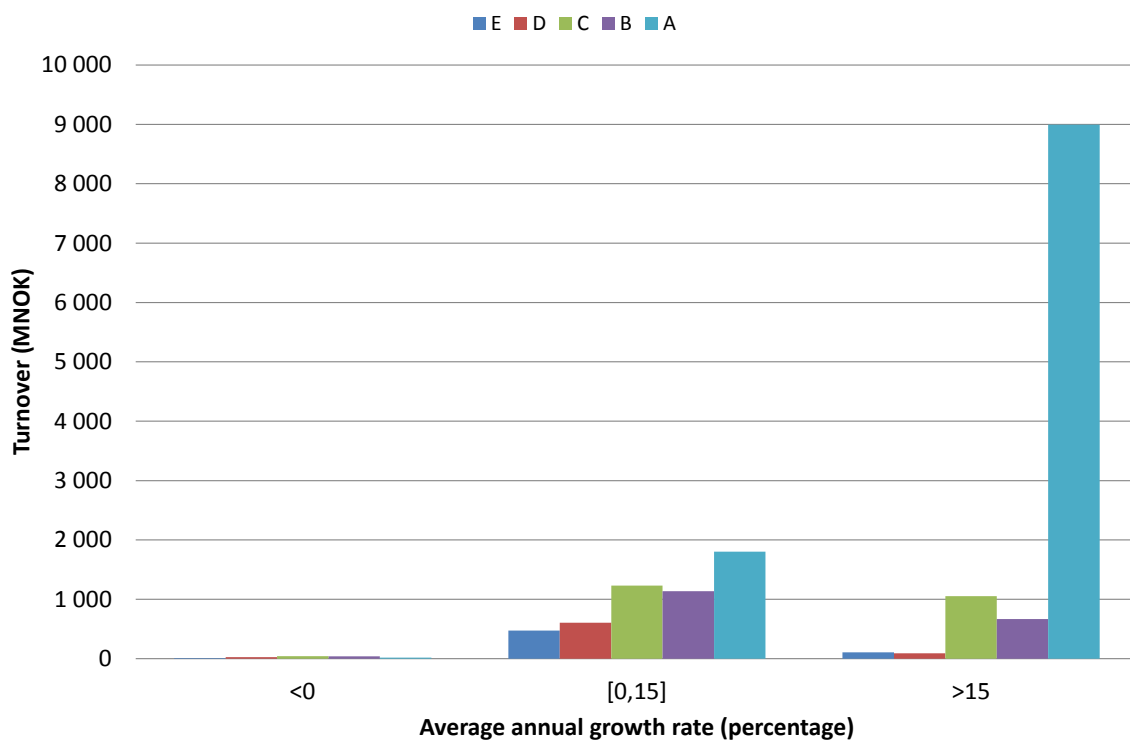


Figure A3.27 Equipment suppliers (n = 116, year 2010) – average annual growth rate as of 31 December 2010 and turnover, 2010

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