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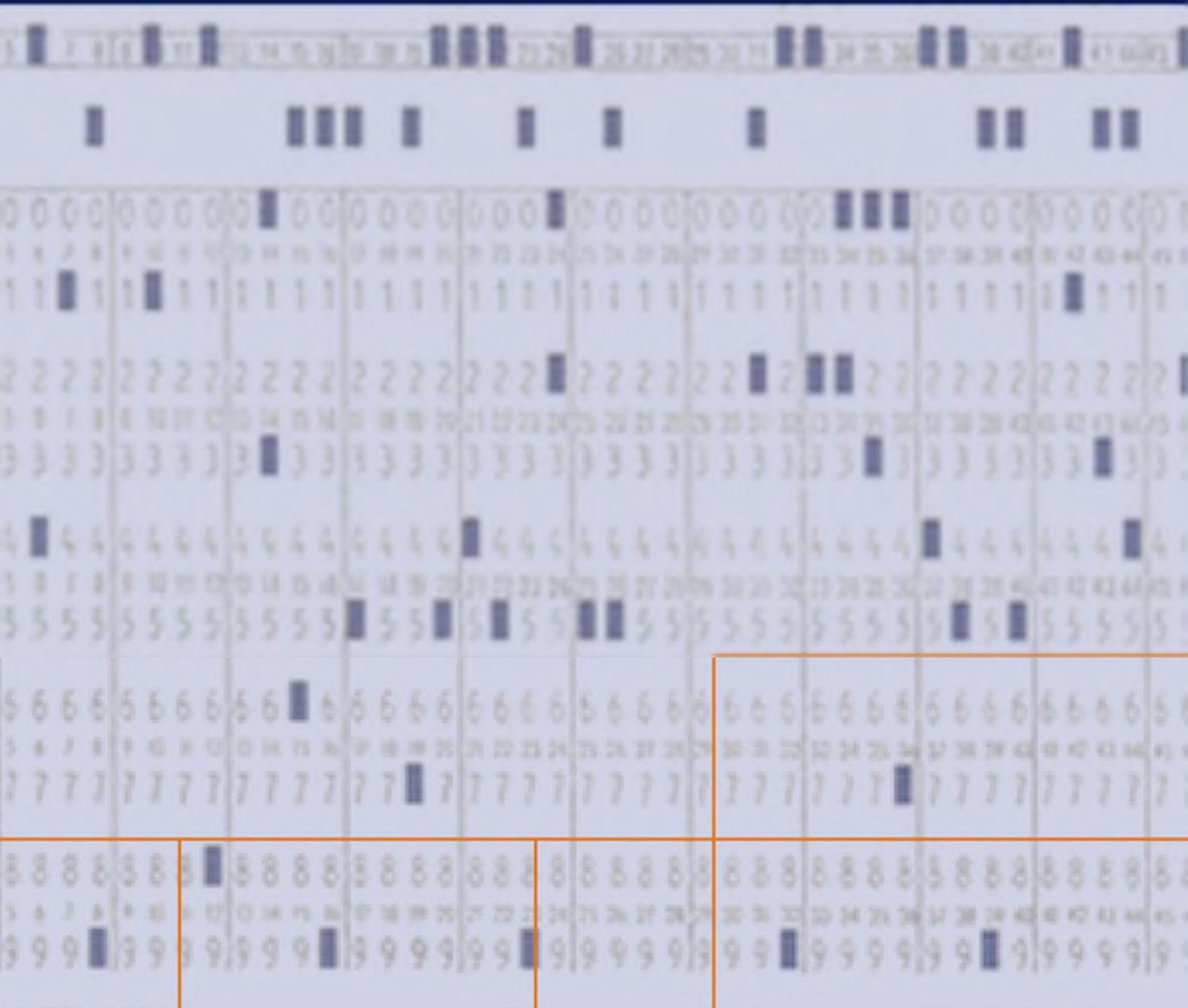
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STATENS ARKIVER

ERHVERVSARKIVET

Erhvervshistorisk Årbog



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Aspects of Danish Business History since 1970 – a short introduction

BY MOGENS ROSTGAARD NISSEN

In this volume of Erhvervshistorisk Årbog, Danish Yearbook of Business History, some of the results of a large project are presented. This introduction presents mainly the historical components of the project, based on studies of contemporary sources dating back to ca. 1970. The volume consists of four articles that refer to four different industries: The textile industry, the furniture industry, the shipbuilding and marine equipment industry, and finally the shipbuilding industry and the formation of spin-off companies instead. In this project we have chosen to use the simple "smiley"-model of the value-chain. The project, called GONE, has uncovered how these industries have changed value-chain strategies, which in turn has had a major impact on those employed in these industries and for Danish society as a whole. It is indisputable that the number of persons employed in the actual manufacturing jobs has decreased very significantly in Denmark since 1970. Instead more people are working in design, purchasing, sales and branding.

Introduction

In a large-scale advertising campaign, the trade association Dansk Produktion has recently attempted to promote the "Innovative Denmark". Under the motto "*Knowledge + production = Welfare*" they are trying to make it clear that in 2012 there were still about 350,000 manufacturing jobs in Denmark. On their website it was formulated this way:¹

It is the interplay between research and production that create value for society, and if you move production abroad, research, knowledge and development will move as well. Danish production accounts for half of the country's revenues, so future growth and prosperity depends on a Denmark, which is not only innovative thinking, but also capable of going new ways.

Provinsindustriens Arbejdsgiverforening (the Provincial Industry Employers' Association) is the organization behind Dansk Produktion. It represents the interests of small-and medium-sized manufacturing companies outside the capital region, and the CEOs of Grundfos and Danfoss serve as board members along with six CEO's from other manufacturing companies.² It is therefore less surprising that it is precisely this organization that is running the campaign. On the other hand it is remarkable that the organization so clearly emphasizes the interaction between research and production for value creation, and inextricably links the two. The campaign demonstrates how Danish manufacturing companies see a strong need to mark that industrial production still takes place in Denmark, which again generates value for the Danish society.

The content and timing of Dansk Produktion's campaign fits well with this presentation of the results of the interdisciplinary research project Global Operations Network – GONE. The project

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started in 2009 and was funded by The Danish Council for Strategic Research.³ The project has focused on how the Danish production companies have tackled the challenge of economic globalization in the period since the early 1970's.

In this volume of Erhvervshistorisk Årbog some of the results of the GONE-project are presented. This article presents mainly the historical components of the project, based on studies of contemporarily sources dating back to ca. 1970. The main sources are public such as trade magazines, newspaper articles etc., which forms the basis for the analysis. To a limited extent, private sources from corporate archives such as internal correspondence, minutes of board meetings etc. have been used, but here archival access remains somewhat restricted. In addition, we have made interviews with key players in the industry associations and some CEO's at various manufacturing companies from 2009 to 2011. Furthermore we have used the research literature, mainly published by business economists, on specific industries and companies in the four selected industries. The focus of the studies is on an industrial level, but cases from individual companies are used to illustrate and nuance the analysis of the overall development of the industry.

This volume consists of four articles that refer to four different industries. René Taudal Poulsen and Kristoffer Jensen have written the article on the textile industry, and Lars Hedeman and Mogens Rostgaard Nissen are the authors of the article on the furniture industry. René Taudal Poulsen has also written the article on shipbuilding and marine equipment industry. Finally, Thomas Roslyng Olesen has written the article on the importance of the closure of the shipbuilding industry and the formation of spin-off companies instead. This is concerning the closure of Danyard in Frederikshavn in 1999. This article is based mainly on the results of his doctoral thesis, which was written as part of the GONE project.⁴ Originally it was planned that there should have been an article concerning the telecom industry, but unfortunately we had to leave this very interesting part out.

The GONE-project

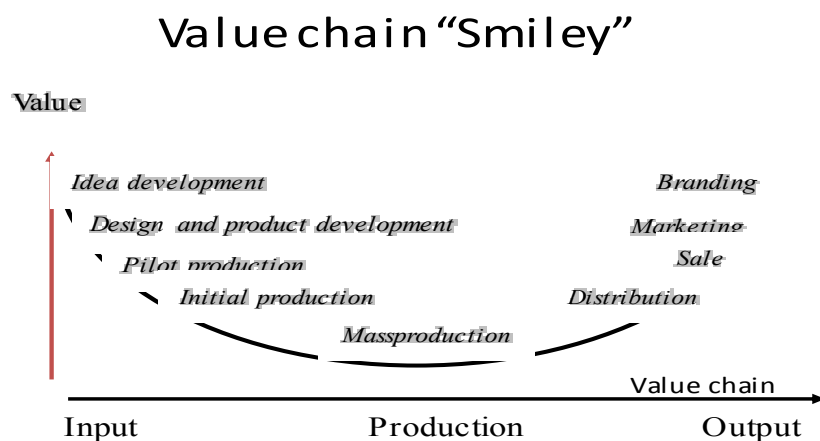
When we started the project four years ago our aim was to study strategies of small and medium sized manufacturing companies in Denmark and analyze how companies in four different industries – textile and clothing industry, furniture industry, telecom industry and the marine equipment industry – had responded to the forces of economic globalization since 1970. Our focus has been on the different value-chain-strategies employed by Danish manufacturing companies since the early 1970's. A key research question has been whether Danish companies have chosen to move some or all production activities out of Denmark. To the extent that this relocation of activities has taken place, we examine if production has been handed over to independent contractors or whether relocation involved the establishment of foreign subsidiaries (so-called *offshoring*). Another key issue has been to examine the extent to which Danish manufacturing companies have tried to rationalize and automate production processes within Denmark and thus minimize the effect of high labor costs and we have tried to assess to which extent this strategy has proven viable.

The project name GONE is an abbreviation for *Global Operations Networks*, but the name also indicates some kind of doomsday prophecy that industrial production in Denmark will soon be a thing of the past. The overarching question is if high cost – especially the high Danish wages – has made or will make it impossible to compete with low-wage countries in Eastern Europe, China and elsewhere in the world.

In this project we have chosen to use the simple "smiley"-model of the value-chain. On the horizontal line, the value chain flows from the left to the right, starting with input activities such as idea and product development, and going over mass production to output activities such as distribution, marketing and branding. The vertical line of the smiley shows the level of value creation for the individual activities within the value chain. According to the smiley-model

upstream activities such as idea and product development and design – add high value to the product. Downstream activities, at the other end of the value chain, also add high value to the product, and include such activities as marketing and branding. On the other hand, mass production – the midstream activities – creates less value added value. The underlying understanding is that mass production of goods, which has only a modest value-creating effect, will be relocated from Denmark to countries with low labor costs, while the more value added activities remain in Denmark. The underlying notion is that Danish labor is highly qualified to develop and designing products and also very good at selling and branding. For these reasons Danish companies choose to keep up- and downstream activities here, while other activities gradually are moved abroad. Following this view, there are few more important myths that one have to deal with. The first is that it is relatively straightforward to move production to where it can be made cheaper. However, some Danish companies have proved that to be more problematic than it seems which is illustrated in the articles in this volume. Some observers have also argued that it will be an advantage for Danish society, if the labor-intensive production is moved as long as the most value-added parts are kept in Denmark. The implicit implication of this view is that Danes are unique in designing and developing new products and that this is something that will continue in the future. Implicitly this means that production and product development can be kept separate, and that it is possible to maintain product development in Denmark even though production has moved to, for example, Eastern Europe or the Far East. Finally, in the public debate it has not been a topic of interest how the production transfer has taken place, whether it has happened to subcontractors or whether Danish manufactures have set up own production facilities abroad.

Figure 1: Activities in the value chain “smiley”



It is these simplistic perceptions that Dansk Produktion attacks, arguing that production can readily be separated from product development. Ultimately, such separation will undermine the basis of the remaining activities in Denmark. Within GONE, we have examined the same stereotypes in more details and we have chosen to focus on four industries to analyze some of the main development trends in the period. Our first industry study concerned the textile and clothing industry, which was exposed to international competition at an early stage. Here both products and production processes are generally relatively basic and have relatively low capital intensity. For the same reasons entry

barriers are relatively low in this business, notably also for businesses from developing countries. For several decades textile and clothing production in Western Europe and the United States was protected by the so-called Multi-Fiber-Agreement, but Danish manufacturing companies already relocated activities abroad in the 1970's. In the beginning they mainly chose to relocate to southern Europe, later to Eastern Europe and Asia and in the years since the millennium, virtually the entire Danish textile production has moved abroad.⁵

Our second study concerns the furniture industry, which has generally been more capital-intensive than the textile industry, but an essential part of the furniture production has also been performed by skilled craftsmen. In the 1980's and 1990's, the Danish furniture exports boomed, but production remained almost exclusively in Denmark until the latter half of the 1990's when some of the simple production was moved to Eastern Europe and the Baltic countries. After the millennium, a relocation of furniture production has occurred, mainly to China.⁶

Our third study concerns the shipbuilding and marine equipment industries. Since the early 1980's all the main the Danish shipyards – like shipyards in other European countries – have closed down its activities, and virtually all new construction of ships are carried out in shipyards in the Far East. The marine equipment industry, on the other hand, has to some extent been characterized by the persistence of production in Denmark. The marine equipment industry supplies the shipbuilding industry, and includes companies such as Viking Safe-Marine, Hempel and MAN Diesel. In industry statistics, it is not defined as an independent industry, because the only thing that binds these suppliers together is their role as subcontractors to the shipyards. Nevertheless the particular development of the marine equipment has made it a relevant case for the GONE study. This despite the fact that business analysts over several decades have predicted the closure of the Danish maritime subcontractors, several major companies have endured. The marine equipment suppliers have thus fared much better than Danish shipyards.⁷

In comparison with the other GONE cases, the telecom industry, which we originally planned to study, is a relatively new industry. Initially, it produced relatively complex products and had relatively complex production process as well, which required well-trained labor. As the production in this industry was increasingly standardized, it was quickly moved away from Denmark. In 2013 virtually no Danish production remains in the telecom industry.⁸ Unfortunately it is not possible to complete an analysis of telecom industry, and therefore this interesting part regrettably must be omitted.

The relevance of the project

In doing a Google search on the word *outsourcing* about 130,000 hits appear. A similar search on the newspaper database "Infomedia", identifies around 18,000 articles in the Danish newspapers and journals. In December 2011 alone, 129 articles containing the word *outsourcing* were published in Denmark.⁹ This shows how the word *outsourcing* has gained a foothold in the Danish language. But what does it really mean? If you ask *Den Store Danske Encyklopædi* for advice you get to know that *outsourcing* means that a company separates a function or activity to a subcontractor to reduce costs. This definition however misses some key aspects. Clearly the Danish newspaper articles demonstrate that *outsourcing* has become a very value-laden term which is often directly related another value-laden word, *globalization*.

Over the years different terms has been used covering Danish manufactures moving production abroad. During the 1990's, it was especially terms like "udflytning" (moving out) and "udflagning" (outflagging) that was used but since the millennium the word "outsourcing" increasingly has been used. On the other hand one can rightly point out that the concept of "offshoring" has hardly been used in Danish newspapers, while in recent years some researcher have written several articles in professional journals and trade magazines related to *offshoring*. The

significance of this is that the Danish newspapers almost exclusively have dealt with whether industrial production has been moved away from Denmark or not, but hardly how this relocation has taken place. As will be shown in the article on the marine equipment industry it is an important point that in this industry for a very substantial part of production have been offshored, and that this has had an impact on the continuation of production in Denmark.¹⁰

When making an analysis on the Danish newspaper articles that are registered in "Infomedia" since the early 1990's, it is striking that it took many years before the papers began taking an interest in the relocation of production abroad. During the 1990's there were very few articles on the subject, and there was typically a positive bias in the description of how Danish manufactures took advantage of opportunities to make some of the simple production activities in countries with low labor costs. This move was clearly seen as a prerequisite for the survival of Danish manufacturing companies. Focus through the decade was the link between the relocation of production and Danish manufactures exports. An example of this is an article in Jyllands Posten from 1997, when Danfoss' relocation of production to Eastern Europe was described. The article tells how much of Danfoss' production growth occurred outside Denmark's borders and that it was both due to new export markets but also because of reduced production costs. CEO of Danfoss, Jørgen Mads Clausen said, among other things:¹¹

The facts are that the relocation of labor-intensive productions will generate new jobs at home. They will be of a different nature. Had we not dared to implement relocation to other countries with significantly lower production and labor costs, it would have been a matter of time before we had been forced to stop because we simply would not be able to produce at competitive prices here in Denmark. For us today it is natural to be anywhere on earth. We can build our factories where there is a market for our products and we can produce them for the prices that the market can take.

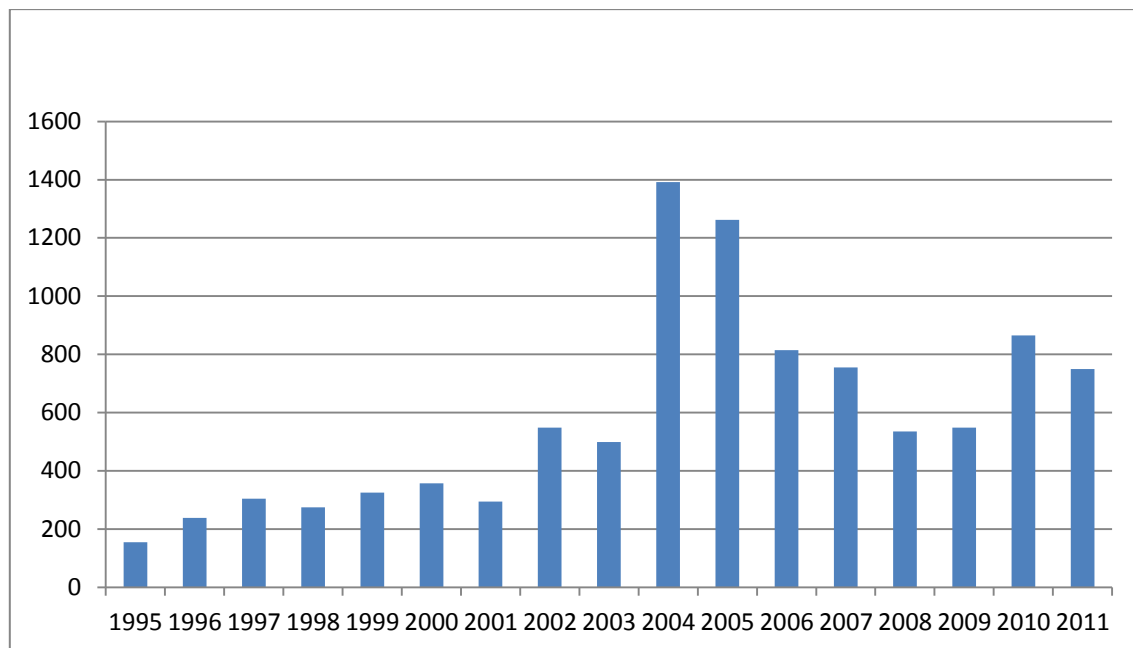
That is a strong indication that the production which Danish manufactures placed abroad was essential for future growth in Denmark.

This view was followed later in the year 1997 when Jyllands Posten could tell that Danfoss moved production back, and the number of employees in Denmark was 8,700, which was the highest number ever.¹² In the article it was stated that Jørgen Mads Clausen's globalization strategy with the relocation of production to the company's own production facilities abroad did not cause a decreasing number jobs in Denmark, which the unions had feared. On the contrary, this strategy increased the workforce in Denmark.

Furthermore, it is characteristic that Danish newspapers in the 1990's perceived Eastern Europe and the Baltic States as a new market for Danish products, while almost no articles considered the possibilities of production relocation to this area. There is some truth to this focus, as the exports to East Germany of Danish pinewood furniture boomed in this period, while only a few furniture manufacturers relocated some of their production.

The main point is, however, that during the 1990's only few articles were written in Danish newspapers about Danish manufactures' relocation of production abroad. In the figure shown below is carried out a search in the newspaper database "Infomedia" on each of the search terms "udflytning" (moving abroad), "udflagning" (outflagging), "outsourcing" and "offshoring" and the figure clearly shows that it was not before the beginning of the new millennium that the relocation of production was a topic, which the Danish newspapers began writing about. The displayed number should be taken with some caution, since they also include figures on the relocation of IT-jobs, reflagging of Danish ships etc. Hence the actual number of articles on relocation of Danish manufacturing jobs is lower, but this fact does not change the observed trend in the number of articles.

Figure 1: Number of articles written in Danish newspapers in the period 1995-2011 concerning Danish manufactures relocation of production from Denmark



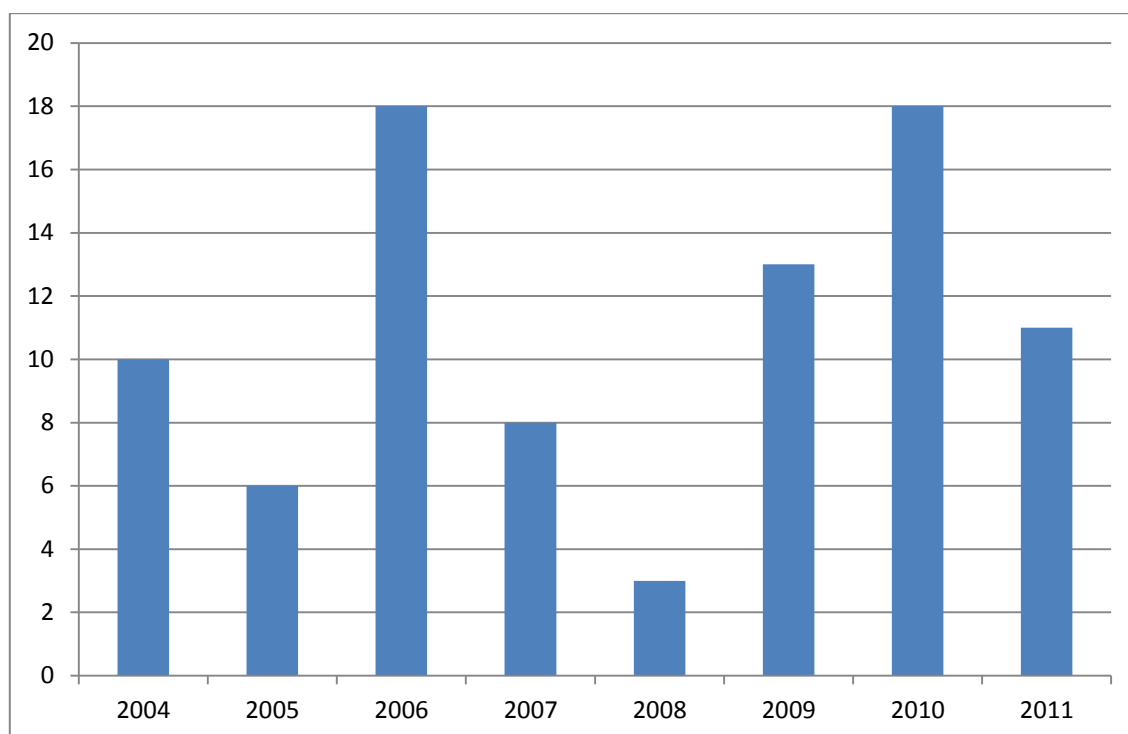
Source: Infomedia.

As shown there was a very marked increase in the number of articles from 2003 to 2004. At the same time, there is an obvious change in the content of the articles. Until that time, there was a bias in how the newspapers described the impact of relocation of production, which was seen as a prerequisite for the Danish manufactures' survival and growth. But after this time, there was an increasing number of articles that problematized the consequences of production relocation. This change in perception did not happen overnight, but still the change happened rather suddenly. Trade unions increasingly pointed out the negative consequences of the transfer of production for employment in Denmark, especially for industrial employment. In April 2003 the unions' journal A4 published a very critical article, which first highlighted that many Danish workers were fired as a result of the transfer of production. At the same time little was done to retrain laid-off workers.¹³ Already in the teaser, it was underlined that *"Mass layoffs happens every day at Danish workplaces, and there is no prospect of improvement"* after which it was pointed out that companies like Dansk Eternitfabrik, Arla Foods, Holmegaard Glasfabrik, LEGO, Rockwool and Egetæpper had fired employees following the relocation of production. Of course the article can be seen as a political contribution because LO had an interest in telling that the right-winged government failed to launch initiatives to retrain laid-off workers. But other magazines also wrote articles about the negative consequences of relocation of production. For instance, in October 2003, Erhvervsbladet reported that *"Fyn has several industrial and manufacturing companies and hence the island is strongly affected when an increasing share of the production is sent out of the country."*¹⁴ Other articles with a similar focus on the social and regional consequences of the production transfer could be mentioned, and notably in 2004 and 2005 Dagbladet Arbejderen¹⁵ brought a series of articles about the very negative consequences of relocation of production.¹⁶ It is doubtful whether these critical articles in this newspaper changed public perceptions on the topic, but it can at least be taken as an expression of the political groups on the political left was alarmed.

Another possible reason why the consequences of outsourcing became increasingly problematized at this time may be that several groups of employees were affected by it. This included workers with short educations as well as highly educated employees. Where the previous focus had been on unskilled workers, especially within the textile industry, then the international economic competition now also hit jobs in various service sectors and in the IT-industry.¹⁷ Thus, it also hit engineers, sales personnel and skilled workers. These groups were better prepared to express their views than the unskilled dressmakers. At the same time, many more Danes than before had to anticipate that in the future outsourcing might affect them, even though they had a technical education or were employed in service jobs.

Thus, it is reasonable to conclude that a major shift in public perceptions on the relocation of the Danish production took place in the first years of the new millennium. At the same time the content in many newspaper articles shifted and a very critical view on the national, regional and social consequences of outsourcing were expressed. Since 2006 a fairly constant number of articles on outsourcing have appeared. There is thus no increase in the number of articles as a result of the financial crisis of 2008. In numerous articles, it is noted that unemployment has increased considerably since the crisis began, and in many articles, it is noted how many people have been fired as a result of production being moved abroad. In most articles, a sort of basic premise is that the outsourcing process is inevitable, and one which Danish manufactures and workers have to deal with. For manufacturing companies this can be done through rationalization of production, through acquisition of robotics or the like. For employees, it is especially through education that one must protect oneself against the consequences of outsourcing and exploit the opportunities of economic globalization.

Figure 2: Articles on offshoring 2004-2011.



Source: Infomedia.

As mentioned it was relatively late that the Danish newspapers began to relate to how the relocation of production has taken place. The question remained: Whether its activities were transferred to foreign subcontractors through outsourcing or whether offshoring to the Danish companies' foreign subsidiaries and/or to their own production sites was employed. The first newspaper article about offshoring was written in 2004, and overall it is written less than 20 articles annually on the subject in the Danish newspapers. In most of these articles experts in the field, especially from CIP, CBS and University of Southern Denmark have given their opinion. Researchers Torben Pedersen, John Johansen, Jan Arlbjørn and others have also written several articles in journals such as *Ingeniøren*, *DI Insigt* and *SCM* on offshoring and outsourcing.¹⁸ Still, the significance of this difference in production relocation has not been spread to other than a small group of researchers and strategic decision makers in businesses and industry organizations.

The results of the GONE-project¹⁹

It was an important goal of the GONE-project to map how small and medium-sized Danish manufactures have organized and implemented the individual value chain activities over the past three-four decades. In the project we have analyzed and identified the factors behind the developments in various industry studies. We have also assessed the impact of this on Danish businesses and Danish society in general.

Based on industry analysis, there are some factors that obviously have had an impact on the choices of value-chain strategies. It is clear that the factors are related and therefore should not be seen as mutually exclusive, but the following are lined up separately to make the analysis clearer. The order is not hierarchical and should not be taken as an expression of which factors that have had the greatest impact on development.

Market conditions and consumer patterns

A first factor that has had a major impact on the value-chain strategies is the market conditions and consumer patterns. It is especially important to distinguish between productions in business-to-business – for example, as a subcontractor – and production of consumer goods. Of the surveyed industries the furniture and the textile and clothing industries to a very large degree – but not exclusively – have produce to private consumers, while shipyards and the marine equipment industry almost exclusively produces business-to-business. It has been crucial to the strategies chosen in the analyzed industries.

In the 1970's and 1980's Danish textile and clothing companies were generally very production oriented, employing integrated value chain strategies with almost the entire production process in-house. Since then they have developed more disintegrated strategies, where only the design and product development is implemented in Denmark, while the entire production is done by foreign subcontractors.²⁰ The development in the part of the furniture industry that has produced for private consumers has been very similar to the development of the textile and clothing industry.²¹ But in this case the change happened later, after the turn of the millennium, and some production of furniture still remains in Denmark. Changing consumer patterns have been instrumental in that Denmark continues to have a relatively large production of flat-packed furniture and some production of handicrafts produced design furniture, while the production of relatively expensive non-designer furniture almost has disappeared from Denmark. For both the furniture and textile industries is true that increased consumer demand for many different types and regular purchases of, respectively, new clothes and new furniture has made it difficult for Danish companies to automate production processes. Instead, a very large proportion of production has been outsourced to foreign subcontractors to maintain production flexibility, which is essential in these fast-fashion-oriented industries.

In recent decades some very large and leading retail chains that have evolved in the furniture and the textile and clothing industries, which dominate these markets. Today retail chains have significant importance for manufacturing companies in these two industries. IKEA and other dominant chains have been of major importance for the development of furniture sales in Western Europe and the U.S., and it has again been crucial for Danish furniture manufacturers. IKEA purchases a significant part of Tvillum's furniture production, which thus must be prepared to comply with IKEA's requirements for quality and design. That it can be a dangerous path shows the example of Bodilsen, which in 2008 had to close a factory that exclusively was supplying furniture for IKEA, when IKEA chose another supplier instead.²² Also in the textile and clothing industry some large retail chains have evolved with Hennes & Mauritz as the most trendsetting, but the largest Danish textile and clothing companies, Bestseller and IC Company, have chosen to focus on own brands and own retail outlets.²³

Based on the industries that we have studied in the project is a clear pattern that companies producing business-to-business have chosen some other value-chain strategies than companies producing to private consumers. In the marine equipment industry almost all companies has chosen to maintain both product development and production in-house. However, it has not been as decisive whether production takes place in Denmark or abroad. The important thing is that these companies often continue to control production. This is due to several things: 1) The marine equipment sub-contractors have chosen to place both production and product development close to their main markets, and as the majority of the shipbuilding industry today is in the Far East manufacturers such as Hempel, Viking Life-Saving Equipment, Novenco and Alfa Laval Aalborg have chosen to establish its own production facilities in the Far East; 2) The production sites in the Far East has been necessary to enter the respective markets because most countries in the Far East protect domestic production in various ways; 3) Of course, the relocation of production is also made to reduce production costs, especially labor costs; and 4) It is highly specialized products with high technical requirements to the functional quality. In order to maintain and develop technological leadership it has clearly been important for many of these subcontractors to maintain production in-house. This also applies to a company like Fibertex producing synthetic textiles for the car industry and for diapers and therefore in reality is a textile manufacturer. Fibertex has moved much of its production to its own production facilities in Malaysia and the Czech Republic; partly to get close to their main markets, and partly to minimize production costs without losing control of production and production development.²⁴

In the shipbuilding industry, only the Odense Steel Ship Yard has acquired shipyards abroad, while this has not been a realistic option for the other Danish yards. Several other smaller yards used in the 1990's Eastern European and Baltic shipyards as suppliers of parts to the ships, which were then transported to Denmark and assembled at the Danish yards, but the extent of this form of outsourcing was modest. Odense Steel Ship Yard took over a shipyard in Estonia in 1994, a shipyard in Lithuania in 1997 and a shipyard in Stralsund in Germany in 1998. The following years these yards were used to build the entire ship sections that were subsequently shipped to Odense, where they were assembled and mounted to the finished vessels. In this way costs were minimized, since a large part of the labor-intensive production took place at its own foreign shipyards where wages were considerably lower than in Denmark.²⁵

Political conditions

Political conditions are another factor that has had a great impact on Danish manufactures value-chain strategies. For several decades, the textile and clothing industry tried to protect themselves against competition from low-wage countries in Asia via the so-called Multi-Fiber-Agreement. At the same time this industry was the first to outsource production and has outsourced production

most comprehensively. The Multi-Fiber-Agreement led to increasing conflicts among the companies that produced clothes, and companies that specialized in designing and selling clothes, which had been produced cheaply abroad. The fall of the Berlin Wall in 1989 opened the Eastern Europe as a sourcing destination to Danish manufacturing companies. In this way the Multi-Fiber-Agreement was partly undermined. One can argue that the agreement helped to maintain a textile production in Denmark which was not competitive and production was quickly outsourced when the agreement lapsed.²⁶

The shipbuilding industry has globally been very influenced by government subsidies, which is also the case in Denmark. Throughout the 1970's and 1980's, Danish shipyards largely were kept alive by various government schemes. This was done either through public orders for the construction of ferries, naval vessels or the like, or through favorable tax treatment for investors in new ships, which placed orders at Danish yards. Gradually government subsidies were removed, and the Danish shipbuilding yards closed in the 1980's and 1990's. The Odense Steel Ship Yard was the last new building yard and it ceased production in 2012. Again, retrospectively one can argue that subsidies to the shipbuilding industry helped sustain an industry that was not competitive.²⁷

The furniture industry has internationally been characterized by relatively free markets with little protection and few subsidies. A significant part of the Danish furniture production has been exported for many decades, but it was mainly from the early 1980's that the industry experienced an export boom. Although the Danish furniture production always has been exposed to international competition, it was only in the late 1990's and especially after the turn of the millennium, that the furniture production was outsourced to foreign subcontractors. This is largely due to that Danish manufactures managed to sell relatively expensive furniture where quality of craftsmanship was high.²⁸

Ownership structure

Small and medium-sized Danish manufactures have previously been characterized by family ownership. Some still are, but in recent years equity funds have acquired many of the old family-owned companies. The ownership structure has had a major impact on the value-chain strategies that have been selected. Judging from the GONE results, there is much evidence to suggest that family-owned businesses have been more reluctant to move production abroad, whether it is in the form of outsourcing or in the form of offshoring.

In the 1970's and 1980's the textile and clothing industry was clearly characterized by many small manufacturers, where the entire production was done at one site in Denmark. As international competition increased these manufactures sought to automate and streamline production, while only reluctantly some companies began to outsource production. A somewhat similar picture emerged in the furniture industry, but this happened between 10 and 20 years later than the textile industry. The result in both of these industries has been that almost all of these small businesses are closed. Those that are left either have a large and highly automated production facility or are new companies, which have been based on foreign production from the very beginning of their business.²⁹

This may suggest that family-owned businesses only very slowly are changing strategies and that this conservative "business-as-usual" approach has proved to be fatal for Danish manufacturing companies. But this conclusion is too simplistic. Especially for the furniture industry it was problematic for small and medium-sized enterprises to establish their own production sites in Eastern Europe in the 1990's, partly because this process was very capital intensive and partly because it would have required an expertise which was rarely present. Moreover, the perception of most businesses and at the trade association Dansk Møbelindustri (Danish Furniture Industry) that quality furniture had to be produced in Denmark. However, one must be aware that it is much easier

to figure out the winning strategies when looking back than it is to predict the right strategies for the future. For a small textile or furniture manufacturer in the 1980's or 1990's, it undoubtedly seemed risky either establish a foreign subsidiary or to do business with Eastern European or Asian subcontractors.

Also among the marine equipment manufacturers, it seems clear that the ownership structures have been very important for the value-chain strategies. Apart from the B&W, the large Danish shipyards were owned by the major Danish shipping companies, including the J. Lauritzen Group, AP Moller Maersk and the East Asiatic Company, and partly due to this ownership structure the shipyards survived for several years, although there were unprofitable. Furthermore, AP Moller Maersk has chosen to keep production at Odense Steel Ship Yard for several years because the shipping company in the manner achieved a competitive advantage by being able to develop new and better ships. A number of marine equipment subcontractors have been founded by the shipyards, which previously were the owner of many of these companies. This ownership was previously crucial for the orders of these subcontractors, but along with the closure of the Danish shipyards and major shipping companies' sales of the marine subcontractor, there are no longer the same close connections between the shipping companies, the shipyards and the marine subcontractors. Despite of this development many Danish marine subcontractors are doing very well, partly due to the fact that they continue to deliver products for building of ships for Danish shipping companies, regardless of it being done in South Korea or China.³⁰

Another important point in relation to the company-owned Danish shipyards is that both the J. Lauritzen Group and AP Moller Maersk has been very involved in creating new jobs at the former shipyard areas in connection with the closure of Danyard in 1999 and Odense Steel Ship Yard in 2012. Some of these new businesses are wholly or partly subcontractors for the shipbuilding industry, and has to some extent been able to get started with direct or indirect support from the shipping companies.³¹

Societal consequences

As shown, the Danish manufacturing companies have changed value-chain strategies over the past three-four decades and often with major corporate and societal consequences. This goes both in relation to the companies that have survived; the companies that are closed down and the new businesses that have emerged, but also for the Danish society in a broader sense and for the job opportunities for all Danish citizens.

In his article *"From shipbuilding to alternative maritime industry - the closure of Danyard Frederikshavn in 1999"* Thomas Roslyng Olesen shows that the closure of Danyard did not represent a complete collapse of the job market in Frederikshavn. A very large proportion of the former shipyard workers found jobs in other businesses in the area, and most could use their skills from the yard. In his PhD thesis from 2012, he has documented that something similar happened after the closure of almost all other major Danish shipyards in the 1980's and 1990's, while it is still too early to say what will happen after the closure of the Odense Steel Ship Yard.³² The closure of the shipyards has not been the disaster among the former shipyard workers that might have been expected. Something similar appears to have been the case in the textile industry.³³ The former textile workers have found employment elsewhere, e.g. in the furniture industry. At this point it might have been interesting to include the telecom industry, as many people were working in this industry in the 1990's, especially in North Jutland. Apparently, most employees in the telecom industry have found a new job after the closures, but the question has not yet been thoroughly investigated. It would be interesting to examine whether these employees have helped to generate faster growth for the companies in which they are now engaged, because many of these workers are characterized by being well educated and having professional skills that might be useful in other

industries. This is an issue that deserves further research. Throughout the examined period there have been major changes in relation to the composition of the workforce in various industries. Most pronounced is of course the development of the textile and clothing industry. Still a relatively large number of employees are engaged here, but the 2013 employee profile differs significantly from the one in 1970. For good reason, there is virtually no production workers – dressmakers, production technicians, etc. – remain, while today there is very large proportion of designers and product developers, buyers, sales staff and branding experts. A similar – though less pronounced – development has taken place in the furniture industry.

Furthermore, this development had regional importance for employment in Denmark. A significant part of the textile production in the 1970's and 1980's took place in Central Jutland, while the majority of those employed in the textile industry today is located in the Copenhagen region or to a lesser extent on the east coast of Jutland. Something similar has happened in the furniture industry, where a cluster of manufacturers of pine furniture in the 1980's and 1990's was established in Central Jutland, which has since almost disappeared, while those employed in this industry are largely located in the metropolitan area. This means that the changed value-chain strategies not only had major demographic consequences – it also had considerable regional importance.

Summary

The GONE project has uncovered how the textile, the furniture and, shipbuilding and the marine equipment industry in Denmark have changed value-chain strategies, which in turn has had a major impact on those employed in these industries and for Danish society as a whole. It is indisputable that the number of persons employed in the actual manufacturing jobs has decreased very significantly in Denmark since 1970. Instead more people are working in design, purchasing, sales and branding. Whether this trend will continue, and whether the loss of production over time also will result in loss of design and product development, it is not possible to say anything certain about yet. There can be no unequivocal answer as to whether there is a direct link between research and production, as Dansk Produktion claims in the campaign "*Viden + production = Velfærd*". Among the marine subcontractors there is almost a clear picture that for businesses it has been important to maintain production in-house, whether it is in Denmark or abroad. An important reason for this is that it is important to maintain and develop production skills when developing products.

On the other hand, there is no clear link between production and design and product development in the textile and clothing industry. Here the winning value-chain strategy was to outsource the entire production – primarily to subcontractors in the Far East – and only keep the design, procurement, sales and branding in Denmark. So far, especially Bestseller and partly IC Company had very good results using this strategy. In the furniture industry, the picture is a somewhat more diffuse, as there are still some manufacturers who are doing well via highly automated production in Denmark. There are also a few manufacturers of classic furniture designs, where skilled cabinetmakers make the furniture. But besides this the developments in the furniture industry is much similar to the one that has taken place in the textile industry.

Notes

¹ www.danskproduktion.dk, July 2013.

² www.foreninger.di.dk, July, 2013.

³ The GONE-project was led by Professor John Johansen from the Center for Industrial Production (CIP) at Aalborg University. In the project, Associate Professor Brian Vejrum Währens from CIP, Associate Professor Bent Dalum – and later Associate Professor Christian Østergaard – from the Department of Business and Management at Aalborg

University, Professor Torben Pedersen, Center for Strategic Management and Globalization at the Copenhagen Business School, Professor Patrik Jonsson from the Department of Technology, Management and Economics at Chalmers University of Technology, and Professor Jan Stentoft Arlbjörn at the Department of Entrepreneurship and Relationship Management and Associate Professor Mogens Rostgaard Nissen of the Department for History and Civilization – both at the University of Southern Denmark – participated as project organizers.

⁴ Thomas Roslyng Olesen, 2012: *"Fugl Fønix? Transformationen af den danske værftsindustri 1975-2012"*.

⁵ Based on Kristoffer Jensen og René Taudal Poulsen's article *"Changing value chain strategies of Danish clothing and fashion companies, 1970-2013"*.

⁶ Based on Lars Hedemann og Mogens Rostgaard Nissen's article *"The internationalization of Danish furniture"*.

⁷ Based on René Taudal Poulsen's article *"Diverting developments – the Danish shipbuilding and marine equipment industries, 1970-2010"*.

⁸ Based on Bent Dalum, Christian Ø. R. Pedersen og Gert Villumsen, 2005: "Technological Life-Cycles: Lessons from a Cluster Facing Disruption". I *European Urban and Regional Studies*; 12.

⁹ Both these searches were made in February 2012.

¹⁰ Based on René Taudal Poulsen's article *"Diverting developments – the Danish shipbuilding and marine equipment industries, 1970-2010"*.

¹¹ Jyllands Posten 12. February 1997: *"Danfoss har en global strategi og satser på verdensmarkedet"*.

¹² Jyllands Posten 20. October 1997: *"Danfoss trækker job hjem"*.

¹³ Ugebrevet A4, 7 April 2003: *"Fyrede mangler hjælp til omskoling"*.

¹⁴ Erhvervsbladet, 13 October 2003: *"Fynsk beskæftigelse er sat under hårdt pres."*

¹⁵ Dagbladet Arbejderen is published by Kommunistisk Parti.

¹⁶ Dagbladet Arbejderen; 9 March 2004: *"Der findes en vej"*; 7 August 2004: *"Arbejdsløsheden stiger fortsat"*; 21 August 2004: *"Opsvinget, der aldrig kom rigtigt i gang"*; 21 September 2004: *"Om vi så skal besætte fabrikken"*; 22 October 2004: *"Metalfolk mod udflagnig"*; *"Eksperter strides om konsekvenserne"*; *"Udflagnig et samfundsmæssigt problem"*; 26 January 2005: *"Globalisering og klassekamp"*; 5 February 2005: *"Globalisering og maskinstormeri"*; 3 May 2005: *"Stor appetit på Østeuropa"*.

¹⁷ Among many other examples: BT, 21 October 2003: *"Danske servicejob på vej til udlandet"*; Information, 17 December 2003: *"Kun en tåbe frygter ikke udflytning"*; Erhvervsbladet, 2 February 2004: *"Tusindvis af elektronikjob flyttes fra Danmark til Kina"*; Berlingske Tidende, 11. February 2004: *"Manden bag Indiens mirakel"*; Information, 23 March 2004: *"Millioner af job flytter væk"*; Ingeniøren, 16 April 2004: *"Det gælder vores fremtid"*; Berlingske Tidende, 5 July 2004: *"Danske topledelse vil forlade landet"*; Erhvervsbladet, 27 January 2006: *"Udflagnig af videnstunge job eksploderer"*.

¹⁸ For examples read DI Indsigt, 16 March 2011: *"Store virksomheder vil investere i udlandet i stedet for Danmark"*; SCM, 28 March 2011: *"Danske virksomheder outsourcer som aldrig før"*; Ingeniøren, 6. maj 2011: *"Offshoring giver højere vækstforventninger"* og *"Eksperter: Offshoring kan skade dansk økonomi"*; 27. maj 2011: *"Ny bølge af udflytning er i gang"*; SMC, 13. december 2011: *"Globaliseringen går ikke bare over igen"*.

¹⁹ This part of the article is based on the articles in this volume written by Kristoffer Jensen and René Taudal Poulsen concerning the textile and clothing industry; Lars Hedemann and Mogens Rostgaard Nissen concerning the furniture industry; René Taudal Poulsen on the shipyard industry and the marine equipment industry and Thomas Roslyng Olesen concerning the closure of and spin-off manufactures from the shipyard industry.

²⁰ Based on Kristoffer Jensen and René Taudal Poulsen's *"Changing value chain strategies of Danish clothing and fashion companies, 1970-2013"*.

²¹ Based on Lars Hedemann and Mogens Rostgaard Nissen's *"The internationalization of Danish furniture"*.

²² Based on Lars Hedemann and Mogens Rostgaard Nissen's *"The internationalization of Danish furniture"*.

²³ Based on Kristoffer Jensen and René Taudal Poulsen's *"Changing value chain strategies of Danish clothing and fashion companies, 1970-2013"*.

²⁴ Based on René Taudal Poulsen's article *"Diverting developments – the Danish shipbuilding and marine equipment industries, 1970-2010"* and Kristoffer Jensen and René Taudal Poulsen's article *"Changing value chain strategies of Danish clothing and fashion companies, 1970-2013"*.

²⁵ Based on René Taudal Poulsen's article *"Diverting developments – the Danish shipbuilding and marine equipment industries, 1970-2010"*.

²⁶ Based on Kristoffer Jensen and René Taudal Poulsen's article *"Changing value chain strategies of Danish clothing and fashion companies, 1970-2013"*.

²⁷ Based on René Taudal Poulsen's article *"Diverting developments – the Danish shipbuilding and marine equipment industries, 1970-2010"*.

²⁸ Based on Lars Hedemann and Mogens Rostgaard Nissen's *"The internationalization of Danish furniture"*.

²⁹ Based on Lars Hedemann and Mogens Rostgaard Nissen's "*The internationalization of Danish furniture*" and Kristoffer Jensen and René Taudal Poulsen's article "*Changing value chain strategies of Danish clothing and fashion companies, 1970-2013*".

³⁰ Based on René Taudal Poulsen's article "*Diverting developments – the Danish shipbuilding and marine equipment industries, 1970-2010*".

³¹ Based on Thomas Roslyng Olesen's article "*From shipbuilding to alternative maritime industry – the closure of Danyard Frederikshavn in 1999*" and René Taudal Poulsen "*Diverting developments – the Danish shipbuilding and marine equipment industries, 1970-2010*".

³² Thomas Roslyng Olesen, 2012: "*Fugl Føniks? Transformationen af den danske værftsindustri 1975-2012*".

³³ Olsen, K.A., R. Ibsen and N.C. Westergaard-Nielsen, 2004. *Does Outsourcing Create Unemployment: The Case of the Danish Textile and Clothing Industry*, Aarhus: Handelshøjskolen i Århus.

The internationalization of Danish furniture. A value chain perspective

BY LARS HEDEMANN AND MOGENS ROSTGAARD NISSEN

During the last four decades the Danish furniture industry has gone through a process of structural change. This is the outcome of a development where increasing international competition has shaped the industry, and from being characterized by small and medium sized companies, the industry is today dominated by few international players, making up for the majority of the industry turnover. This has happened gradually, first with a late deployment of outsourcing to Eastern Europe in the 1990s, and later by accelerating this trend in the post-2000 period. In sum, this has led to the development of a new type of furniture companies based on business models deviating significantly from the ones linked to the traditional notion of 'Danish furniture'.

Introduction

Over the years, the Danish furniture industry has been object of attention in several occasions, not least due to the industry's competitive strength. A measure repeatedly used to indicate the significance of this strength is the export intensity of the industry.¹ Export intensity signifies the percentage of production accounted for by Exports, and in the case of the Danish furniture industry the export intensity has since 1990 permanently been above 70per cent.² When looking into the data it becomes clear that the development of the industry toward this exorbitant export level, in a low-tech industry located in a high labor cost country, is characterized by continuous restructurings and a process of structural change. From being an industry dominated by small and medium sized manufacturing companies, a low number of large international companies today dominate the industry. The focus of this article is on this development and the business strategies applied among the industry players in this quest for survival and growth in an industry that has become more and

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more global. In order to understand and describe this development the article is structured in the following fashion. First, the early internationalization of the industry is presented, with a retrospect to the 1950s where the first seeds enabling the early internationalization of the industry were sown. This is followed by a section describing how the application of different value chain strategies have allowed for the development of a very heterogeneous industry – but also how these strategies have been modified as the industry matured. This part is structured around a framework developed by Moeller and Pade in their analysis on value chain strategies in the Danish furniture industry in the 1980s.³ The analysis presented in this section provides a contemporary update to the 1980s analysis. Finally, a discussion summarizes the most interesting observations made, and how these findings contribute to studies of the development in other Danish manufacturing industries. An important offset, in understanding the development of the Danish furniture industry is to acquaint with the nature of furniture. Historically, the products manufactured in the Danish furniture industry has been divided into three subcategories; Discount-, Basic- and Design Furniture.⁴ For all three groups it applies that the product is characterized as being low-tech and relatively labor intensive. Further, furniture has been characterized as naturally lending itself to internationalization *“in that it performs the same basic function across geographic areas and cultures such as seating, bedding, dining, storage and display”*.⁵ However, as this article reveals the nature of furniture is today somewhat more nuanced, as furniture to many people have changed from considering furniture consumer durable goods, into perceiving furniture as a short lived consumable. This tendency was already observed in the late 1980s, and have increased in pace throughout the post-2000 period.⁶ A feature facilitating this development is the introduction of new manufacturing technologies, which opens for a greater automation in the furniture manufacturing process, and this has paved the way for much cheaper furniture than it previously was the case. An example of such new manufacturing technology is the one used in producing flat packed furniture, which is a modern type of furniture, which allows for the production of highly standardized and low priced products.

Second, the impact of large international retail chains has increased significantly in recent years. This development is important to the manufacturing of furniture, as it implies that furniture manufactures lose their control of the distribution channel. More specifically, this means that most manufactures today acts as pure sub-supplier manufacturing pre-defined designs provided by the retail chains, in contrast to previously where furniture was developed and designed by the furniture manufactures themselves targeting more specific niche segments. The significance of this development is visible across the globe, for instance in Germany where five large retail chains controls the entire market, and in Denmark where 64per cent of the sale of furniture in 2005 happened via retail chains.⁷ Over the last three-four decades global retail chains as IKEA or HABITAT continuously have expanded their global presence. Consequently this means that European furniture manufactures today face a much more fierce competition from low cost countries than previously and as the significance of global retail chains increases, competition

intensifies and the manufactures are forced to optimize in order to reduce costs. However, the history takes its starting point in the 1950s with the first steps of the internationalization⁸ of Danish furniture.

The internationalization of Danish furniture

In order to understand how the historical trade of furniture has influenced on the globalization of furniture, a prerequisite is to understand the nature of internationalization. A classic model in explaining the process of internationalization is the one of Johanson and Vahlne according to whom there are two directions, or steps of internationalization; 1) an increasing involvement of the firm in the individual foreign country via sales and 2) a successive establishment of operations in new countries.⁹ In respect to the first direction, furniture in general proved a product category that exhibited strong export growth as international trade started to grow in the 1980s. However, the strong export focus of the industry dates back to the post-WW2 period, where a particular reputation originated around the industry which ended up developing into a strong international brand. The strong international reputation of Danish furniture is believed to be linked to two aspects; the foreign promotion of Danish furniture in the 1950s - and the consumption trends prevailing at this time. Both of these aspects are thoroughly analyzed in the work of the Danish historian, Per H. Hansen, who in his work describes how Danish furniture already at an early stage was intensely marketed abroad, and via a well-organized promotion tour in the US in the 1950s the notion of “Danish Modern” was established.¹⁰ This notion of Danish furniture was closely related to several very influential Danish architects as Kaare Klint, Børge Mogensen, Hans Wegner and Arne Jacobsen. Hereby a conception of Danish furniture was established as a product of “high quality craftsmanship and design”. Combined with the trend of consumption prevailing in the middle of the twentieth century where the social status related to furniture made up an important feature of competitiveness, the Danish brand in furniture became an important mediator in the foreign demand of Danish furniture - first in the US, later in other countries as well.¹¹ The significance of this trend is for instance demonstrated by the import of furniture to the US, in 1978 only made up for 6.6 per cent of US consumption of wood household furniture - in 1990 this had grown to nearly 25 per cent.¹² In the first half of the 1980s the export of Danish furniture boomed. In the journal “DMI – nu skal du bare høre” published by Foreningen Dansk Møbelindustri several articles explained this development. Especially the chairman, Wedell Pedersen, explained that the export boom was based on quality, design and functionality. In the journal his views repeatedly were supported by financing and manufacturing experts. However, an important part of the explanation behind the increasing export of furniture was that Danish furniture companies already in the 1970s invested in efficient production facilities, which made Denmark very cost competitive. That being said, the production of wooden and upholstery furniture falls under the category of labor intensive activities¹³ and thus, it would seem obvious that the early involvement at foreign markets for the Danish furniture

industry would facilitate a “full internationalization” as Danish labor costs started to rise in comparison to other countries. In reality, the response proved to be an intensified focus on automation, e.g. demonstrated by Wedell Pedersen and others, who in the 1980s stressed that it was necessary to invest in automation of the production to improve competitiveness. In the 1980s focus was on production in Denmark, as the trade organization did not believe that production in low cost countries could provide high quality furniture. This meant that in the 1980s the Danish furniture industry did not pursue the second direction of internationalization; the successive establishment of operations in new countries. Instead, this did not happen before the mid-1990s, where some of the first Danish furniture companies, inspired by the textile industry, started to experiment with the use of manufacturing facilities located in Eastern Europe. For the majority of the Danish furniture companies making use of this option, this happened via outsourcing to foreign sub suppliers, but also a few Danish furniture companies established their own operation sites in Poland or the Baltic States in the latter part of the 1990s following an offshoring strategy.¹⁴ During this decade the director of the Furniture Industry organization, Foreningen Dansk Møbelindustri, Keld Korsager, several times explained the reason behind this development being caused by the fact that the Danish furniture industry was characterized by very small producers, which did not have the financial power or the necessary international knowledge to establish their own operation sites in Polen or the Baltic states. An alternative explanation is offered by Maskell though, who suggests the reason why Danish furniture manufactures were not affected by strong global competition as it was the case in other industries, is to be found in the formation of the industry, which was located in regional clusters. In these years, this was especially prevalent in the Mid Jutland region, and it has been suggested that the geographical proximity among the furniture manufactures, created some fundamental extra-firm intra-industry capabilities, such as high trust and localized learning, which made it possible for the manufacturing firms to maintain their competitiveness despite the high Danish factor costs.¹⁵

Despite both arguments, things took off in the latter part of the 1990s where outsourcing of production to Eastern Europe boomed.¹⁶ This development is illustrated in figure 1 below. When looking at the national statistics, it seems clear that the importance of foreign production was already intensifying in the late 1990s, and in the early 2000s the tendency started growing in a rapid pace. The countries explored in this process were primarily Poland, but also Estonia, Lithuania and Latvia followed as sourcing markets for the ‘new’ Danish furniture companies.¹⁷

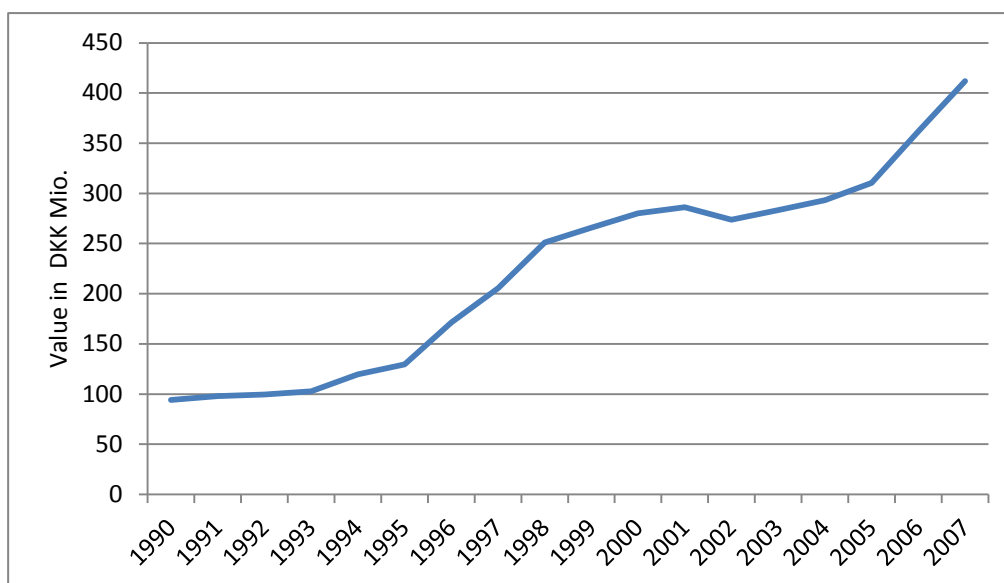


Figure 1: Historical development in the value of Danish furniture import in DKK Million, cleansed for inflation. Source: MIB Annual reports.

As figure 1 illustrates, the import of furniture to Denmark, including both part manufactured- and complete furniture, remained at a steady level around a value of DKK 100 million until 1995. Hereafter the value of furniture import started to rise continuously, and breaking down the statistics behind this development indicates that this is a sign of increased outsourcing of production. More specifically this is visible when looking at the five most significant nations in terms of Danish furniture import; Italy, Poland, Germany, Sweden and China. Of these five, the imports from Italy and Germany have remained on a relatively steady level throughout the post-2000 period, whereas the imports from Poland, Sweden and China have increased - for the latter two significantly, which is shown in figure 2. Whereas the rise in the case of Poland is steady throughout the period, the rise of Swedish furniture import is primarily taking place in the period 2004 to 2007. Finally, the growth of Chinese imports have ever since 2000 experienced a constant uninterrupted growth, from a value of DKK 208,3 million in 2000, to a value of DKK 2,1 Billion in 2007.

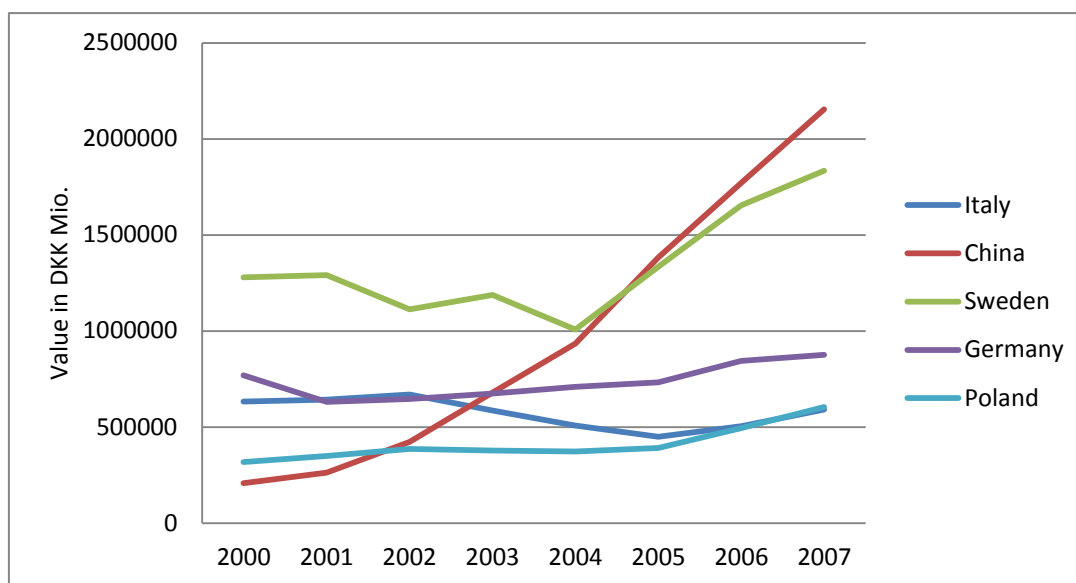


Figure 2: Historical development in the import of furniture import in DKK Mio. Source: Statistics Denmark.

Breaking down the import statistics behind figure 2 to a product level, it is clear that the five different countries represented, supplied Denmark in different ways; either via direct sale in, or re-export from Denmark – or alternatively via semi manufactures, for further processing or assembly in Danish furniture companies.

This analysis is further supported by Keld Korsager, director of Møbel+Interiør Brancheforeningen, who in a recent version of the Industry Associations journal stated that:¹⁸

In 2010 the Danish import of furniture had a value of DKK 8,2 Billions, which is 13 per cent more than in 2009. This growth is almost exclusively related to the import from China, Poland, the Baltic States and other Eastern European low cost countries, which in summary account for more than half of the furniture import. The import from these countries is predominantly made up by furniture and furniture parts, subsequently being re-sold by the Danish companies why this is a clear indication of outsourced production... ..and considering the aggregate import of furniture from low cost countries, correspond to the Danish furniture industry in 2010 having more or less half of its production made abroad.

In summary one overall thing stands out as particularly interesting from the historical overview of the internationalization of Danish furniture manufacturing; the Danish furniture industry was a late adapter in respect to the second step of internationalization, i.e. global manufacturing. This adaptation did not happen before the late 1990s and hereby the industry makes up an interesting example of a Danish industry, which managed to compete with foreign low cost production, for a much longer period than it has been the case in comparative industries, especially the textile industry. In order to gain an understanding of how this was possible, an important issue is the value

chain strategies followed by the companies of the industry, as these strategies made up an important lever behind the continuous Danish production of furniture.

A historical reconfiguration of value chain strategies

Pre-2000: Local manufacturing pushed to international markets

As already mentioned, several types of furniture companies exists within the furniture industry, serving different product niches and consequently several variations of business models and value chain strategies apply. In their work from the late 1980s, Pade *et. al* looked into this matter, and from their analysis of the industry five categories of business models emerged:

Business model	Value chain activity			
	Idea development	Manufacturing	Marketing	Sale
Integrated companies	Own development of new products, for instance in collaboration with international distribution channel	Own manufacturing of parts + Own assembly	Own marketing department	Own sales and distribution organization on the largest markets
Disintegrated companies	Involved in the new product development process, but in collaboration with external designers	Parts are manufactured by local subcontractors, but assembled at the premises of the company	Own marketing department	Own sales and distribution organization in Denmark, and typically a sales agent on foreign markets
Design consultancies	Development of new furniture designs for several companies			
Manufactures and Subcontractors		Manufacturing of complete furniture, or semi-manufactures for further processing or assembly		
Export agents			Works for several companies as marketing and distribution channel.	

Table 1: The five categories of Business models prevailing in the Danish furniture industry in the 1990s, and the related value chain activities. Source: The authors own contribution, after inspiration from Pade: *Vækst og dynamik i dansk erhvervsliv* and Pade et al. *Møbelindustrien*.

The five different categories of business models illustrated in table 1 can be separated into two overall categories; furniture companies and support functions. The furniture companies are made up by the integrated and disintegrated companies characterized by controlling the entire value chain from idea development to sales. The support functions are made up by the companies only serving a part of the furniture industry value chain.

Integrated companies

Among the furniture companies, the integrated companies made up for the majority of companies in this period, serving the discount, the basis and the design segment. Characteristic for this type of companies in this period was that they altered their relation to the upstream activities. These were in this period represented by suppliers of raw materials, technology and labor. The raw materials were primarily imported from Norway, Sweden, Finland and Asian countries, and the sourcing started in this period to be made by the companies themselves, whereby this demonstrates an integration of the specialized supplier function. Hereby the integrated companies got rid of the previous dependence of sourcing agents and gained a closer communication to their suppliers.¹⁹ In respect to manufacturing, integrated companies remained competitive throughout the 1980s and most of the 1990s by using Danish production facilities, and despite the cost pressure starting to dominate in supplementing industries, this had so far not affected the competitiveness of the furniture industry.²⁰ This happened in parallel to the strong German interest in pine wood furniture from Denmark which meant that the integrated companies serving the basis furniture segment experienced a particular growth in this period.

However, this changed in the late 1990s, and as a result the first Danish furniture companies started to work with automation and optimization. This happened as the notion developed in the Danish furniture industry, that in order to fight foreign competition the share of product costs accounted for by labor costs should be kept low and productivity high.²¹ An important means in this process was the introduction of automation, and the number of robots utilized in the Danish furniture industry grew from one to five per 1000 employees in only one year, from 1998 to 1999.²² This happened as automaton was considered an obvious way of reducing labor costs, and was promoted as the alternative to manufacture abroad. Consequently, a great investment was made in automated production facilities, especially in the companies serving the basis and the design segment. Among the furniture companies serving the discount segment automated production had already gained acceptance at an earlier stage as furniture at a discount price level was only obtainable via automated production of flat packed particle board furniture.

Disintegrated companies

As described, the relation to the upstream activities of the integrated companies characterized the late-1980s and the early 1990s, but also the relation to the downstream activities were subject to changes. More specifically, two distribution channels evolved; sales directly to the wholesaler or

sale via a distributor, normally an export agent. The tendency with export agent was enforced by a Government initiative, financially supporting the remuneration of export specialists, with the consequence of an indirect disintegration of the distribution activities. Export associations were continuously established, and an example of a successful export association in the 1990s was FUMAC which still exists today, under a different concept though.²³

As described by the overview in table 1, the use of export agents was primarily the choice of market oriented companies, which based their business on outsourced production by using the competencies of local sub suppliers. However, outsourcing via foreign manufacturing was also tried out by some Danish furniture companies in this period, but not to the same extent as it happened in the textile industry. Instead, the notion in the industry was that the best premise for the manufacturing of Danish furniture was Denmark and this opened up for the possibility for local sub suppliers to expand their business. Considering the present importance of offshoring and outsourcing, it is surprising how strong the belief was in the competitiveness of Danish manufacturing. But as late as in 1999 the director of the Danish furniture industry Association, Keld Korsager is quoted in the Danish business press, stating that; *“the assumption that the furniture industry would move out of Denmark to Eastern Europe as it had happened in textiles in the early 1990s, can be put to rest.”* The argument behind this statement was that in 1999 only five Danish furniture companies had established their own factories in Poland or the Baltic States, and for the four of those they only had production of semi-manufactures, which was then assembled in Denmark.²⁴ At the same time Korsager pointed out that Danish furniture companies in the late 1990s accelerated outsourcing of production to companies especially in the Baltic countries, and that he forecasted this to grow in the coming years. On the other hand he did not expect many Danish furniture companies to establish their own factories, simply because most of them were too small.²⁵

Post-2000: Global manufacturing directed by international demand

The late 1990s and early 2000s was a turbulent period to Danish furniture manufactures. This was first of all the case since consumer taste changed, and within few years the demand for the previously popular pinewood furniture declined, and from making up for 50 per cent of the aggregate turnover of the Danish furniture industry in 1996, this had by 2007 declined to 10 per cent.²⁶ Hereby a lot of companies were forced to renew in order to remain profitable, a quest which to many Danish furniture companies failed. However, the activity previously accounted for by the deserted furniture manufactures were compensated for by new activity, either by existing companies in their process of renewal or new companies entering the industry: Characteristic to the companies succeeding in this period was outsourcing of production. As mentioned, some companies had started experimenting with foreign production in the late 1990s, but in the early 2000s this

tendency started growing in a rapid pace. As a consequence the nature of the industry altered significantly in just a few years.

First, this is the case in respect to the number of people employed in the furniture industry. The number of people employed in production has been under severe decline, and the number of people employed in furniture production declined from its peak of 22.140 in 2000 to 16.500 in 2007, and it is estimated that approximately 4.000 jobs has vanished since 2008.²⁷ Second, this change has also affected the geographical location of the furniture industry, as the requirements to the labor force altered. Historically, the furniture industry has had a tradition of clustering, a feature which still today characterize the industry. But the location of today's furniture clusters has altered. This is visible by comparing two maps, illustrating how new Danish furniture companies were located in the 1972-1992 period, and where the industry is located today.

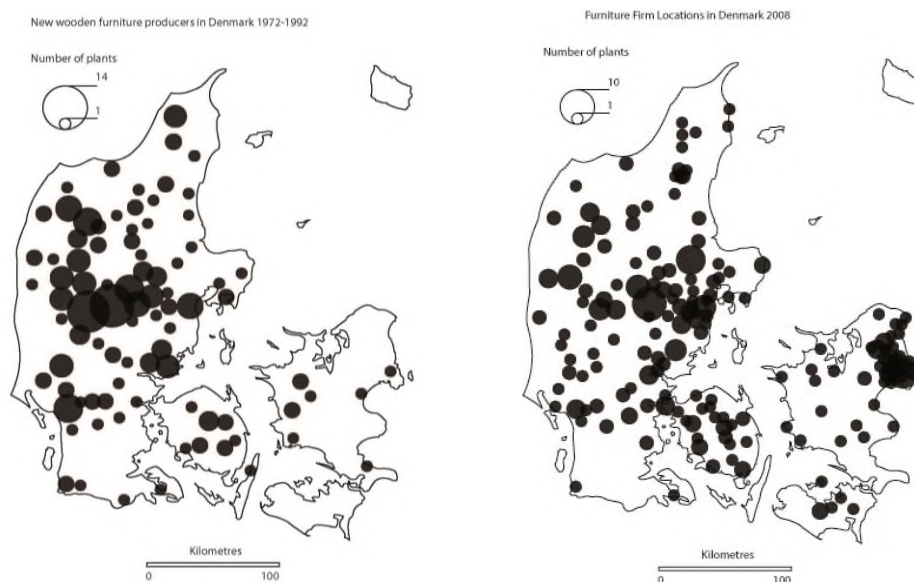


Figure 3: The geographical location of the Danish Furniture industry. Source; Map 1, to the left: Maskell: *Low-Tech Competitive Advantages and the Role Of Proximity: The Danish Wooden Furniture Industry*; Map 2, to the right: Howells and Hedemann: *A Growth Path Dependent upon the Early Internationalisation of Entrepreneurial Behaviour or 'Clusters' as Explanations for the Exceptional Export Success of the Danish Furniture Industry?*

What is interesting from these maps is that it illustrates how the altered workforce requirements, influence on the location of the industry, i.e. the hot-spot of wooden furniture manufactures in the 1990s was central Jutland, but in 2008 the Danish furniture companies instead started clustering around Denmark's principal cities, Copenhagen and Aarhus. In an analysis of this phenomenon, Howells and Hedemann demonstrated a close link to the type of employees needed by the companies. This is illustrated by one of the interviewees from their analysis, CEO at BoConcept, Viggo Mølholm, describing how BoConcepts historical roots and following choice of location in

Herning in Central Jutland, today makes up a challenge in recruiting new employees; *“No, this location is not something we benefit from, as a matter of fact in terms of the people (employees) we need to attract we would be better off located in Aarhus.”*²⁸

Finally, the new structure of the Danish furniture industry is visible by comparing the size structure of Danish furniture companies. Buch illustrated this in an analysis of the Danish furniture industry. The study demonstrated that 45 per cent of the Danish furniture production in 1997 derived from companies with a turnover larger than DKK 100 Million, and furthermore these companies accounted for 41 per cent of Danish furniture export. By 2005, the significance of +100 Million turnover companies had grown to 78 per cent of production, and 65 per cent of export.²⁹ This is considered a clear indication that the conception of furniture manufactures being made up by SME’ no longer holds true. In several articles Keld Korsager has underlined a close relation between this structural change and the increasing number of companies’ offshoring production to Eastern Europe and Asia in the post-2000 period. As the companies became bigger they were financially stronger and better prepared to buy foreign production facilities, which has been the case during the last decade. A great number of Danish furniture companies have reacted proactively to the fierce international competition, and by rethinking their ”make-buy” strategy a lot of pro- and re-active companies have come out successful of this intensification of competition.

Integrated companies

In Møller and Pades overview of business models prevailing in the Danish furniture industry in the 1980s – see table 1 – it was illustrated how integrated companies controlled all stages of the value chain, from idea development over manufacturing and marketing to sale. Given the increasing impact of foreign low cost production fewer Danish furniture companies today follow an integrated value chain strategy than it was the case in the 1980s, simply because integration has become a very vulnerable value chain strategy. This is the case since integration implies enormous requirements in terms of the skills required to succeed in all stages of the value chain. An example of such vulnerability is FLEXA, a Danish furniture company supplying children’s furniture.

FLEXA was founded in 1972 by Henning Lykke Jensen, and at its heydays the company was among the largest Danish furniture companies in terms of turnover.³⁰ Being very entrepreneurial by nature, the founder was fascinated by establishing new ventures allowing him to gain a better control of all stages of the value chain, and as a response the strategic decision was made also to control the supply of raw materials by investing in forestry. This proved a successful value chain strategy for a long time, and especially in early 2000s FLEXA benefitted from the companies’ control of raw material costs, as prices of raw materials increased in this period. However, as the global financial recession stroke in 2007 the advantages previously gained by controlling raw material costs turned into a disadvantage, as the prices on raw materials dropped significantly due to the decreasing demand. In summary this had a negative impact on the competitiveness of FLEXA and despite a replacement of the companies’ top management in 2009 it was not possible to rescue

FLEXA and the company went into administration in 2010.³¹ As illustrated in the example of FLEXA, pursuing an integrated value chain strategy can be a risky venture, but whereas FLEXA can be considered an extreme example of a company pursuing an integrated value chain strategy, several examples exist on Danish furniture companies having adopted a modified version of the integrated value chain strategy. In the following three examples of business models based on an integrated value chain strategy are illustrated; offshoring, automation and high quality niche production.

Integrated companies: Offshoring

Offshoring refers to the relocation of a business process from one country to another, and in relation to furniture the business process moved out is typically manufacturing, which is then kept in control of the company via ownership of the production facilities. This allows the company to reduce manufacturing costs by making use of employees accepting a lower unit labor cost than it is the case at the home country. Hereby the economic logic is the one of comparative advantage.

As described above, offshoring was relatively late at gaining foothold among Danish furniture manufacturers in the 1990s. One of these was the Danish manufacturer Eilersen, which as a response to the high labor cost pressure started to search for a new location for their manufacturing process, at which the labor cost could be reduced. This search was initiated in 1995 and after two years of preparation the first test-production was running at a small factory in the outskirts of Beijing. Quality being a prime issue to Eilersen, the first furniture manufactured was shipped to Denmark for quality inspection and with the quality approval in place, a full scale production was established and in 2010 the fully owned factory in China employed 250 employees.³²

Integrated companies: Automation

Due to the increasing Danish labor costs, the companies pursuing local production, already at an early stage were forced to identify how to make up for burden of high Danish labor costs, and one option was to reduce labor costs via automation. The first fully automated furniture manufacturing plants were established in Denmark in the 1960s and 1970s where the first companies started to experiment with automated production, for instance Tvilum Møbelfabrik and Scanbirk Møbler. For these companies automated production technology proved successful in making a new type of products, flat packed do-it-yourself (DIY) furniture. Besides from being suitable for automated production, this type of furniture also proved very suitable for transportation, due to the reduced bulk density, and hence a perfect mean for exploiting export markets.

Among the companies operating fully automated production facilities in Denmark, two types of companies exist; kitchen manufacturers and furniture subcontractors, supplying large international retail chains. In detail, the kitchen manufacturers, process the kitchen carcass in Denmark, and import cabinet doors from abroad, especially Italy which has developed into a kitchen door supplier specialist.³³ On the contrary, the retail chain subcontractors manufacture the entire piece of furniture

in Denmark, and ship it off in packed boxes, ready for assembly at the customer's destination. An example of one such company is Tvilum, exporting 90 per cent of its production to large international retail chains, among others to JYSK, IKEA and Wall Mart.³⁴ The products sold to these customers are typically based on the design supplied by the clients, and the only input provided by the company is the manufacturing capacity. For both the kitchen manufactures as well as the large subcontractors, the competitiveness rests in an ability to manufacture at prices compatible to the ones from low cost countries and not least, well developed skills in terms of readjustments, according to customer needs.

Caused by the large volumes, taken by the large international retail chains, a great risk follows along with the strategy of supplying this type of global retail chains. This is for example visible by looking at the supply strategy of IKEA. Due to the significance of IKEA, the company have been able to enforce very high requirements on its suppliers, meaning that IKEA suppliers in some cases has ended up reconfiguring their business in meeting IKEA demands. Andersen *et al.* describes how this was the case for the Danish furniture company Bodilsen. In 2003 Bodilsen had a customer portfolio of 400, but based on a strategy of positioning the company as a specialist supplier for large customers, the portfolio was reduced to 12 customers by 2005, of which IKEA was central. Consequently, Bodilsen ended up dedicating an entire factory for IKEA production.³⁵ As a consequence, the company was left in severe trouble, when IKEA in 2008 decided to stop using Bodilsen as a supplier. Shortly after the company went bankrupt, and 430 employees lost their job.³⁶

Integrated companies: High quality niche-production

An alternative to low cost automated production for integrated companies is high quality niche-production of products with a high margin. Hereby this type of furniture naturally lends itself to the international conception of Danish furniture, as a product of high quality, and design-wise developed in a close collaboration between furniture architect and craftsman.³⁷ The type of companies exploiting this niche is typically old companies having a long history of manufacturing in Denmark and possessing the design rights of some of the classic Danish furniture designs from golden age of the industry in the 1930-1950s.

An example of such a company is Rud Rasmussen/Denmark which was founded in 1869. Today the company is run by the fourth generation of the Rasmussen family. The genesis of Rud Rasmussen/Denmark is the continuous believe in the value of a close collaboration between furniture architect and craftsman, which was also one of the ethos promoted as characterizing Danish furniture in the 1950s, but whereas other Danish furniture companies started evading from this in the 1960s and 1970s, Rud Rasmussen/Denmark has maintained this tradition and the present collection sold by the company still rests on furniture designs from a wide range of internationally honored Danish furniture architects, such as Kaare Klint, Børge Mogensen, Poul Kjærholm, Finn Juhl and Nanna Ditzel.³⁸ Another example of a high quality niche manufacturer, which also is a

family company, is Carl Hansen and son. In contrast to Rud Rasmussen/Denmark, Carl Hansen and son has based its product range on the designs of one furniture architect, Hans J. Wegner. A collaboration initiated in 1949. This means that, just like in the case of Rud Rasmussen/Denmark, the backbone of the product range does not renew, instead, it's based on the manufacturing of relatively old designs, by craftsmen with decades of experience and thereby employees who are capable of delivering a superb quality and a result.

Disintegrated companies

Due to the high Danish labor costs, several Danish furniture companies have made the strategic decision to outsource manufacturing, as this part of the value chain typically is the one most vulnerable to competition. Hereby a lot of Danish furniture companies, previously thriving due to strong competencies in manufacturing, have been challenged to identify other key competences. This was for instance clear from a statement made in the business press by the Danish furniture industry Association in 1998 in which the director of the association, Keld Korsager. Here it was declared how Danish furniture companies in order to survive should learn from the textile and fashion industry, and be much better at marketing themselves and not only aim at being superb in respect to manufacturing. As an outcome of this development, especially three niches have developed; idea development specialization; production controller specialization and branding specialization.

Idea development specialization

The furniture companies specializing in idea development are typically small companies employing relatively few people who are specialized in design, and holds a formal education in design or architecture. The designs developed at these companies are then manufactured via outsourcing either locally or abroad. Hereby this strategy has similarities to what is known from the fashion industry where individual designers develop personal labels based on their own designs. To this type of companies design awards make up an important means of demonstrating their capabilities in developing novel and useful new furniture designs.

An example of an idea development specialist is the company GlobeZero4, referring to themselves as a "design and development" company. The business concept of GlobeZero4 is to develop high quality Danish/Scandinavian design furniture, for the corporate as well as the private market. This is done by collaborating with some of the most renowned and skilled new Scandinavian designers and by outsourcing the production to highly skilled and innovative sub-suppliers. According to the company this strategy provides a freedom to be both innovative and flexible when designing new furniture like it allows the company to focus on using the most advanced technology in the manufacturing process.³⁹

Production controller specialization

The furniture companies applying a production controller specialization strategy bridge the gap between design and manufacturing, which has evolved as outsourcing have grown to dominate. To

this type of companies their competencies are anchored in their connection to, and control of foreign sub-suppliers. An example of a company who at an early state saw this market opening up, due to the problems many companies faced in finding reliable manufacturing partners was the company ZanZ, which ended up representing around 30 furniture- and interior-manufactures located in The Baltic States, Poland and China.⁴⁰

The business concept of this type of company is hereby to develop new products and collections in a close collaboration with the company's clients, typically large international retail chains, and via its sub-suppliers/manufacturing partners in low cost countries, ensure the manufacturing of trendy and modern products at a competitive price. Another interesting example of a company pursuing this strategy is Actona Company. Actona was founded under the name Marmorhuset in 1981 as a retailer of marble products and Italian furniture, but over the years the company has grown into a large international wholesaler of furniture. In an interview, the founder of Actona explains how the core of this, at that time, "new strategy" was to develop furniture designs which appeal to contemporary trends:⁴¹ In interview, it is explained how:

We have our own designers and product managers, but we are not to invent anything new, our prime task is simply to locate the right materials and identify the right colors, and then make sure that the furniture arrives at the furniture outlets in the right quality at the right time... So, at the end of the day our job is to help our customers control the production, they provide us with the designs they want and then we make sure the quality meets their expectation, so you could say that we provide a type of controller service.⁴²

Hereby the core business for companies following a production controller specialization strategy is to ensure a high degree of responsiveness to consumer trends and manufacturing methods.

Branding specialization

Of the three types of disintegrated value chain specialization strategies, the one sharing most similarities to what is happening in the furniture industry's classic source of inspiration, the textile and fashion industry, is the branding specialists. The main focus of companies following a "brand specialist" strategy is branding and sales, while idea development and manufacturing is outsourced. Branding proved an important driver of furniture company survival in the transformation of the industry, from local production into global sourcing. This was emphasized already in 1998 by the Danish furniture industry association, and as proven by history, this shift has been carried out more successful in some companies than others.⁴³

An interesting example of a company which has succeeded in such transformation and today is considered a beacon of good taste via its high-end furniture range is Republic of Fritz Hansen. What is particularly interesting in this case is that Republic of Fritz Hansen is the fact that prior to its change into a branding specialist, the company was honored for its capabilities in high quality manufacturing, a tradition which roots back to the founding of the company in 1872. A significant

event in the development of the company was when collaboration was established, with the furniture architect Arne Jacobsen, whose designs have accounted for a significant share of the turnover of the company due to the international awareness of Arne Jacobsens furniture designs. Besides from Arne Jacobsen, collaboration was also established with other honored furniture architects, for instance Poul Kjærholm. Hereby it was a characteristic to the company that it was the products which drew the company. However, in 1998 it became clear that the company had to change strategy if they wanted to remain in business. Consequently, a new CEO was brought in and the decision was made to transform the company from a furniture manufacturer to an international brand, or a lifestyle provider as the CEO phrases it in an interview. In this process, it was also decided to start outsourcing production, and throughout the 1990s the company developed a sub-supplier strategy, meaning that production was moved out to manufactures in Denmark, Sweden and Eastern Europe. In addition the ambition changed from being excellent in furniture manufacturing, into becoming the preferred brand within exclusive design furniture, and today the company stands out as part of a small exclusive array of luxury brands of world class design.

Discussion and conclusion

During the last four decades the Danish furniture industry has gone through a process of structural change. This is clear by comparing to the Moeller and Pade study from the 1980es, referred to in the analysis, and by looking at the companies from this period still in operation. But also, this is underscored by comparing the size structure of the industry over time; In 1997 large companies with an annual turnover above DKK 100 million accounted for 45 per cent of the furniture industry turnover. In 2005, 8 years later, the equivalent numbers had risen to 78 per cent, or by 33 per centage points. In contrast to comparable industries where international trade barriers existed such as in the textile industry where the Multi Fiber Agreement facilitated the competitiveness of the Danish textile industry via import restrictions, no such protective barriers existed in terms of furniture.⁴⁴ As a result, passivism, in respect to company strategy has been equal to financial decline and bankruptcy, which ended up being the faith of many Danish furniture manufactures in the post-2000 period.

The spatial changes in the industry spilled over onto the composition of the industry workforce, which changed significantly during the same period. The number of employees engaged in blue-collar manufacturing activities was reduced from 22,000 to 16,500 from 2000 to 2007, and a further reduction of approximately 4,000 people has taken place since 2008. Specialization has also taken place, both in terms of product range and production processes. With regard to the product range, three groups have historically dominated the industry: Discount, basic and design furniture. In 1997 Kjeld Korsager, CEO of Danish Furniture Industry indicated that a contraction was taking place in

the market for basic furniture, but in contrast, Danish production of discount and design furniture fared better.⁴⁵ This development has continued, and in 2010 Danish production of basic furniture has almost ceased. In terms of turnover, manufacturers of discount furniture, most notably flat packed furniture, has held a dominating position in Denmark. Value chain strategies have also evolved. From 1970 to the 1990s the Danish furniture industry was characterized by companies which held all the main activities in-house. Companies developed their own designs, manufactured the furniture and handled marketing. In some cases sales took place through agents or through joint sales agreements with other Danish companies. The main value chain activities were performed on Danish locations, which were often adjacent. From the mid-1990s, however, this structure was changed fundamentally. A fine slicing of the value chain has taken place, both in terms of ownership of production activities and production geography. Where some Danish furniture companies started outsourcing production to Poland and later also to the Baltic countries, only few companies offshored production as most companies lacked resources to acquire Eastern European production facilities and hence could not resort to this value chain strategy. After the year 2000 the fully integrated companies, which hold all value chain activities in-house, have more or less disappeared from Denmark. Since the 1990s, Danish furniture companies have resorted to a wide variety of value chain strategies and continue to do so at the time of writing; Companies choosing a branding specializing strategy have focused on branding and marketing. In this strategy production is outsourced to low-cost countries and mainly China. A second strategy concerns idea development specialist and in this case companies focus on the development of new furniture designs and outsource all remaining activities to low-cost countries. Several such companies were established after 2000 and as such they were “born global”. A third strategy concerns the control and integration of sliced value chains. Here companies ensure that production is according to specified designs and quality requirements and ensure on-time delivery of furniture in the right place.

Danish furniture exports have played an important role in the development of the Danish furniture industry. Since the early 1980s the main part of the Danish furniture production has been exported. The Danish Furniture Industry Association has also defended a liberal trade regime, supporting the removal of international trade barriers. This sets the furniture industry apart from the textile and clothing industry, which defended trade restrictions for a long time. Outsourcing and offshoring of furniture production, however, happened later in the furniture industry than it did in the textile and clothing industry. In the furniture industry it only took place to a large extent after the year 2000. In comparison with the textile and clothing industry, the production of furniture was generally more capital intensive and involved more complicated production processes. Moreover, the majority of Danish furniture companies was small or medium-sized enterprises and did not have resources to set up their own foreign production sites. Finally, several Danish furniture companies held a skeptical perspective on the quality of furniture produced in Eastern Europe or Asia.

Changes in consumer habits have also played an important role in the development of the Danish furniture industry and Danish companies have been forced to act accordingly. At the start of the period consumers typically changed furniture only once in their life, but today consumers have developed a habit of change furniture more frequently. In part this is due to the general increase in wealth in Western Europe, North America and Japan. Similar developments have also taken place at a later time in Eastern Europe and now in China. Of course the tendency is also related to the relative lowering of the price of a piece of furniture. In relative terms, the price of furniture has decreased since the 1970s and therefore frequent changes of furniture are more feasible. Distribution and sales of furniture have also changed significantly in Europe and North America since the 1980s. Large furniture retail chains, like IKEA and Wall Mart and in a Danish context Jysk, have increased their market shares and today retail chains have a major influence on furniture production. The retail chains specify design and quality requirements for manufacturers and due to their strong bargaining power they have been able to lower prices significantly. Subsequently Danish and foreign manufacturers have been forced to automate production in order to remain competitive in serving this market.

A large number of companies have left the business and others have entered it. A group of 'old' companies however have managed to remain in business despite the significant changes in the nature of the industry. Two such companies are Fritz Hansen and BoConcept which both have mastered the change from focusing on production activities, into excelling as branding specialists.

Regardless of strategy, the characteristic of the Danish furniture companies which have survived periods of change seems to be an ability to adapt to new situations, and in this process convert the basis of previous success into drivers of future growth.

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¹ E.g. Bendtsen: *DesignDenmark*, and Hedemann: *The dubious role of 'Danish Design' in the international success of Danish furniture: An update on the favorability of the marketing match between Denmark and Furniture* and Pade et al. *Møbelindustrien*.

² Based on analysis of annual reports published by the Danish furniture industry association; Møbel+Interiør Brancheforeningen.

³ Moeler and Pade: *Industriel Success: Konkurrence faktorer i 9 danske brancher*. p. 270-271

⁴ Pade: *Vækst og dynamik i dansk erhvervsliv*, p. 153.

⁵ Smith et al.: *The globalization of furniture industries/markets*, p. 103.

⁶ Pade et al.: *Møbelindustrien*, p. 265

⁷ Buch et.al.: *Mod alle odds – En analyse af de strukturelle udfordringer for træ- og møbelindustrien i Danmark*, p. 13

⁸ Here internationalization refers to different company activities in different countries. Initially this was sales on export markets, but today it also refers to for instance production in foreign countries.

⁹ Johanson et. al.: *The internationalization process of the firm – a model of knowledge development and increasing foreign market commitment* p. 29.

¹⁰ Hansen: *Networks, Narratives, and New Markets: The Rise and Decline of Danish Modern Furniture Design, 1930-1970*, p. 449

¹¹ Hansen: *Networks, Narratives, and New Markets: The Rise and Decline of Danish Modern Furniture Design, 1930-1970*, p. 450.

¹² Smith et al.: *The globalization of furniture industries/markets*, p. 103.

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- ¹³ Pade et al.: *Møbelindustrien*, p. 267.
- ¹⁴ *JyllandsPosten*: "Møbelindustrien bliver (J. Aaes)" 30.08.1999.
- ¹⁵ Maskell: *Low-Tech Competitive Advantages and the Role Of Proximity: The Danish Wooden Furniture Industry* p. 115
- ¹⁶ For instance: *Danske Møbler nr. 7*: "Synspunkt – Under østeuropæisk bekvemmelighedsflag" 09.1998.
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- ²⁰ Maskell: *Low-Tech Competitive Advantages and the Role Of Proximity: The Danish Wooden Furniture Industry*, p. 101
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Changing value chain strategies of Danish clothing and fashion companies, 1970-2013

BY KRISTOFFER JENSEN AND RENÉ TAUDAL POULSEN

Over the last four decades, the clothing industry has seen one of the most radical, global transformations of any industry, and Western European clothing companies have been put under strain. To the surprise of industry observers and academics, however, Denmark continues to hold expansive and profitable companies within this industry. Both the trade itself and industry observers see the present success of Danish fashion as the result of Danish pioneering in international outsourcing. The article challenges the commonly told story, arguing that the present success should be seen as the result of new companies entering the sector rather than the transformation of old ones. The article demonstrates that value chain strategies are constantly in the making and successful ones rarely remain competitive for long.

Introduction

Over the last four decades, the clothing and fashion industries have been radically transformed on a global scale. New, low-cost production centres in Eastern Europe, Latin America and South East Asia have challenged old industrial districts in Western Europe and North America. Increasingly value chains have been fragmented and the individual value-adding activities, from design of clothes over cutting and sewing to distribution and marketing, now take place in various locations and often in different continents.¹

The Danish clothing industry is an example of an old Western European industry, which has encountered increasing competition from new players in low-cost countries. It has had to reconsider business strategies accordingly. Despite the external pressures and the high Danish labour costs, several, and notably some large, fashion companies are headquartered in Denmark. During the period of intensifying global competition, the Danish fashion companies have increased their turnover and key Danish actors have recently expressed ambitions of developing Copenhagen into the world's fifth fashion cluster after Paris, London, Milan and New York.²

The development of the Danish clothing industry has surprised Danish industry observers, and academics have paid attention to the industry for the same reason. In a report from 2006, Andersen, Bøllingtoft and Christensen argued that Danish clothing companies had shifted their focus away from production towards high-value adding and knowledge intensive activities, such as design and branding. The companies had successfully created value by positioning themselves strategically in new, global production networks.³ Similarly, Danish business historians have noticed the recent transformation of the industry, even though research in the field has been sparse until recently.⁴ Christoffersen described how labour intensive textile and clothing manufacturing

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had relocated to low-cost countries and how new players had successfully transformed the industry.⁵ He said:⁶

While domestic textile production contracted, an important group of trade companies emerged, which handled design, organized textile production in low-wage countries in South East Asia or other places and handled distribution. This group grew rapidly and expanded internationally both in terms of sales and production. Therefore an important textile sector remained in Denmark, but in a post-industrial form, where manufacturing itself was no longer a key economic activity.

In the industry's self-conception, revised value chain strategies are seen as key success factors. Many companies have prospered and expanded because they have adopted sophisticated value chain strategies, focused on high-value adding activities only and outsourcing simple production activities. In 2008 Jørgen Kjær Jacobsen, chairman of the industry association, Danish Textile and Clothing (Dansk Textil og Beklædning, DTB) emphasised that Danish textile and clothing companies were global pioneers in terms of outsourcing. When competition from low-cost countries in Southern Europe and later Eastern Europe and South East Asia had made certain production activities unviable in Denmark, Danish companies had quickly relocated such activities abroad. Hence, Danish companies had strengthened their competitive position and increased their revenue in a highly competitive, global environment.⁷

The commonly told story of a successful industrial transformation needs revision for three reasons. Firstly, it is highly retrospective. The development was far less linear or straightforward than usually told. The story only traces the development of the present-day dominating strategies and leaves out uncertainties and alternative avenues of development. It conceals the fact that Danish companies adopted a multitude of value chain strategies, some of which led numerous companies into decline. Secondly, the narrative from the industry association largely neglects the fact that growth was produced by newcomers, not existing companies. The Danish development was not so much a case of industrial transformation as a case of radical change, propelled by new entrants with new value chain strategies. Thirdly, 'Dansk Textil og Beklædning' forgets that it itself fought for various protectionist schemes for approximately two decades in order to seal Danish clothing production from international competition.

In this article we analyse the development of the Danish clothing and fashion industries after 1970, in order to evaluate the multitude of value chain strategies and try to explain why Denmark still has profitable and expanding companies in this business despite its high labour costs. We use the concept of value chain in Michael Porter's generic sense, which splits value adding into a number of sequential activities, spanning from inbound logistics over operations to marketing, sales and services.⁸ We define a value chain strategy as top manager decisions on the company's position in the value system and it involves two main issues: One concerns which activities to engage in and which to outsource (make or buy-decisions). The other concerns locational issues (where the various activities should be located and how the individual activities should be controlled and integrated into a coherent value chain). We divide the value chain into up-, mid- and downstream activities. Upstream, design and product development take place. Midstream, the manufacturing processes such as cutting and sewing are performed. Finally, marketing, branding and distribution are referred to as downstream activities.⁹

International framework

By 1970, the clothing industry had reached a mature development stage in which well-proven production technologies changed only slowly and where a cost focus was highly important to corporate competitiveness. Midstream activities remained labour intensive and the work force generally required only short training. Industrial latecomers had opportunities to enter the business and could potentially gain a competitive advantage based on low labour costs. In 2007 Dicken stated:¹⁰

The manufacture of clothing is an ideal candidate for international subcontracting. It is highly labour intensive; uses low-skill or easily trained labour; and the process can be fragmented and geographically separated, with design and often cutting being performed in one location (usually a developed country) and sewing and garments assembly in another location (usually a developing country).

Several countries from Southern Europe, Latin America and South East Asia have entered the global clothing markets after 1970 and Eastern Europe joined after 1990. The new exporters generally derived competitiveness from a large, well-disciplined and low-cost labour force. The process was also facilitated by increasingly fast and reliable container transport.¹¹ Moreover, new information technologies have gradually enabled cheap and fast information exchange in dispersed networks. Lead times from design to finished products have been shortened and high fashion firms can now quickly respond to constantly changing consumer requirements. It is now feasible to exchange drawings in true colours electronically, a precondition for spatial separation of design and production. Similarly, the new electronic tracking of stocks in widespread systems has facilitated this process.¹²

Political power relations and trade politics have also influenced the development of the clothing and fashion industry. Already in the 1960s, the industry became a battleground for international trade policy. Strong interest groups in the established production centres in Western and Southern Europe and North America battled to preserve the status quo, arguing that the old centres needed protection and time to transform.¹³ Their advocacy resulted in an international trade regime with various restrictions, and protectionism became widespread after the 1960s. Europeans and North Americans used import quotas, tariffs and various labelling schemes for clothes to protect their domestic industries. The so-called Multi Fibre Agreement (MFA) epitomised this development. Implemented in 1974 with the long-term goal of gradually liberalising the textile and apparel trade, the MFA set the boundaries for global textile and clothing trade and allowed various trade barriers during an interim period, in order to give Western European and US players time to upgrade and prepare for intensified competition. The MFA was subsequently renegotiated several times and the interim period lasted for three decades.¹⁴

Danish protectionism

Trade policy also became a contested issue in Denmark, a fact which is often forgotten by present-day industry observers. In the 1970s and 1980s, the Clothing Producer Industry Association (Beklædningsindustriens Sammenslutning, BS) and the Textile Manufacturers' Association (Textilfabrikantforeningen, TEX) fought a coordinated battle for protectionism.¹⁵ They argued that Danish companies, like Western European colleagues, needed time to prepare for global competition, demanding protection in an interim period. In 1973, BS and TEX supported Danish membership of the EEC, because they expected a more protectionist stand from European authorities than from Danish authorities. The two associations were deeply dissatisfied with the attitude of the Danish government because Denmark had given developing countries favourable

access to its market through a unilateral lowering of tariffs in 1972. BS and TEX believed that the EEC would embark on a more protectionist course.¹⁶

Following Danish EEC membership in 1973, negotiations regarding the actual import quotas stipulated in the MFA became part of joint European negotiations. Initially, BS and TEX expected to start a joint lobbying effort with the trade associations of the other member states, but they soon realised that their interests did not always converge.¹⁷ Moreover, protectionist lobbying damaged the industry's reputation in Denmark: *'There was some discussion as to whether the claim for protectionism should be continued, since that course leads to considerable bad will unfavourable to the clothing industry.'*¹⁸ As part of Danish foreign policy, Denmark paid development aid to several developing countries in order to help them industrialize. The Danish policy conflicted with the trade association's arguments for import limitations for developing countries.¹⁹

BS' efforts to limit Danish clothing imports also caused a clash within the organization itself, because a large share of these imports derived from BS' own members.²⁰ In the 1970s, many clothing manufacturers realised the advantages of supplementing Danish production with low cost manufacturing in Southern Europe. The role of the association in regard to members with import problems was discussed. The chairman of the board of BS argued for association assistance to members with import problems, but the majority of members turned his suggestion down. In 1974 it was agreed that: *'BS neither can nor shall prevent the individual member from importing finished articles, but it cannot be considered BS's duty to help them in that respect.'*²¹ Later in the 1970s, the issue was raised again, but it was agreed to maintain the industry policy from 1974.²²

Discussions on protectionism continued into the 1980s. A report by the Danish Ministry of Industry from 1985 can serve as an example of the prevailing Danish discussions at the time and illustrates how clothing manufacturers were able to set a national, political agenda.²³ The report analysed *'the competitive position of the Danish textile and clothing industry, including the need for protection'* and *'identified specific Danish problems, interests and priorities for the upcoming international negotiations concerning the MFA...'*²⁴ The report examined the potential effects of trade liberalisations on Danish industry and concluded that the Danish companies generally performed better than competitors in other Western European countries in terms of employment level, productivity and exports. Some products in the 'sensitive part of the industry' were at danger in case of a liberalisation, while others would not experience any great difference under a liberal trade regime. Most notably, clothing production would likely suffer in case of an intensified competition from low-cost countries in developing countries. The authors of the report, however, were unable to forecast changes in employment in case of liberalisation.²⁵

Danish free trade

In 1987, BS reformulated its policy on international clothing trade: *"... we all have something to gain from allowing our members to supplement their own production with products made by foreign subcontractors."*²⁶ A few years later, BS and TEX made a common statement, arguing that all markets should be opened through gradual trade liberalisation. Danish politicians should work internationally to stop production subsidies.²⁷ Growing Danish clothing exports in the latter half of the 1980s had demonstrated the potential advantages from international integration and explain the new association policy, which also became more aligned with Danish politicians' anti-protectionist stands.²⁸

The opening up of Eastern Europe at the end of the Cold War from 1990 strengthened this tendency further. Generally, production in Eastern Europe suffered from low productivity, but several countries, including Poland, the Baltics and Rumania, had a long engagement in the clothing industry. Low labour costs and the proximity to the large Western European consumer markets made Eastern European countries attractive sites for low-tech clothing production. Moreover,

Eastern Europe was not part of the MFA, and thus not trade restricted. Productivity in Eastern Europe soon improved through inflow of western know-how.²⁹ This dramatically changed the competitive environment for the Danish textile and clothing sector and Danish clothing imports from Eastern Europe rose rapidly after 1990.

In 1991, the Danish textile and clothing industry association made a cost-benefit analysis of production in Eastern Europe for its member companies, concluding that in many cases mass production for sewing was cheaper in Eastern Europe than in Denmark. Small series of clothes, on the other hand, could be sewed more profitably at home. Hence: “...*production at home and abroad can supplement each other in a division of labour, where small series, for instance test- and repeat orders are sewed here [in Denmark], and the large series are sewed abroad.*”³⁰

For companies, unfamiliar with production in Eastern Europe, there were many challenges to overcome and the Danish industry association soon produced a manual with recommendations for companies, wishing to pursue new value chain strategies.³¹

The opening of Eastern Europe changed the structure and the fundamental conditions of the Danish industry, and many players in the industry gradually modified their position accordingly, shifting towards a more liberal perspective.³² Still in the 1990s, the pace of liberalisation was contested and several Danish manufacturing companies continued to prefer a very long period of transition to free markets.³³ Several developed countries experienced a similar gap between clothing importers on the one side and manufacturers on the other. For instance in the US, a conflict between free traders and protagonists of protectionism also developed into a fierce battle over trade regimes during this period, so Denmark was not unique in this regard.³⁴

For many years, the textile and clothing trade were kept out of negotiations in the General Agreement on Tariffs and Trade (GATT) and later the World Trade Organization (WTO), but after 1994 a gradual integration of clothing into GATT/WTO was made. Subsequently, international trade quotas were gradually removed. From the late 1990s, China experienced rapid growth and industrialisation and gained strength in clothing manufacturing. Some Western countries still opted for protectionism in the 2000s, but the Danish trade association argued that import restrictions hampered Danish business.³⁵ From the 1990s, the most successful Danish companies in the industry preferred free trade and used foreign sourcing extensively. The success of these companies tipped the balance in favour of free trade. The protectionist strategy had failed, demonstrated by the fact that the adaptation, which was anticipated by US and Western European protagonists of protectionism, had failed to materialise: The majority of the old manufacturing companies established before 1970, especially those in the clothing industry, proved unable to adjust to the new global competition and gradually disappeared.³⁶ It took more than three decades to change the trade system, and clearly protectionism postponed the transformation. It could not, however, save old, entrenched industrial structures in Denmark or elsewhere in the developed economies.

Fully-fledge value chain strategy

In Denmark protectionist arguments were often combined with a fully-fledged value chain strategy, which aimed at maintaining clothing production in Denmark. In 1970, Denmark had several hundred textile and clothing manufacturers with a single production site, holding up-, mid- and downstream activities in-house. Many of these companies continued to pursue this strategy after 1970, owning and retaining activities in Denmark, and changing little in terms of value chain configuration. The fully-fledged value chain strategy is often forgotten today, for the simple reason that it was generally a losing one. In the 1990s large numbers of small and medium-sized companies exited the industry, and many of them had pursued exactly this strategy and had thus failed to lower costs to competitive levels.³⁷ As often winners write history, and the successful fast-

fashion companies with radically different value chain strategies have tended to focus mainly on their own story. Hence, the losers in the transformation process are often forgotten.

Tage Vanggaards Kjolefabrik exemplifies the fully-fledged value chain strategy. Established in 1933 as a traditional production centred business with one Danish production site, the company expanded considerably in the 1950s and 1960s. Tage Vanggaard, the founder, focused on product design and successfully applied efficient marketing, when selling dresses to Danish and other Scandinavian consumers. At the peak in 1969, the company employed more than 600 people, but decline set in from the 1970s. Vanggaard could neither reformulate the company strategy nor transfer the responsibility of the company to a younger, professional management. Instead his priority was control of the company. After many years with disappointing results, the company was finally closed down in 1991. The case demonstrates how insufficient incremental strategic shifts were during a period of dramatic changes in clothing markets. Family ownership set up strong restrictions on the company's room to manoeuvre and seen in retrospect Vanggaard's stable value chain strategy represented a passive and inefficient response to the challenges of the time.³⁸

The case of Vanggaard was not unique. On the contrary, there are numerous examples of Danish clothing manufacturers, which failed to adapt to the new, global competitive setting. Between 1972 and 1988 728 companies within textiles and clothing were closed down, and in 1998 Nielsen and Pedersen estimated that approximately 300 companies had left the business between 1987 and 1997, mainly within clothing manufacturing, which thus almost disappeared as a Danish manufacturing industry.³⁹ Danish labour costs exceeded international standards. As global trade was gradually liberalised, the salaries paid in Danish manufacturing proved too high to sustain a profitable, low-tech business in Denmark (Table 1). The fully-fledged value chain strategy failed to address the challenges of the industry and the global transformation of value chains. From a present day perspective, it is clear that fully-fledged value chain strategy was a re-active one and it may be difficult for present day observers to understand why some company managers and owners choose to rely on it for so long. When analysing retrospectively, it is tempting to make such negative judgments of past strategies. But it is important to remember that the defensive strategy was often combined with more offensive actions to reduce production costs through automation.

TABLE 1. Hourly labour costs and productivity index in the clothing industry, by country, 1998.⁴⁰

Country	Hourly wage in DKK	Wage index, DK = 100	Productivity index, DK = 100
China	1,37	2	70
Latvia	2,75	3	75
Lithuania	2,85	3	75
Morocco	5,58	7	70
Turkey	8,44	10	85
Poland	9,82	12	80
Portugal	16,30	20	85
Denmark	81,68	100	100

Automation

The idea of competing through automation was widely used by Danish clothing manufacturers both before and after 1970. The aim was to neutralise the effect of high Danish wages, but clothing manufacturers soon faced the problem that the handling of cloth, a flexible, three-dimensional material, was difficult to automate.⁴¹ In the 1980s the trade associations became increasingly aware of the trade-off between flexibility and automation, and they changed recommendations to their members accordingly. The focus on design and selling was to be downplayed, while technological upgrading projects should be given full attention.⁴² In 1983, the Association of Danish Employers (Dansk Arbejdsgiverforening) initiated a project concerning strategic development in Danish manufacturing companies, named Change from Within (Forandring indefra), and the textile and clothing associations participated and disseminated new ideas from the project to their members.⁴³ As one of the association's reports said:⁴⁴

Change from within challenges the sales centered strategy and attempts to bring production in focus. Changes in production processes must be planned well in advance, and thus production processes should lead the process of change.

This perspective was highly centred on production, and represented an engineer's view on business development. According to this view, companies should change continuously and production itself should initiate such changes.

The case of Brandtex illustrates the automation strategies' advantages and limitations. It was the most extreme Danish case of automation in clothing manufacturing, and it inspired many Danish colleagues in the 1970s and 1980s. During this period, Brandtex became the largest player in the Danish clothing industry, employing more than 1,000 people. Established in 1935, the company concentrated production on slacks for mature women from the 1970s. Mature women were not as heavily influenced by fashion trends as other segments, a fact which supported the company's automation strategy. Brandtex invested heavily in production technology and made large-scale rationalisations, notably in cutting and warehousing. Large-scale production was also propelled by an increase in foreign sales.⁴⁵ Max Petersen, CEO of Brandtex, saw low design variability of its product range as a virtue:⁴⁶

Designers may be dispensed with if one is good enough. If one is automated enough. [... Designers] want to make something new all the time, or they wouldn't be designers, and if one makes new things all the time one can't mass-produce. For instance, we have invested 225,000 DKK in a pocket machine, and it can only make one shape of pocket, so it's no use if your designer invents new pocket shapes all the time.

Brandtex experienced frequent and exclusively positive media coverage in the 1970s and the 1980s, and was perceived as a Danish bulwark against cheap and implicitly poor foreign products. As Petersen expressed it in a newspaper interview: "*They are welcome to come on with all their underpaid labour and cheap goods. We can now produce a pair of slacks in nine minutes, and the others cannot match that.*"⁴⁷

Nevertheless, after the middle of the 1980s the Brandtex management gradually lost faith in the automation strategy. Consumers increased their demands for details in clothing and greater collection variety. Hence clothing companies could no longer dispense with designers. The demand for more design and variation increased sewing time, and thus increased the pressure for lower production costs and a relocation of mid-stream activities to low-cost countries.⁴⁸

In our firm we have the maxim that items of clothing with a production time of more than 10 minutes need to be made abroad in order to be profitable. Other products we may advantageously make at home. The fact is, however, that we are forced to stake increasingly on design. That demands a longer production process.

The external pressure led Brandtex to reformulate its value chain strategy, basing it on offshoring after 1990.

Offshoring

Following the opening up of Eastern Europe, Danish clothing companies had to face new competition, but also gained new, low cost production opportunities. Brandtex was one example out of a large group of production-oriented clothing companies that started offshoring to Poland to reduce costs in the early 1990s. Manageable geographical distances from the Danish head offices to Poland enabled a close connection between management and production. At a strategy seminar in 1994, the Brandtex management concluded: *“The products should move to more fashion orientation [...] in order to meet the consumers’ needs.”*⁴⁹ In order to reduce overheads the company had to move mid-stream production activities to the company’s own, new factories abroad. Maintaining production know-how was seen as decisive: *‘Keep production and technology know-how for the main products within the Brandtex organisation - competitive advantage’*.⁵⁰

The skirt producer Lindon is another case on Danish offshoring to Poland in the 1990s. Like Brandtex, Lindon had hoped for long to maintain production in Denmark, but finally concluded that a dramatic reduction of costs was a prerequisite for survival in the 1990s. Setting up a factory in a neighbouring country seemed like the best alternative to Danish manufacturing. Similar to Brandtex, Lindon maintained design, cutting, quality control, packaging, marketing and distribution in Denmark while moving sewing to a Polish site, which was controlled by onsite Danish management.⁵¹

In the early 1990s both productivity and production quality lagged far behind on the Polish clothing production sites due to outworn machinery and untrained labour, but technology transfer from companies like Brandtex and Lindon soon followed and narrowed the knowledge gap between Denmark and Eastern Europe. The development increased the incentives for Danish companies to produce in Eastern Europe, but wage levels grew rapidly in Eastern Europe in the same years.⁵² The increasing Polish wage levels combined with reduced global trade barriers meant that Poland often only became a stepping-stone for Danish clothing manufacturers on their way to cheaper production centres in Asia and the offshoring value chain strategy proved short-lived.

Backward integration in retailing

Even though Brandtex, Lindon and some other traditional clothing manufacturers demonstrated a capability for strategic changes, the most dynamic players in Denmark, who came to define the successful value chain strategy of the 2000s, came from elsewhere. Many of the new players originated from the 1960s and focused on fashion design and retailing, i.e. up- and downstream activities, while leaving midstream production activities to Danish and foreign subcontractors.⁵³ Generally the archives of these companies have not been open to historical researchers, but it is possible to analyse their development based on annual reports, industry journals and interview-based case-studies from business economists.

In official statistics, the new players were defined as retailers, and therefore excluded from the traditional clothing industry category. Bestseller is the most expansive example of this group. It owns brands such as Jack & Jones and Vero Moda, and has an annual turnover surpassing 18 billion DKK and several thousand retail shops, notably also in China.⁵⁴ Founded in 1975, Bestseller started as a single shop, and grew fast from the early 1990s with new brand stores in Denmark and abroad,

partly with local franchises. Bestseller utilised feed-backs from its retail chain to cater for consumers' design requirements. Traditional clothing manufacturers could not get the same wealth of information from selling their products through independent retailers, which often represented numerous brands. Tight market connections and deep market insights proved decisive for the Danish fashion companies following the late 1980s, when consumer culture started to shift more quickly. The retailers contributed to this development by shaping consumer culture.⁵⁵ Fashion innovation researcher Yen Tran described the role of present day fashion companies:⁵⁶

In the development of stylistic innovation, connection to the users appears to be a sophisticated process involving observation, evaluation, intuition, subjective decision, and the creative combination of diverse and partially contradictory trends. In this process however, the final responsibility of offering fashion statements rests with the fashion firms and not with consumers.⁵⁷

Successful retailers do not only owe their growth to efficient market insights, they influence the market itself. Hence, retailers have improved their bargaining position relative to traditional manufacturers.

IC Companys, the second largest enterprise within Danish fashion today, like Bestseller, never possessed midstream activities. The company management states that their core competences are within design and trade and the company possess '*the ability to develop and expand international brands*'.⁵⁸ IC Companys grew through mergers and acquisitions.⁵⁹ The company has built a multi-brand platform with many functions, such as sourcing, logistics, HR and finances, common for all brands. The brands of course maintain a high diversity, but the common platform produces considerable economies of scale.⁶⁰ The company uses the concept 'value chain optimisation' to describe its efforts to reduce production costs.⁶¹ Interestingly, clothing labels from Peak Performance, an IC Companys brand, currently says 'Designed in....' rather than 'Made in...'. The emphasis on design, not production site, demonstrates that the design is valued higher than production, and design is used increasingly in the marketing of clothes.

The existence and increasing success of companies like Bestseller and IC Companys, that develop their own designs and produce within tight networks with subcontractors mainly in South East Asia, challenge the traditional picture of Danish clothing manufacturing. According to the Danish Statistical Agency, Bestseller and IC Companys belong to the service sector, not manufacturing, but the two companies do not work as traditional wholesalers, which buy finished products for distribution through retail channels. On the contrary, they develop new products, which they bring to the market through a very tight network of foreign subcontractors. This development has also occurred in many other Western countries, and Lane and Probert have also emphasised this entanglement between manufacturing and retailing:⁶²

Due to the widespread abandonment of the manufacturing function by clothing firms and the adoption of some direct sourcing by most retailers, the boundaries between types of firms have become increasingly blurred and difficult to draw.

Lane and Probert nevertheless argued that the new type of firms "... *still execute certain essential pre- and post-production functions and, in many cases, continue to command manufacturing skills and knowledge*".⁶³ In the Danish case, the transformation, described by Lane and Probert, has clearly also taken place, and it was triggered by backward integrating retailers, most notably the Bestseller group. Since the 1990s, Bestseller has inspired many of the remaining clothing manufacturers in Denmark to outsource mid-stream activities and establish own retail chains instead of owning all activities in the value chain.

Outsourcing

The gradual movement from offshoring to outsourcing, which occurred in Denmark in the 1990s, was analysed by Nielsen and Pedersen in a study for DTB. Writing in 1998, when outsourcing was reshaping the Danish clothing and fashion industries, the two authors identified three value chain strategies or business models as they preferred to call them. The three models were distinguished by ownership and geography. Nielsen and Pedersen labelled the three models Outward Processing Traffic (OPT), Cut, Make and Trim (CMT) and Sourcing from Own Design (SOD) and each model represented a stage in the outsourcing process (See Table 2). Similar labels are used in the international literature on the industry.⁶⁴ As outsourcing progressed, Danish companies moved from OPT via CMT to the SOD model and value chain strategies increasingly departed from the traditional in-house production model.⁶⁵ In the OPT model only the most labour intensive activities, sewing and packaging, were outsourced, whereas other activities took place in Denmark. According to Nielsen and Pedersen, CMT represented ‘*a step up in the outsourcing process*’.⁶⁶ Further activities were outsourced abroad, including cutting and quality control. Procurement was maintained in Denmark for reasons of quality concern, but otherwise manual processes were outsourced to foreign companies. Travelling controllers ensured quality control in the foreign suppliers’ sites. SOD was the most radical model, in which only design, logistics and distribution, which represent the most knowledge-intensive activities, remained in Denmark.

TABLE 2. Value chain strategies.⁶⁷

Activity	OPT Outward Processing Traffic (1985-90)	CMT Cut, Make and Trim (1990-95)	SOD Sourcing from own Design (1995-)
Design	Denmark	Denmark	Denmark
Logistics	Denmark	Outsourcing, Denmark	Outsourcing, Denmark
Procurement	Denmark	Outsourcing, Denmark	Outsourcing, Eastern Europe
Processing	Outsourcing, Denmark	Outsourcing, Southern Europe	Outsourcing, Eastern Europe
Cutting	Outsourcing, Denmark	Outsourcing, Eastern Europe	Outsourcing, Asia
Sewing	Outsourcing, Southern Europe	Outsourcing, Eastern Europe	Outsourcing, Asia
Packaging	Outsourcing, Southern Europe	Outsourcing, Eastern Europe	Outsourcing, Asia
Quality control	Denmark	Outsourcing, Southern Europe	Outsourcing, Asia
Branding	Denmark	Denmark	Denmark

The core competencies of the SOD-model companies were not within production as such. In fact, many such companies valued design and marketing higher. Some traditional manufacturing companies, which originally held the main value chain activities in-house, had succeeded in transforming into SOD model companies by emulating innovators such as Bestseller. This transformation was not an easy one, and the cases of Brandtex and Lindon can shed some light on this process.⁶⁸

In the early 1990s Brandtex and Lindon had both offshored mid-stream activities to Eastern Europe, but managers in the two companies soon decided to abandon their own foreign production

sites. From the late 1990s, they started to outsource cutting, sewing and trimming. At the same time, Brandtex and Lindon faced distribution problems. They sold their collections through independent retailers, which had a variety of brands in the same shop, but competition from new brand stores set up by companies such as Bestseller, IC Companys and Swedish H&M intensified. In response, both Brandtex and Lindon started to offer shop-in-shop solutions to their independent retailers. In this way, retailers saved cost for decoration, which were partly transferred to the brand owners, and brand owners could standardise their marketing throughout the retail network. The shop-in-shop solutions required fairly broad collections, and Brandtex and Lindon had to expand in this regard. As expressed on a board meeting at Lindon: “*We should expand and raise turnover in our existing retail network by broadening our collections and adding more themes to our collections [...] We are seen upon as a supplier of niche products.*”⁶⁹ A growing need for fast fashion also laid pressure on the company:⁷⁰

We should avoid falling behind in terms of fast deliveries. Even though this has a number of drawbacks, Lindon has to act quickly. Otherwise retailers will go elsewhere to buy products. [...] Retailers are forced by consumers to be more active – i.e. constantly provide new products.

The pressure to broaden collections and increase the number of shifts between collections caused Brandtex and Lindon to abandon their own production sites.⁷¹

Environmental and industrial relation issues also made it difficult to maintain control of production sites. When Lindon offshored production to Poland it aimed at low Polish wages. But, it was a direct order from the company board to the daily management that: ‘*The working environment in Poland should equal the one in Frederiks [the Danish factory]*’.⁷² This ideal was increasingly difficult to maintain, when competing with companies using an outsourcing business model: *Large brands tend to move production to low-cost areas without restrictions on their own production capabilities and disregarding labor and working conditions.*⁷³

On a more general basis, researchers Lane and Probert have confirmed that Western firms, in spite of CSR-slogans, indirectly use outsourcing to lay pressure on environmental protection and labour rights:⁷⁴

The garment industry not only sources from countries with the lowest wages but further pushes down costs by utilizing workers with the lowest bargaining power – women and (im)migrants and other unregistered employees.

The increasing distance between Western fashion company headquarters and midstream activities often reduces or blurs problems with midstream labour conditions. Production costs are lowered, but in many cases, labour working conditions are also lower than conditions in Western countries and this fact explains the pressures experienced by Danish companies such as Lindon.

In search for flexibility and reduced production costs, Lindon and Brandtex started outsourcing around 2000. But especially Lindon soon faced the problem that not much was left of the company when mid-stream activities were abandoned. Brandtex, in an effort to emulate Bestseller, tried to replace the lost part of the value chain by the setting up of a large-scale retail chain, but plans were quickly abandoned when the management had to realise it did not possess the necessary retailing competences. Brandtex, renamed BTX-Group in 2005, remains a player in the Danish fashion industry. It owes its continued existence not alone to the Brandtex brand itself, but to the acquisition and development of new brands, which were never manufactured in Denmark.⁷⁵

Limits to outsourcing

Growing fashion exports have fuelled Danish optimism in the last two decades, and a 2005 study from Copenhagen Business School stated that ‘the future seems promising’. It concluded that:⁷⁶

Several key representatives of the fashion industry predict that Danish companies will have a strong competitive position under the new market conditions, as the outsourcing strategy is well established in the Danish clothing industry and most companies have managed to strike a unique balance between price, design and branding. ... One of the reasons for the success of Danish clothing abroad is the reputation Danish fashion designers have for representing unique styles and design.

Some observers were sceptical about these ambitions, arguing that Copenhagen did not have sufficient scale to compete with foreign fashion centres.⁷⁷ Subsequent developments have confirmed that optimism ran a little high in the middle of the 2000s. The dreams about developing Copenhagen into a global fashion centre did not materialise, and many small fashion businesses had hard times during the 2008-09 financial crisis. In short, Danish fashion has generally remained expansive, but on a more modest scale than anticipated in the middle of the 2000s.⁷⁸

Industry observers have also recently started to question the outsourced value chain strategy. Several academics have argued that outsourcing may cause unanticipated problems to the outsourcing company, and ultimately an erosion of important technical know-how.⁷⁹ On a general level, Bettis, Bradley and Hamel have focused on such unintended consequences, arguing that non-strategic outsourcing could cause a long-term erosion of outsourcing companies’ core-competencies.⁸⁰ Companies’ cost cuttings through outsourcing are often built on the misconception that design and manufacturing could be easily separated. In many cases suppliers have made encroachments on the outsourcing company’s core competencies and outsourcing companies have often proved unable to hold market knowledge away from suppliers. In the context of the clothing and fashion industries, observers have argued similarly. Said Lane and Probert.⁸¹

Outsourcing of production [...] has been shown to be a progressive process, and more and more steps in the value chain have become externalized. While this may enhance the share of value captured by firms and their investors in the short term firms lose their industrial experience and expertise. This eventually undermines their competitive advantage.

In Denmark industry players, including DTB, have also voiced some concern in this regard. In 2000, DTB saw outsourcing as prerequisite for survival in highly competitive global markets, but advised companies to keep a certain Danish basis production in order to maintain long-term competitiveness.⁸² The company Kello can serve as an example of this perspective. Established in 1983, Kello designed, produced and sold high-quality clothing for women. It started as a traditional clothing company with in-house, Danish production, but embarked on the outsourcing avenue in the 1990s. First stop was Poland, and then followed the Ukraine and the Baltics. Only five seamstresses, who produced proto-types for the company, remained in Denmark. In a 2004 research interview, Kello managers stated an explicit concern about the unintended consequences of outsourcing. Outsourcing of production activities to foreign partners could potentially cause the Danish companies to lose production know-how, which was crucial when negotiating prices and delivery terms with suppliers. Future generations with little personal experience in clothing production could encounter problems gaining access to such know-how in Denmark.⁸³

An international trend, where companies prefer production near consumers to low-cost country outsourcing, has also recently emerged. A 2011 study made by Cachon and Swinney demonstrated that companies with a ‘fast fashion approach’ tend to generate higher profits than competing clothing companies.⁸⁴ Targeting demanding customers, a fast fashion approach combines

capabilities for trendy designs with quick responses and short lead-times. The approach often has high costs, because expensive labour, located close to the market, is used extensively instead of low-cost outsourced production. These companies, however, avoid end-of-season clearance sales, which are expensive, and they are excellent at matching inventory with demand. Furthermore, they produce trendy clothing, which is appreciated by demanding customers. Quick responses and short lead times allow companies to follow customer design demands more closely. Moreover, production close to consumers may also facilitate corporate social responsibility, which can prove important if future costumers will start to question the social problems related to outsourcing.

In Denmark some evidence also suggests that value chain strategies may be changing again. Bestseller, the leading Danish example on outsourcing, recently bought shares in Bombay Rayon, an Indian clothing manufacturer and retailer. Bestseller described this as a portfolio investment, but industry observers also emphasised the advantages of gaining a more direct control of a subcontractor: *Large players have easier access to a resource which is sometimes scarce, i.e. production capacity with suppliers. With a shareholding in supplier companies, they can more easily control the supply chain.*⁸⁵

The issue of value chain control also reached the public's attention in the spring of 2013, when a Bangladesh building holding clothing manufacturing suddenly collapsed, causing the death of more than 1,100 workers. The disaster demonstrated poor labour working conditions in clothing production in developing economies. It reached both international and Danish news, and the public started to ask whether the labour working conditions clashed with corporate social responsibility (CSR) of the fast fashion companies.⁸⁶ The full effects of this debate on the fast fashion companies remains to be seen, but it is evident that CSR issues and consumer's concerns with labour conditions may hold a potential to affect value chain strategies.

Conclusion

The clothing industry is often seen as a pioneer in the globalisation literature. Dickerson put this eloquently:⁸⁷

For many years, the textile and clothing sectors have been on the forefront of globalization. No industries are more broadly dispersed around the world than textile and clothing. Just as the textile industry led the industrial revolution, textile and clothing production has been among the first sectors to be part of today's global shifts in production and trade.

Historically, the textile and clothing industry transformed earlier than other industries, and over the last four decades it saw one of the most radical, global transformations of any industry. Global shifts caused a squeeze on traditional production centres and old business strategies. In a statistical sense, large parts of the Danish industry no longer belong to the manufacturing sector. Instead the label 'fashion industry' is now commonly used.

Since the 1970s, and due to technological changes and gradual trade liberalisations, the Danish textile and clothing industry has been forced to compete head-on with low-wage countries. The industry has followed several strategies in an attempt to address the challenge. For many companies a first response was to argue for protectionism or at least a slow-down in the pace of trade liberalisations. Today this is often forgotten, but the quest for protectionism followed by the industry's trade associations in the 1970s and 1980s was indeed supported by the majority of its members.

For many companies, the protectionist course was combined with an internally focused strategy, best labelled fully-fledged value chain strategy. Companies in this group saw no need for change or proved unable to adjust despite realising the need for change. The vast majority of these mainly privately owned companies disappeared in the 1980s and 1990s. The lacking ability of these

firms to adapt to the new competitive setting could lead to the conclusion that family business within the textile and clothing industry holds no future, but that would be misleading. At the time of writing, family businesses remain widespread and some of the most profitable companies in the trade, notably Bestseller, are family controlled.

The fully-fledged value chain strategy was mainly defensive. Automation, combined with lobbying, represented a more offensive response to international competition. In the clothing industry automation was also used in the 1970s and 1980s, but already in the 1990s this strategy proved difficult to combine with product flexibility as demanded by customers, who increasingly required fashion.

In the 1990s the inherent problems in the automation strategy led clothing manufacturers into offshoring. Companies hoped to benefit from lower labour costs in Eastern Europe. Manufacturing skills were seen as pivotal and foreign production in factories was controlled from Danish head offices. Leadership in manufacturing was seen as a source of competitive advantage within these companies. However, in many cases offshoring only proved to be a stepping-stone on the way to outsourcing. Despite low labour costs in Eastern Europe, Danish firms could not escape the fundamental dilemma between automation and flexibility. The need for flexibility was constantly growing as consumers demanded more details and more rapid shifts between collections. Though not thoroughly researched, it would be fair to assume that the changed signals from the consumers in the 1990s were at least partly due to the influence of successful retailers. Bestseller, IC Companies and multinationals such as H&M started to influence consumer habits.

Outsourced midstream activities and a strong focus on design, distribution, branding, and selling are the characteristics of today's most expansive Danish fashion firms. According to the commonly told narrative, this business model came from the clothing industry itself, but this story neglects the highly important and dynamic role of retailers. The transformation of the Danish clothing industry resulted from pressure from retailers, who integrated backwards into design and distribution. To survive, manufacturers had to copy the success of retailers. Retailers have a direct connection to consumers enabling them to react more rapidly to shifts in consumer culture than traditional clothing manufacturers.

Outsourcing meant giving up midstream activities in the value chain, and allowed companies to focus stronger on design and distribution. Many of the traditional manufacturers had to realise, though, that substituting the lost parts of the value chain with new and more profitable parts was a difficult task and often they lacked competences within design and distribution. The long-term consequences of the present day dominating outsourcing strategy remains to be seen, but many researchers have stressed that problems can arise from the separation of design and manufacturing. Predicting future directions of the clothing industry is difficult, but the Danish case can serve as a reminder that new value chain strategies are constantly in the making and successful ones rarely remain competitive for long.

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- ⁶⁵ Nielsen and Pedersen. *Dansk tekstil & tøj*, 4.
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- ⁶⁷ Based on Nielsen and Pedersen. *Dansk tekstil & tøj*.
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- ⁷⁶ IMAGINE. *The Danish Fashion Industry Annual Mapping 2005*, 36.
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Diverting developments – the Danish shipbuilding and marine equipment industries, 1970-2010

BY RENÉ TAUDAL POULSEN

Over the last couple of decades, the shipbuilding and marine equipment industries in Denmark and elsewhere in Europe have been exposed to strong competition from new and rapidly expanding maritime nations in Asia. In the 1970s, Denmark had a stronghold in both industries, which have been closely related and which have both derived demand from the volatile shipping industry. They also have clear mature characteristics. To a large extent Danish companies in both industries have had to address the same types of challenges caused by the emergence of dynamic, low-cost competitors. Nevertheless developments in the two industries have diverted after 1970. All the large and medium-sized Danish shipyards have ceased, whereas several equipment suppliers have endured and some have built up strong positions within their respective fields. Focusing on corporate strategies in shipbuilding and marine equipment manufacturing, this article examines the diverting developments of the two industries and asks what has caused this divergence?

Introduction

Over the last couple of decades, the Danish shipbuilding and marine equipment industries have been exposed to the strong forces of global competition. On a general level, the emergence of new and increasingly dynamic players from Asia, most notably Japan, South Korea and China, have changed the rules of the game in both industries. The shipbuilding and marine equipment industries have always been closely related (one supplying the other with equipment to install in new vessels), and both have ultimately derived demand from the highly volatile shipping industry. Hence, to a large extent both industries have faced similar market conditions and have had to address the same types of business challenges. Nevertheless, in a Danish context, developments in the two industries have diverted after 1970.

In the 1970s and 1980s, Danish shipbuilders delivered approximately 3 percent of all new ships and Denmark had more than ten medium-sized or large shipyards and numerous suppliers of marine equipment. A wave of shipyard closures, however, started in the 1980s and the whole Danish shipbuilding industry contracted rapidly around the turn of the new millennium. In 2012, the last large shipyard, the Odense Steel Ship Yard, seized and only small niche yards, specialized in the building of small vessels, remain in Denmark.¹ Several Danish manufacturers of marine equipment, on the other hand, have managed to redefine their strategies in the same period and they have endured. Some of them have built up strong positions within their respective fields.

The changing fortunes of the Danish shipbuilding and marine equipment industries were clearly revealed in a change of name made by the Shipbuilders' Association ("Skibsværftsforeningen") in 2003. Traditionally, recruiting its main members among the Danish shipyards, the

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association was facing a rapid contraction in its group of members around 2000. In order to maintain a critical mass, it decided to expand its membership group to include several manufacturers of marine equipment. To reflect the changing focus of the association, it changed its name to Danish Maritime (“Danske Maritime”).²

Generally, Danish marine equipment suppliers were more successful than shipbuilders in addressing the challenges posed by the new maritime economies in Asia. Focusing on corporate strategies, this article examines the diverting developments of the two Danish industries and asks why developments diverted?

Industry definitions and methodological challenges

Both in the Danish and international, economic historiography, the shipbuilding industry has tended to attract considerable attention.³ In contrast, suppliers of marine equipment have not gained the same level of academic interest.⁴ This is perhaps not surprising, given the large shipyard work forces and the large local or regional importance of shipbuilding in many European cities. Moreover, shipyards have often had central locations in ports and shipbuilding has usually been a very visible (and sometimes noisy) activity. At times, public discussions on the future of shipbuilding have also been very intense in several European countries.⁵

The marine equipment industry, on the other hand, is more difficult to identify and thus also to analyze. No such thing as a marine equipment industry exists in the most commonly used industry classification schemes and hence it does not exist in official statistics.⁶ Suppliers of equipment to shipyards are grouped in various other industry categories. For instance, manufacturers of life-saving equipment are grouped as manufacturers of rubber products and manufacturers of hull paints belong to the category of paint manufacturing. Hence, industry statistics are not readily available for marine equipment manufacturers. Furthermore, in a Danish context, the marine equipment industry did not have its own industry association before 2003, when the Shipbuilders’ Association changed its name to Danish Maritime and admitted more equipment manufacturers as members. Still the association does not include all Danish companies, which supply shipbuilders with equipment.⁷ Moreover, the industry does not have clear boundaries and some companies, which supply equipment to shipyards, may not perceive themselves as belonging to a marine equipment industry. This could be the case, when a manufacturing company’s main customers are non-maritime and supplies to shipbuilding only generate a small share of total revenue.⁸ For the same reason, it is very difficult to precisely estimate the number of employees, turnover, revenue etc.

The above reservations, however, do not render the concept of a marine equipment industry meaningless nor does it mean that the industry has been an insignificant source of employment and revenue in Denmark. On the contrary, a government study based on statistics from Statistics Denmark estimated that approximately 20,000-22,000 people were employed in the industry between 1990 and 2002.⁹ While such numbers are very rough estimates, they do demonstrate that the marine equipment industry has been a significant employer, also in a comparison with shipbuilding, where employment fluctuated between approximately 16,000 and 6,000 people from the mid-1970s to the early 2000s (Figure 1).

What the above reservations do mean, however, is that the study of the marine equipment industry is more difficult than the study of shipbuilding or the textile, clothing and furniture industries, which generally conform more closely to traditional industry definitions.¹⁰ An overview of the marine equipment industry cannot be made from publications or reports from the industry association and Danish and international maritime journals have tended to focus more on technical aspects of new marine equipment rather than the suppliers and their corporate strategies.¹¹

Market cycles

In order to understand the nature of the shipbuilding and marine equipment industries, a few words on market cycles in shipping are pertinent. As said before the two industries derive demand from shipping, which is a highly volatile and cyclical business. Fluctuations in shipping are caused by the fact that demand for seaborne transportation can change rapidly, while supply can only adapt slowly, and shipping has experienced several booms and busts since 1970. Generally shipbuilding and in some cases also the marine equipment manufacturers have been slow in adjusting to changes in demand. Long adjustments periods in shipbuilding and equipment manufacturing have been caused by the time lag from new vessels are ordered to the time of delivery, which is often more than two years, as well as government interventions.¹² Shipbuilding and equipment industry cycles are thus derived from shipping market cycles, but there is often a considerable lag from the time shipping freight rates are reduced until a contraction in shipbuilding activity takes place.

The main market for marine equipment comes from construction of new vessels (i.e. shipbuilding), but repair, service and retrofit of existing tonnage can also generate income for suppliers. For ship-owners, it is important to minimize vessels' off-hire time and therefore reliable equipment is important.¹³ In most cases, however, the new-building market is the largest market for suppliers. The market for marine equipment is governed by marine rules agreed by member states in the UN International Maritime Organization (IMO), and changes in regulation, e.g. with regard to emission levels or safety standards, can represent a business opportunity for some companies.¹⁴ For example in a Danish context, this is relevant for companies such as Viking Life-Saving Equipment or Alfa Laval Aalborg. The latter has recently introduced scrubbers to exhaust gas cleaning in response to new environmental regulation on maritime emission levels.¹⁵ For this reason new regulation can also cause changes in market conditions in the equipment industry in addition to the cycles caused by the cyclical shipping industry.

Erosion of European competitiveness in shipbuilding

Since the nineteenth century, Europe dominated global shipbuilding completely. Europeans owed their position to early industrialization and a strong political position and built more than 90 percent of the world's merchant ships around the year 1900 and continued to hold this position into the Post World War II period. However, in the latter half of the twentieth century a spectacular collapse in the competitiveness of European shipbuilding took place. Between 1950 and 2010, the European market share fell from approximately 80 percent below 10 percent, and shipbuilding is one of the most striking examples of global shifts in production patterns in recent decades.

The shift from European to Asian dominance was caused by multiple factors. Asian governments focused strongly on building up shipbuilding competencies, supporting yards with various subsidies in the early stages of development. Shipbuilding was generally a labour intensive activity and already in the post-war period it had the characteristics of a mature industry, which could relatively easily be emulated by late-movers.¹⁶ Japan became the world's largest shipbuilder in 1956, only eleven years after the country's defeat in World War II. South Korea emerged in the 1970s and 1980s and built up a competitive and dynamic industry despite a slump in shipping markets. Brazil, another developing economy, also attempted to build up a strong shipbuilding industry during this period but it failed despite considerable government subsidies.¹⁷

In the early 1990s, after the fall of the Iron Curtain, several Eastern European shipyards, notably in the former German Democratic Republic and Poland, which had considerable experience in supplying merchant ships to the Soviet Union and its allies, entered the international shipbuilding markets. They were able to gain orders from Western European ship-owners and generally benefitted from lower costs than Western European yards. However, recently, the development in

Eastern European shipbuilding has been characterized by yard closures and a contraction of market share.¹⁸ Other countries such as Turkey, Vietnam, the Philippines and India have recently established shipbuilding activities, but still only account for a minor part of the total market. The most striking feature of the development after 2000 was China's ascent in shipbuilding. It took China only little more than one decade to become the largest shipbuilding nation. Today the world shipbuilding scene is dominated by China, South Korea and Japan.¹⁹

Traditionally, shipbuilding has received considerable attention from policy makers and during the long period of decline in the Western European shipbuilding industry, policy makers have made various attempts to support the industry. Indeed, the economy of shipbuilding was clearly a political one, where market forces and political intervention interacted closely and often created global overcapacity.²⁰ The political interest was attributable to the regional significance of shipbuilding. In several port cities, e.g. Glasgow in Scotland and Uddevalla in Sweden, shipbuilding and the related equipment industry employed a very large share of the local work force. In Denmark this was also the case in Frederikshavn and Nakskov.²¹ From the 1960s to the 2000s, various subsidy schemes and other support measures (e.g. government orders) were used by European governments to counteract the effects of Japanese and South Korean shipbuilding policies and subsidies. While ultimately preferring a free market without subsidies, the Danish Shipbuilders' Association supported subsidies from the Danish government in a defense against other countries' subsidies.²² In the 1990s, South Korea in particular was alleged of destructing the global shipbuilding market, but Danish shipbuilders also feared unfair competition from other European countries, notably in the former German Democratic Republic, caused by various national support schemes.²³

In contrast to shipbuilding, the marine equipment industry did not experience the same level of international controversy after 1970. Probably because of the industry's heterogeneity, Danish marine equipment manufacturers did not rally or lobby on a large scale for government support schemes and debates about market distortions or subsidies did not reach the international political agenda for equipment suppliers.

Endurance and erosion of Danish competitiveness in shipbuilding²⁴

Shipbuilding was an important activity in Denmark. In the mid-1970s, between five and six percent of the industrial work force was employed in shipbuilding, and this was a higher percentage than in any other European country except for the Netherlands.²⁵ Direct employment in shipbuilding (including ship repair) was approximately 20,000 people in 1975 (Figure 1).

Denmark was also peculiar in another sense. To a very large extent, Danish shipbuilding was internalized into Danish shipping groups. The J. Lauritzen group owned yards in Elsinore, Aalborg, Frederikshavn and Aarhus and A.P. Møller and the East Asiatic Company (EAC) owned the Odense Steel Ship Yard and the Nakskov Yard, respectively. Only the B&W shipyard in Copenhagen was relatively independent from the main shipping companies for most of the period.²⁶ Vertical integration was also practiced elsewhere in Europe, but Denmark was the most extreme example of this. This peculiarity can partly explain both the endurance of Danish shipbuilding into the 1990s and the ultimate erosion of competitiveness after 1995.

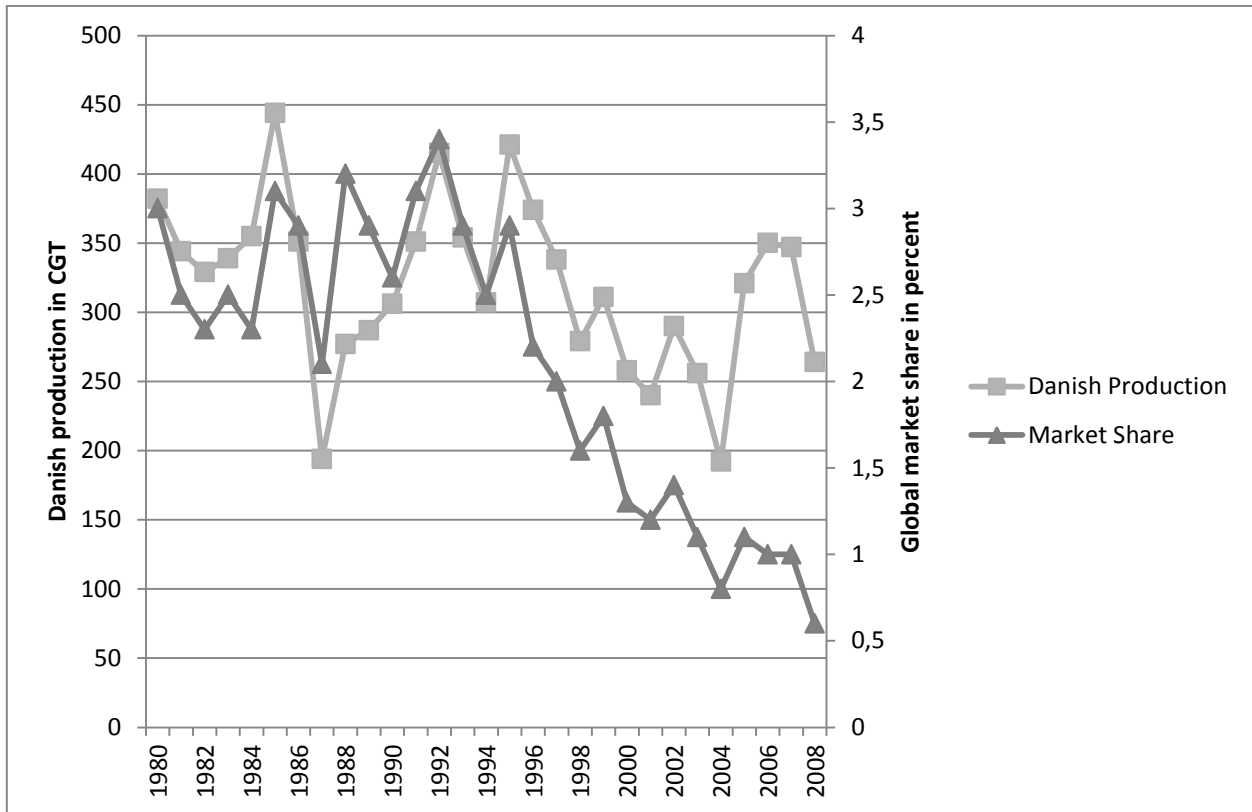


Figure 1. Production in Danish shipbuilding (in CGT) and Danish market share, 1980-2008.²⁷

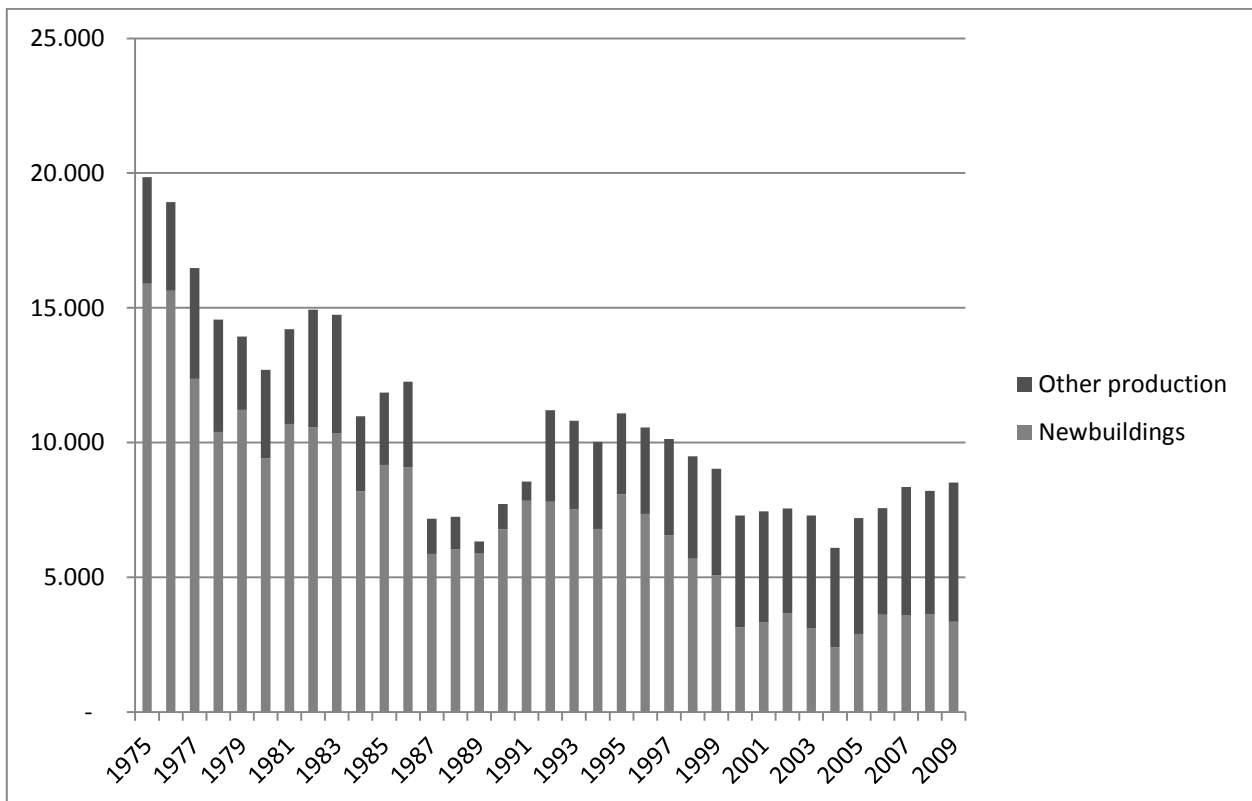


Figure 2. Number of employees with members of Danish Maritime/Shipbuilders' Association, 1975-2009.²⁸

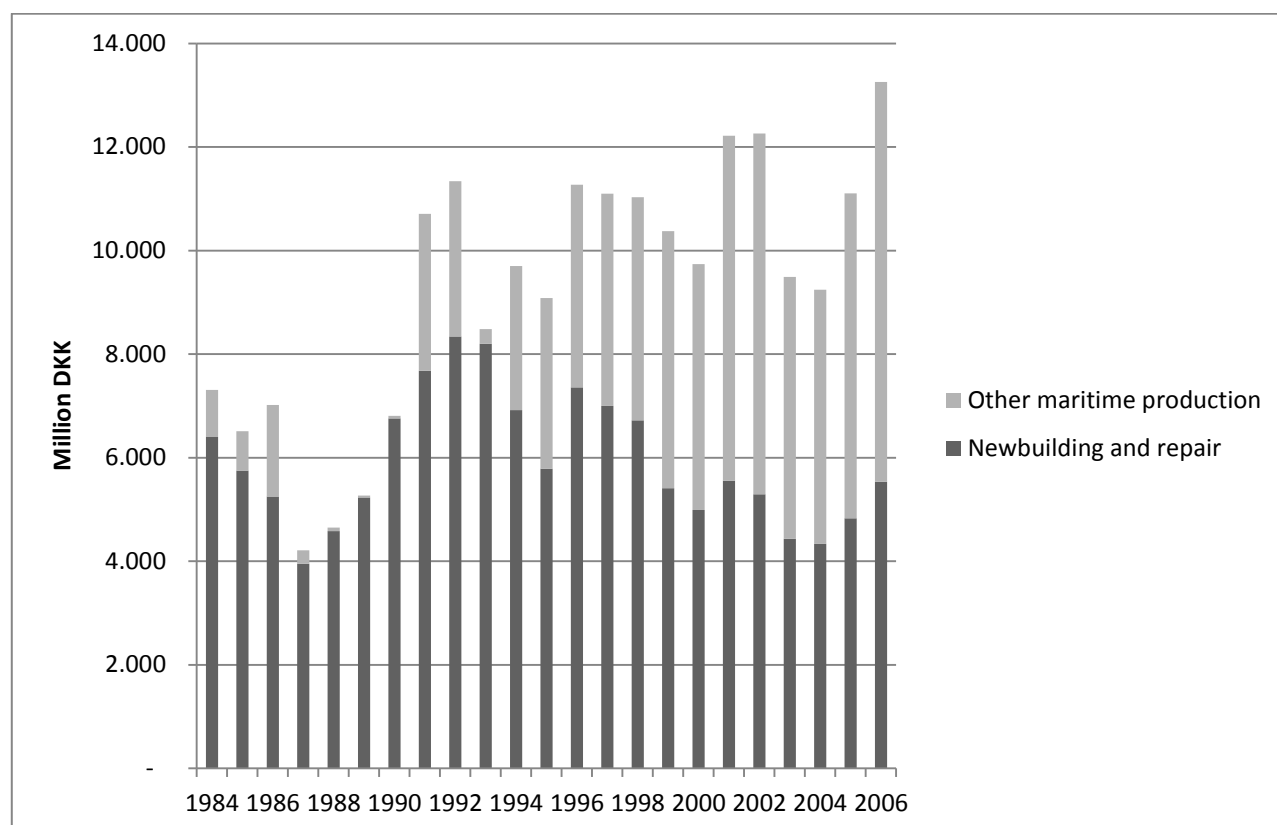


Figure 3. Turnover of members of Danish Maritime/Shipbuilders' Association, 1984-2006.²⁹

The 1950s and 1960s were a period of growth for Danish shipbuilding, as new yard facilities opened. Automation strategies were increasingly used in these facilities, as shipbuilders turned to section building methods and started to deliver larger vessels in long series. The expansion of Danish shipbuilding was enabled and supported by Danish shipping companies, which aimed at building up a strong position both within shipping and shipbuilding.

In 1973, a major drop in tanker freight rates caused a fifteen year-long crisis in shipping and this cascaded into European shipbuilding. In the 1970s and 1980s, several European shipbuilders had to seize despite considerable government efforts to restructure or save the industry. Danish shipbuilders, on the other hand, endured for longer and maintained their global market share of approximately three percent until 1995. Multiple causes explain the endurance of Danish shipbuilders. Danish yards built advanced vessel types, such as reefers, passenger and container vessels and chemical tankers, which were not hit as hard by the shipping crisis as more standard types (mainly oil tankers or dry bulk ships). For some time emerging shipbuilding nations in Asia also focused on standard tonnage such as dry bulk vessels and tankers and thus left the more advanced vessels for European shipbuilders. Moreover, Danish yards generally had a versatile production capability, which enabled them to shift more easily between vessel types, than many other European shipbuilders could. Owners, i.e. the shipping companies, were also patient and placed orders in their own yards and supplied additional capital, when the yards made large losses. Finally the government bolstered demand for Danish built tonnage with state-orders and a favourable taxation regime for shipping investors. The three factors – yard capabilities, owners' support and government support – worked together to sustain the industry and the structure of the industry remained intact into the late 1990s.

Despite the endurance of Danish shipbuilding into the late 1990s, structural weaknesses became increasingly evident. A global overcapacity in shipbuilding and relatively modest growth in demand for new ships caused problems for Danish shipbuilders both in the 1980s and 1990s. In the mid-1980s and again from the mid-1990s, large losses in shipbuilding required ship-owners to supply more capital to yards, which shipping companies would or could not provide in the long run. Moreover, Danish yards increasingly relied on the home market, which was a clear sign of weakness. In most years in the 1980s and early 1990s, less than 10 percent of orders came from foreign customers. This contrasted with the marine equipment industry. In the years around 2000, the Danish Ministry of Business estimated that Danish marine equipment suppliers had an average export ratio of over 80 percent.³⁰ The internationalization of the equipment manufacturing industry has never been properly examined before, but it is reasonable to assume that suppliers' international market penetration generally made them less vulnerable than shipbuilders, and at least in part this difference can explain the divergent developments of the two industries.

Danish shipbuilding declined for the same reasons as Western European shipbuilding contracted. Costs were too high and competitors in low-cost countries in Asia and Eastern Europe, which were supported by government subsidies, proved long-lived. Moreover, learning curves in the new shipbuilding nations in Asia were steep, and in some countries, notably Japan and South Korea, new yards built up expertise for sophisticated vessel types. In at least two Danish cases, customers defaulted on the payments of tonnage ordered in the yards, and this contributed to a drain of the yards' resources.³¹

In 2002, shipping markets and demands for new ships started to pick up and a large boom lasted for the following six years. By 2002, however, most Danish shipbuilders had seized and, with the notable exception of Odense Steel Ship Yard, Danish companies could not use this opportunity for growth. Marine equipment suppliers from Denmark, on the other hand, were better positioned to reap the benefits of the growing demand for new vessels and equipment after 2002.³²

Players and products in marine equipment industry

The decline of European and Danish shipbuilding is a well-known story, but the development of equipment suppliers to the shipbuilding industry remains more elusive. Before an in-depth study of the marine equipment industry can be undertaken, a basic identification of players and products in the industry is required. In the following a sketch of the contours of the industry in Denmark is made, with the goal of answering three basic questions: Which companies manufactured marine equipment? What equipment did they produce? And to what extent did the group of players and the product range change from the 1970s to the 2000s?

As mentioned above, industry association sources are not available for the main part of the period and maritime journals and newspapers have tended to focus on technical aspects of new equipment rather than the companies, which produced it. The Danish newspaper "Søfart", however, can provide valuable information on the companies and their products. From the 1970s to 2002, Søfart presented most new-buildings delivered from Danish shipyards.³³ Newspaper articles with a typical length of two to four pages included suppliers' or makers' lists for equipment installed in the vessels. Danish yards had a very diverse portfolio in terms of the vessel types, which they were capable of building.³⁴ Therefore it is reasonable to assume that equipment installed in vessels from Danish yards from the 1970s to the early 2000s give a fair representation of the equipment types, which were installed in the world merchant fleet. Moreover, according to several studies, Danish marine equipment manufacturers generally had strong positions in the Danish home market.³⁵ For these reasons, it is feasible to identify Danish players and equipment from the makers' lists published in Søfart.

When most Danish yards stopped production around 2000, Søfart discontinued the practice of publishing makers' lists. Therefore it is impossible to identify the companies, which supplied international shipyards with marine equipment, from this source after 2002. However, member list for Danish Maritime, the former and enlarged Shipbuilders' Association, and Danish Marine Group, an export association promoting Danish equipment manufacturers abroad with more than 140 members in 2010, can make up for this lacuna.³⁶ Member ship lists from the two associations give a comprehensive view of the companies which engage in the marine equipment industry.³⁷ Data in Table 1 are based on these sources.

Propulsion	Main engines	MAN Diesel & Turbo (1843)
	Boilers	Alfa-Laval Aalborg (1919)
	Engine monitoring systems	Selco (1984)
	Fuel and engine room pumps	DESMI (1833)
	Fuel filters	C.C. Jensen (1953)
	Gen-sets	Deif (1933)
	Waste water treatment	Gertsen & Olufsen (1945)
Navigation	Navigational equipment	Iver C. Weilbach & Co. (1759)
	Satellite communication	Thrane & Thrane (1981)
	Bridge control systems	SAM Electronics-Lyngsø Marine (1950s)
Safety	Life-saving equipment	Viking Life-Saving Equipment (1960)
	Fire-fighting equipment	Novenco Fire Fighting (1947) and Danfoss Semco (1955)
Cargo-handling	Cargo pumps	Hamworthy Svanebjerg (1928) and DESMI (1833)
	Refrigeration	Johnson Controls
	Inert gas systems	Alfa-Laval Aalborg (1919)
	Valves and venting systems	Pres-Vac Engineering (1952)
	Paint	Hempel (1915)
Other	Cranes	Acta
	HVAC	Novenco (1947) and Johnson Controls (1895)
	Ballast water treatment	Alfa-Laval Aalborg (1919)
	Incinerators	Atlas Incinerators
	Fresh water distillers	Atlas, APV (1910)
	Windows	C.C. Jensen (1953)
	Ceilings	Dampa (1951)

Table 1. A selection of Danish, marine equipment suppliers, which were active in 2010: Product range and founding year.³⁸

Table 1 gives an indication of the breadth of the product range for Danish marine equipment manufacturers in 2010. A comparison of the product ranges, which appeared in the "Søfart" makers' lists from 1975-2002 and the Danish Marine Group member list of 2010, indicates a high

degree of continuity in the industry. Most products, which were sold in 2010, have been on the portfolios of the companies for decades. Only a few additions, notably satellite communication, scrubbers and ballast water treatment systems, have entered the list between 1970 and 2010. They are related to the emergence of electronic navigation and increasing demands for environmental protection. On the other hand, no major types of products, which were produced in the 1970s, have disappeared from the portfolio of the group of Danish companies and this underlines the general picture of stability. It is also noteworthy that Danish manufacturing companies were capable of producing a very broad range of products and they continued to hold these positions in 2010.

Several Danish companies, which supplied equipment to shipbuilders in 2010, have a history which predates 1970, in many cases by several decades, and only few players have entered the business after 1970 according to the “Søfart” makers’ lists. In other words, several companies have survived despite the global shift in shipbuilding and marine equipment industry and this sets them apart from Danish shipbuilders. From Table 1 it is evident that the group of companies is a very diverse one. It consists of large industrial companies which have their main customers onshore, and only generated a minor part of their revenue by supplying equipment to shipbuilders.³⁹ For instance, through its 60 percent shareholding in Danfoss Semco A/S, the large Danish industrial group of Danfoss A/S is involved in the production of fire extinguishing systems both for maritime and onshore industrial customers.⁴⁰ The group of companies also includes dedicated marine equipment suppliers, e.g. Hempel A/S, which has gradually expanded into onshore businesses as a supplement to the maritime activities. Today, Hempel’s paint is also sold to the wind turbine industry, container industry etc.⁴¹ Finally the Danish group of companies contains enterprises which continue to rely almost entirely on maritime activities, e.g. Pres-Vac Engineering.

During the period 1970 to 2010, a number of companies have managed to expand, and develop dominating position within their respective fields. Most notably this is the case for Alfa-Laval Aalborg (marine boilers), Hempel (marine paint), MAN Diesel (design of two-stroke main engines), Viking Life-Saving Equipment (life-vests and inflatable life-rafts), Thrane & Thrane (satellite communication) and Pres-Vac Engineering (valves and venting equipment for tanker shipping).⁴² It is noteworthy that two of the largest and most successful companies within their respective fields are spin-offs from distressed shipyards. These are MAN Diesel and Turbo, which was previously part of the B&W shipyard, and Alfa Laval Aalborg, which originated from Aalborg Yard.⁴³

An important comment should be made to the definition of “Danish”. In the case of the shipbuilding industry, a Danish industry, defined as companies with Danish shareholders, Danish head-quarters and main operations located in Denmark, makes perfect sense. In contrast, such a definition is less feasible for the marine equipment suppliers. If the analysis only focuses on companies with Danish head-quarters, main operations in Denmark and Danish shareholders, it will gradually lose its unit of analysis between 1970 and 2010. This was due to the fact that ownership structures changed and operations became increasingly international. Hence, towards the 1990s and 2000s a more imprecise or “vague” definition of “Danish” is required, in order for the analysis to make sense. If companies have maintained their main offices (including considerable research and development, human resource management and at least some strategic management functions) in Denmark, they are included in this analysis. Owners may be foreign now and considerable production activities may take place abroad.

In the 1970s, many supply companies were controlled by families or family funds⁴⁴ or owned by shipping companies⁴⁵, but gradually these types of ownership have changed. Several companies, including some of the main suppliers, were acquired by foreign industrial groups during the 1990s and 2000s.⁴⁶ The German MAN group had already acquired the engine division of the B&W shipyard in 1980 and continues to own it.⁴⁷ Likewise, Hamworthy, an international provider of

equipment to shipbuilders, the offshore industry and other industrial customers, acquired the Danish pump manufacturer Svaneøj International A/S in 1993. Recently Hamworthy, including the Svaneøj activities, was acquired by the Wärtsilä group, which had a global workforce of more than 18,000 people in 2012.⁴⁸ Sabroe Refrigeration A/S, the large supplier of maritime refrigeration, is another example. It was once part of the J. Lauritzen shipping and industrial group, which sold it to York International in 1999, in order to focus on shipping. In 2005 resold to another foreign industrial group, Johnson Controls, the company is still active in the Danish marine equipment industry, despite the foreign ownership.⁴⁹ Aalborg Industries, the leading marine boiler manufacturer with 2,600 employees in 2010, was set-up by the J. Lauritzen group following the closure of yard in Aalborg in 1987-88. The yard had produced boilers since 1919. In 2011, Aalborg Industries was acquired by the international manufacturing group Alfa-Laval and renamed Alfa-Laval Aalborg.⁵⁰ Exactly how changes in ownership structures and foreign acquisitions have affected corporate strategies is difficult to assess, and it probably differs from case to case. However in several companies, activities have remained in Denmark in what were formerly the companies' head-quarters.⁵¹ Value chains, however, have been reconfigured in many cases and this has often caused many activities to move abroad.

Value chain strategies

In the textile, clothing and furniture industries, a redefinition of value chain strategies proved important to sustain corporate competitiveness after 1970 (see the other articles in this yearbook). The concept of value chain, as developed by Michael Porter, splits value adding into a number of sequential activities, from inbound logistics over operations to marketing, sales and services. In this paper a value chain strategy is defined as the top managers' decisions on the company's position within the value chain. A value chain strategy answers to important questions: The first one concerns which activities the company should engage in and which it should outsource (make or buy-decisions). The other one concerns locational issues (where the various activities should be located and how the individual activities should be controlled and integrated into a coherent value chain).⁵² It is relevant to examine to which extent changing value chain strategies have influenced the developments in shipbuilding and the marine equipment industry and in the following a first attempt to answer this question is presented.

Automation in shipbuilding and marine equipment industry

In mature industries, where competitive pressures on costs increase, automation is a typical corporate response. Companies' aims are to reduce costs by replacing an expensive input (i.e. labour) with capital (i.e. new and more efficient equipment) and improve productivity. This was attempted in the textile and furniture industries, and this was also done in shipbuilding and marine equipment manufacturing. In many cases capital requirements in shipbuilding and marine equipment manufacturing with large production sites were higher than in the textile and clothing and furniture industries, but often automation strategies were insufficient to sustain competitiveness in the long run. Ultimately companies reached the limits of what could be automated.

In the 1950s and 1960s, several Danish shipyards expanded, and new facilities tailored for section building of ships in long series along more rational lines were opened. These investments were based on a rationalization paradigm, which also played a role in the marine equipment industry.⁵³ Companies such as Atlas, Sabroe, Hempel and Nordisk Ventilator Co. (later renamed Novenco) built new production facilities in Denmark, which were ideal for automated production processes. At the same time several companies moved from central city locations to the suburbs to utilize the full potential of automation and more rational production site layouts.⁵⁴

Automation strategies continued to play a role after 1970. In shipbuilding, the automation strategy was most evident in the case of Odense Steel Ship Yard which continued to focus on productivity improvements and pioneered the use of robot technologies for welding purposes until its closure in 2012.⁵⁵ In the marine equipment industry, Maersk Container Industry, established by the A.P. Moller group in Tinglev in Southern Jutland in 1991, also pioneered automation strategies in container manufacturing.⁵⁶ Despite high productivity levels in the Danish site, production of dry cargo containers was moved to China in 1999-2000 where production costs were lower. Moreover, the locations of the Chinese sites were more rational for positioning empty containers near customers (i.e. for shipment of Chinese exports). A few years later the production of more advanced reefer containers was also moved to China. At the time of writing, global headquarter global sales office and main R&D centre, service, and sales have remained in Denmark.⁵⁷

Outsourcing and offshoring in shipbuilding

Few if any shipyards or marine equipment manufacturers relied solely on automation as a competitive strategy. They often combined it with outsourcing or offshoring and for the same reason, boundaries between the two industries moved between 1970 and 2010. Danish shipyards increasingly outsourced manufacturing activities to third parties. In this way, yards became more focused on assembly of ships, leaving the manufacturing of individual components for the ships to supplier companies.⁵⁸ In some cases, construction of hull sections was also outsourced from Danish shipyard to Danish suppliers in the 1980s and 1990s.⁵⁹

Based on experience with outsourcing in a Danish context in the 1980s and the early 1990s, Danish yards were well positioned to utilize new international outsourcing opportunities which emerged after 1990. In this regard they experienced changes which were similar to the textile, clothing and furniture industries. The fall of the Iron Curtain produced both new competitors and new opportunities for low-cost production in countries relatively close to Denmark. The same happened for the shipbuilding and marine equipment industry.

Several Eastern European countries had a long experience in shipbuilding. Polish yards, famous for the shipyard worker's role in the formation of the "Solidarity" movement in the 1980s, were large and proved competitive in global markets after rationalizations were made. Based on lower costs than Western European levels and government support, they were able to penetrate the international shipbuilding markets. Similarly, a transformation process in the former German Democratic Republic's shipyards was initiated in the reunited Germany, where the government supported modernizations. Danish shipyards criticized the German government for unfair competition and a production limit was established before the European Union accepted government support to the rationalization of East German shipyards.⁶⁰

Danish yards soon grasped the new sourcing opportunities in Eastern Europe. The welding of hulls was generally a labour-intensive stage in the building of a new vessel and it required large groups of blue collar workers. In this stage of the building process, the Danish work force had problems maintaining competitiveness. This step could relatively easily be outsourced to low-cost shipyards in Poland, the Baltic countries or Romania. The more demanding building stages of vessel design and outfitting were kept in Denmark. From the 1990s, hulls or hull sections were often welded in Eastern Europe, tugged to Denmark and outfitted there.⁶¹ Several small or medium-sized yards used this strategy, including Ørskov Yard in Frederikshavn and Karstensen's Yard in Skagen, which outsourced hull-welding for ferries, offshore and fishing vessels. This was not a particular Danish strategy, but it was also used by other nations' shipyards, for instance in Norway.

Offshoring in shipbuilding occurred in only one case: The Odense Steel Ship Yard, which by far was the largest Danish yard. In the 1990s and 2000s, it built long series of container vessels for its owner. In 1994 and 1997, respectively, A.P. Moller group acquired the Loksa shipyard in Loksa,

Estonia, and the Baltija shipyard in Klaipeda, Lithuania. Construction of hatch covers, superstructures and various hull sections were performed in Estonia and Lithuania. From the Baltic sites, sections were tugged on barges to Odense, where assembly took place. A former GDR shipyard in Stralsund was also acquired, but it did not supply sections to the Odense yard. The production strategy of Odense was basically similar in nature to the strategy, employed by the smaller yards, but those yards did not have the resources to acquire production sites in Eastern Europe. The A.P. Moller group (from 2003: A.P. Moller-Maersk) on the other hand was financially strong, and it could.⁶²

Despite the savings made from outsourcing, Danish shipyards experienced hard times in the late 1990s and accumulated large losses. Outsourcing proved insufficient to save Danish shipbuilding, and yards in Svendborg, Frederikshavn (Ørskov and Danyard), Aarhus, Ringkøbing and Copenhagen closed after heavy losses. The outsourcing strategy, however, remains in use by Danish, niche shipbuilders, still in existence in Hvide Sande, Assens and Skagen.⁶³ The Odense yard started to post large losses in the 2000s, and despite efforts to improve productivity and reduce costs, it was decided to close the yard, which delivered its last vessel in 2012. The A.P. Moller-Maersk group also sold its Baltic and German yards and exited the shipbuilding industry as the last Danish shipping company.

Moving Danish shipbuilding companies abroad was never on the agenda. High sunken costs in Danish facilities and the Danish work-force may have caused inertia in this regard, but it is also reasonable to assume that a move to the emerging markets in Asia was simply unrealistic and impossible. It was possible for the A.P. Moller-group to acquire facilities in the Baltic Countries and in the former German Democratic Republic, but Danish shipbuilding companies could not establish yards in South Korea or Japan. The main South Korean and many Japanese yards were part of South Korean or Japanese industrial groups, and no European shipbuilders transplanted to these settings.⁶⁴ In this regard shipbuilders were more restricted in their strategic options than several marine equipment suppliers, which tended to offshore when Danish costs proved too high.

Outsourcing and offshoring in the marine equipment industry

After the turn of the millennium, manufacturing activities in the Danish marine equipment industry were increasingly moved abroad. Several Danish companies established their own production sites in emerging economies, mainly in Asia. The practice of moving production abroad however was older and Danish and other European companies had previously pursued the opportunities for production in Asia in various ways. Unfortunately, the study of outsourcing and offshoring strategies in the marine equipment industry is a difficult task, because published sources, such as maritime newspapers and industry association reports, have tended to focus on the equipment itself rather than the manufacturing companies and their strategies. For the same reason, this article can only provide a first sketch of outsourcing and offshoring practices in the marine equipment industry. More in-depth studies of individual companies are required in order to do this topic full justice.⁶⁵

When Asian countries entered the international shipbuilding scene, new markets for marine equipment suppliers emerged and often local production in Asia was worthwhile for European suppliers. In the Japanese case of the 1950s, the country was generally missing equipment suppliers for the yards and the South Koreans and Chinese generally faced similar challenges, when they built up their shipbuilding industries two and four decades later.⁶⁶ In some cases, licenses were granted by Danish equipment suppliers to Asian companies. In fact, B&W Diesel & Turbo (later MAN Diesel & Turbo) got its first engine licensee in Japan as early as 1926.⁶⁷ Such arrangements lowered transportation costs and enabled Danish companies to build up their brands in Asian shipbuilding nations. Moreover, such arrangements were generally supported by Asian governments' industrial

policies, which aimed at supporting local production. Of course the Danish companies ran the risk of helping future competitors to build up substantial businesses, but generally European suppliers could not obstruct new entrants to the industry.⁶⁸

An archival case study on Novenco, a Danish manufacturer of ventilation and air-conditioning equipment to maritime and onshore industrial customers, has demonstrated how rationales for offshoring in the Danish marine equipment industry have changed over time.⁶⁹ Novenco established foreign production sites from the 1960s to the 1980s in order to gain access to foreign markets. Local production was a means to counteract effects of protectionism in various countries and to reduce transportation costs. Most notably Novenco established a joint-venture, Hi-Pres Korea Ltd., with South Korean interests in 1988. The South Korean venture set up South Korean production of ventilation and air-conditioning for the South Korean shipbuilding market, based on a license agreement with Novenco. After 2000, cost considerations and proximity to Asian shipyards became the main strategic drivers for Novenco's offshoring and Novenco set up its own production site in China in 2007 for this reason. In 2013, Novenco's marine activities were acquired by Hi Air Korea Co. Ltd. from South Korea. The new, South Korean owner originated from the Hi-Pres Korea Ltd., which Novenco had set up in the 1980s. The changing ownership structure of Novenco thus also demonstrates how the centre of gravity in the marine equipment industry has moved from Europe to Asia.⁷⁰

Novenco was not unique in regard to the establishment of foreign production sites. The main players with the Danish industry, notably Alfa Laval Aalborg, Hempel, Viking Life-Saving Equipment, Novenco, Maersk Container Industry and DESMI have all set up considerable production activities abroad within the last decade. At least in the case of Hempel research and development (R&D) is now also performed abroad.⁷¹ In this way Danish companies have been able to utilize opportunities for cost reductions. China has been the preferred destination, but Thailand and Brazil has also attracted attention from Danish companies. Danish companies seem to have preferred offshoring to the outsourcing of activities to third parties.

Activities in Denmark have also been influenced by the foreign expansions and the offshoring of activities, but the long-term effects remain to be seen. Some companies have clearly reduced manufacturing activities in Denmark. MAN Diesel & Turbo is one such example, but the company has maintained a large R&D department in Copenhagen.⁷² Danish Maritime has warned against a loss of manufacturing capability in Denmark, if production is not maintained in Denmark. Danish Maritime has argued that development follows production. The association sees Danish reason for concern in the case of an accelerated offshoring or outsourcing. Said Danske Maritime:⁷³

It is a common misunderstanding that physical production is not longer desirable nor possible in Denmark due to the increasing importance of service and 'soft' trades. As a matter of fact, it is not an either/or question. The increasing importance of production knowledge, and technical expertise and product development are closely related to production and the products.

Conclusion

From 1970 to 2010, Danish shipbuilders and marine equipment manufacturers were exposed to the same forces of intensified global competition, which followed from the emergence of Asian maritime economies. In the 1970s, Denmark had a stronghold in both industries with more than ten medium or large shipyards as well as several equipment suppliers, which manufactured most types of marine equipment. Despite the fact that both industries derived demand from the same source, the shipping industry, their developments started to diverge in the 1980s. Shipyards started to close and the Danish market share dropped sharply after 1995, but in many cases equipment suppliers endured and some built up strong positions within their respective fields. What were the causes for

the observed difference in survival rates in shipbuilding and marine equipment industries? How can we explain the divergent developments of yards and equipment suppliers in a Danish context? The causes of decline in Danish shipbuilding are well-known: Intensifying foreign competition was caused by the entrance into a mature industry of several dynamic players from Asia and Eastern Europe. A global overcapacity in shipbuilding and numerous foreign subsidies also made life very hard for Danish shipbuilders as did high Danish costs and defaulting customers. Danish yards built state-of-the-art vessels and they were willing to revise strategies when markets changed, but they did not endure the competitive pressure after 1995.

Several marine equipment suppliers fared better. Danish yards relied heavily on the home market, but data indicates that Danish equipment manufacturers had considerably higher export ratios. This probably made them less vulnerable to market changes. Danish yards' reliance on Danish shipping companies for orders and capital proved to be the Achilles' heel of the industry in the long-term.

Different value chain strategies may also have influenced the divergent developments of the two industries. To some extent shipbuilders and marine equipment manufacturers applied similar value chain strategies in response to the challenges of intensified competition from abroad after 1970, but suppliers were in a more favorable position to utilize new alternatives for low-cost production. Automation was a typical response to intensified competition both in shipbuilding and marine equipment manufacturing, but often it proved an ineffective competitive strategy in the long run. The automation strategy reached its limits during the period. In both industries companies were also willing to utilize the low-cost production opportunities abroad. Production activities were relocated mainly to Eastern Europe or Asia after 1990, through outsourcing or offshoring. Generally the surviving companies in the marine equipment industries have tended to prefer offshoring, whereas most yards with strained budgets gravitated towards outsourcing. The yards were more grounded than equipment suppliers. Sunken costs in shipbuilding facilities in Denmark were high and relocation to Asia was not possible for Danish companies. In Japan and South Korea governments focused on building up national players in shipbuilding and equipment suppliers also had some problems establishing businesses in Asia. Offshoring, however, proved to be a more viable strategy for several equipment manufacturers, and many companies established their own production sites in Asia after 2000. This allowed them to benefit from a reduction in transportation and production costs and allowed them to move closer to their main shipbuilding customers. While Danish and European companies have clearly lost momentum in shipbuilding, the development of the Danish equipment suppliers after 1970 demonstrates that the development of manufacturing often is a non-linear process.

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¹ In Skagen, Hvide Sande, Assens and Søby. In addition, ship repair is performed in Odense and Frederikshavn, in former shipbuilding sites.

² Danske Maritime annual report 2003/04, p. 1. See also Figure 2 and 3 below for a very rough indication of the different fortunes of the two industries.

³ In a Danish context see Lange 1995; Hyldtoft 1996; Rasmussen, Rønne and Johansen, 2000; Jeppesen, Andersen and Johansen, 2001; Lange 2001; Lange 2002; Hyldtoft and Johansen, 2005; Søndergaard et al.

2007; Christensen et al. 2011; Poulsen and Sornn-Friese 2011. On European shipbuilding studies see: Kuuse 1983; Stråth 1987; Bohlin 1989; Lorenz 1991; Todd 1991; Heide 1993; De Voogd 1993; Johnman and Murphy 2002; Jamieson 2003; Johnman and Murphy 2005; De Voogd 2007; Stopford 2009.

⁴ For exceptions see Starkey and Murphy 2008; Poulsen and Sornn-Friese 2009; Poulsen, Wæhrens and Nielsen 2012; Slaven and Murphy 2013.

⁵ This article focuses on shipbuilding only, not ship-repair. Several Danish yards both engaged in shipbuilding and repair, but market structures differed in the two activities. Shipbuilding has a very cyclical nature, following the cycles of the freight markets. Fluctuations in ship-repair tend to be less pronounced. Even in times of low freight rates, when demand for new ships is low, the existing fleet needs ship-repair and maintenance. Ship-owners may even prefer to schedule vessel maintenance to periods with low freight rates, because vessel off-hire is less costly at that time. The development of Danish ship-repair remains under-researched.

⁶ For instance, the North American Industry Classification System (NAICS) does not distinguish maritime manufacturing as a separate industry category. On Danish industry codes see Henrik Sornn-Friese, *Navigating Blue Denmark: The Structural Dynamics and Evolution of the Danish Maritime Cluster* (Copenhagen, 2003), 44-5.

⁷ See list of members of Danske Maritime, which counted 24 companies in 2010, in Danske Maritime annual report 2009/10, p. i. See also list of members of Danish Marine Group, 2010.

⁸ For instance, Grundfos is well known for its pumps for onshore use, but the company has also supplied shipbuilders with pumps for maritime use.

⁹ Økonomi- og Erhvervsministeriet 2006, p. 77. The statistics are based on data sets from Statistics Denmark (so-called input-output data). The methodology used to assemble the data set and the sources of uncertainty are described in Sornn-Friese 2003. In 1995, Erhvervsministeriet (p. 13) estimated that 11,000 people were employed directly in the marine equipment industry and the large difference between the estimates in the two reports clearly indicates the difficulties of counting the number of employees precisely.

¹⁰ Although the Danish textile and clothing industry has recently transformed in a way that cause some of the most dynamic companies to fall outside the traditional industry definition.

¹¹ This is the case both for the leading Danish newspaper "Søfart" and the international technical journal "The Motor Ship". The international, commercial newspaper "Lloyd's List" has its main focus on shipping companies.

¹² See e.g. Stopford 2009; Wijnolst and Wergeland 2009.

¹³ For equipment, which is key for a vessel's seaworthiness, after-sales are important to reduce expensive off-hire periods for owners. This is most notable for marine engines. MAN Diesel Primeserv homepage on after-sale services for marine engines: <http://mandieselturbo.com/primeserv> accessed on March 13, 2012. See also Pyndt and Pedersen 2006.

¹⁴ Stopford 2009, pp. 655-93; Wright 2012.

¹⁵ Bastiansen 2001; Poulsen, Wæhrens and Nielsen 2012; Aalborg Industries, annual report, various years.

¹⁶ Amsden 1989; Chida and Davis 1990; Todd 1991; Stopford 2009; Bruno and Tenold 2011.

¹⁷ de la Pedraja 1999

¹⁸ Stopford 2009, p. 624.

¹⁹ Chida and Davies 1990; Stopford 2009; Bruno and Tenold 2011; Jiang and Strandenes 2012.

²⁰ Stråth 1987; Chida and Davies 1990; Todd 1991; Erhvervsministeriet 1995; Bastiansen 2001; Bruno and Tenold 2011. Skibsværftsforeningen, annual reports various years; Danske Maritime, annual reports, various years.

²¹ Olesen 2012.

²² Danske Maritime annual reports, various years.

²³ Danske Maritime annual reports; Erhvervsministeriet 1995.

²⁴ This article is based mainly on Poulsen and Sornn-Friese 2011.

²⁵ Stråth, 1987, p. 183.

²⁶ Poulsen and Sornn-Friese 2011. Although several large Danish shipping companies did own shares in the yard in the 1960s. For a discussion of ownership structures in B&W see Lange 1995, Lange 2001, Olesen 2012.

²⁷ Production is measured in Compensated Gross Ton, which takes into consideration the fact that production of some shiptypes (e.g. passenger ships, reefers and chemical tankers) are more advanced and labour intensive than others (e.g. crude oil tankers and dry bulk carriers). After 2000, Odense Steel Ship Yard's production of large container ships concealed the decline of other Danish shipbuilders in the statistics. Odense Steel Ship Yard delivered its last vessel in 2012 and Danish production and global market share has declined accordingly.

²⁸ Danske Maritime home page, accessed on April 16, 2010. More recent data, from the period after the closure of the Odense Steel Ship Yard, are not yet available, but the layoffs from Odense counted the majority of the remaining workers in newbuildings.

²⁹ Danske Maritime home page, accessed on April 16, 2010.

³⁰ Økonomi- og Erhvervsministeriet 2006, pp. 74-76. This is generally also supported by figures calculated in Bastiansen 2001.

³¹ This was the case in Ørskov and Aarhus Flydedok.

³² For a status of the equipment suppliers in Denmark around 2000 see Bastiansen 2001.

³³ "Portræt af en nybygning", 1975-2002, published in Søfart and referred to as Søfart makers' lists in the following.

³⁴ Poulsen and Sornn-Friese 2011.

³⁵ Industriministeriet 1991; Erhvervsministeriet 1995.

³⁶ Danske Maritime, annual report for 2009/10; Danish Marine Group, *Who is who 2010*.

³⁷ Danish Marine Group also included non-manufacturing companies, including ship-designers, maritime consultants etc.

³⁸ The list contains a selection of companies and their product range. It is based on makers' lists for Danish newbuildings, published in Søfart 1975-2002. Companies which have exited the industry during the period are excluded. Data on founding years comes from company websites.

³⁹ See also Bastiansen 2001 for a status of the industry players around 2000.

⁴⁰ Company web page, accessed on March 12, 2012.

⁴¹ Skaaning 1980; Hempel A/S annual reports, various years.

⁴² Danske Maritime annual reports, various years; Company web-pages.

⁴³ Olsen 2012.

⁴⁴ E.g. Nordisk Ventilator Co. (later renamed Novenco), C.C. Jensen, Viking Life-Saving Equipment and Hempel.

⁴⁵ E.g. Svanehøj International, Sabroe Refrigeration and Atlas.

⁴⁶ Bastiansen 2001, p. 40.

⁴⁷ Lange 2001; Pyndt and Pedersen 2006; Olesen 2012.

⁴⁸ Company webpage, <http://www.hamworthy.com>, accessed on March 12, 2012.

⁴⁹ Lange 1995; Eriksen 1997; Company webpage, <http://www.johnsoncontrols.dk>, accessed on March 12, 2012.

⁵⁰ Olesen 2012.

⁵¹ MAN Diesel and Alfa-Laval Aalborg are such examples.

⁵² Porter 1986. See also Coe, Dicken and Hess 2008; Gereffi, Humphrey and Sturgeon 2005.

⁵³ Hyldtoft 1996; Rasmussen, Rønne and Vedsted 2000, pp. 33-48; Hyldtoft and Johansen 2005; Christensen, Hasstrup, Sørensen and Thøgersen 2011; Hyldtoft and Johansen 2005.

⁵⁴ Rasmussen 1995; Hyldtoft 1996; Eriksen 1997; Nielsen 2003; Hyldtoft and Johansen 2005; Poulsen, Wæhrens and Nielsen 2012.

⁵⁵ A.P. Møller annual reports; Christensen, Hasstrup, Sørensen and Thøgersen 2011.

⁵⁶ Of course in a strict sense, containers are not marine equipment installed onboard ships but rather cargo handling equipment.

⁵⁷ A/S D/S Svendborg and D/S af 1912 A/S, annual reports, 1991-2003; A.P. Møller-Mærsk A/S annual report 2004-12; <http://www.mcicontainers.com/>, accessed on March 13, 2012.

⁵⁸ Erhvervsministeriet 1995, p. 13, 28, 41.

⁵⁹ Olesen 2012.

⁶⁰ Danske Maritime, annual reports, various years; Skibsværftsforeningen, annual reports, various years.

⁶¹ Søfart list of Danish newbuildings various years; The Motor Ship various years.

⁶² A.P. Møller annual reports.

⁶³ Søfart various years; Danish Maritime annual reports various years.

⁶⁴ Amsden 1989; Chida and Davies 1990; Bruno and Tenold 2012. See Poulsen, Wæhrens and Nielsen 2012 on a Danish equipment supplier's difficulties in setting up production in these markets. In 2007, The South Korean STX group acquired a number of European shipyards, including major yards in Norway, France and Finland, which specialized in ferries, cruise and offshore vessels. The South Korean group did not experience the same entry barriers in Europe as the European companies had experienced in Asia. The South Korean venture in European shipbuilding, however, proved problematic following the 2008 financial crisis and the drop in shipbuilding demand. Some of the European assets have now been sold off from the STX Group. See Eason 2007; Lin 2013.

⁶⁵ Kuuse 1983 has examined the development of Swedish marine equipment suppliers, but only during the period when Sweden had a major shipbuilding industry. Thus the period after the closure of the shipyards remains under-researched.

⁶⁶ Amsden 1989; Chida and Davies 1990; Bastiansen 2001; Bruno and Tenold 2011; Poulsen, Wæhrens and Nielsen 2012.

⁶⁷ On MAN Diesel see: Pyndt and Pedersen 2006. See also Eriksen 1997 on Sabroe Refrigeration and Poulsen, Wæhrens and Nielsen 2012 on Novenco.

⁶⁸ Poulsen, Wæhrens and Nielsen 2012.

⁶⁹ Poulsen, Wæhrens and Nielsen 2012.

⁷⁰ http://www.novenco-marine.com/sitecore/content/Group/About_Novenco_Group/Novenco_in_brief.aspx?sc_lang=en, accessed on October 2, 2013.

⁷¹ Aalborg Industries, Hempel, DESMI annual reports various years.

⁷² MAN B&W Diesel and MAN Diesel annual reports various years.

⁷³ Danske Maritime annual report 2008/09, p. 2. Author's translation.

From shipbuilding to alternative maritime industry – The closure of Danyard Frederikshavn in 1999

BY THOMAS ROSLYNG OLESEN

The past 20 years has seen several studies on the decline of European shipbuilding. The existing research mainly examines the reasons for the decline but not the consequences of the shipyard closures. This article examines what happened after the closure of Danyard Frederikshavn in 1999. The first part examines the various attempts that were made to save the shipyard during the 1990's. The second part examines what activities were continued after the closure. It identifies six spin-offs and shows how the shipyard site was turned into a thriving business park with app. 1,000 jobs in 2011. The article furthermore shows how the activities gradually went from manufacturing in the late 1990's to maritime service activities in 2011. Finally the article presents a statistical survey which examines what happened to the app. 1,300 workers that lost their jobs when the shipyard closed. The survey shows that the workers mainly went to neighbouring sectors and that their competences were widely sought for in the local business community. The article concludes that the closure of Danyard Frederikshavn wasn't a breakdown but a transformation into new and more viable activities.

Introduction¹

The oil crisis in 1973 marked the beginning of a worldwide shipbuilding crisis. From 1975 to 1987 the amount of launched tonnage fell from 35,9 million GRT to 9,8 million GRT. The crisis was especially severe in Europe. From 1977 to 1985 the European market share fell from 41% to 18%. During the same period of time Asia increased its market share from 46% to 70%. A combination of lower wages, massive state subsidies and new efficient production plants allowed Japan, South Korea and later China to steal market shares through a vicious price dumping which led to the closure of most European shipyards from the late 1970's to the late 1990's.²

The dislocation of shipbuilding from Europe to Asia is one of the clearest examples of the decline of European manufacturing and the loss of industrial workplaces in Europe. In the early 1970's Denmark had more than ten mediums sized and large shipyards. After the oil crisis, however, the Danish shipyards began to experience increasing problems and in 1980 the first large shipyard – B&W in Copenhagen – went bankrupt.³ The closure of the B&W marked the beginning of a series of Danish shipyard closures during the 1980s and 1990s. In 2012 the last major shipyard – the A.P. Møller Mærsk owned Odense Steel Ship Yard at Lindø – was closed.⁴

The decline of Danish and European shipbuilding has received heavy attention from business historians and economists. The existing research on the topic mainly explains the reasons for the decline and the various attempts to save the ailing shipyards. Only few have, however, examined the consequences of the shipyard closures.⁵

This article investigates the time that followed the closure of Danyard Frederikshavn in December 1999. The article falls in three parts. The first part examines the closure of the shipyard

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from 1995 to 1999. The aim of this analysis is to identify the measures taken by the management to save the shipyard.

The second part of the article examines what activities were continued after the closure. This part examines (1) what spin-offs that were created after the closure, (2) who were the main entrepreneurs and investors behind the spin-offs, (3) what activities were continued in these companies and (4) what had happened to the spin-off companies in 2011 – ten years after the shipyard closure.

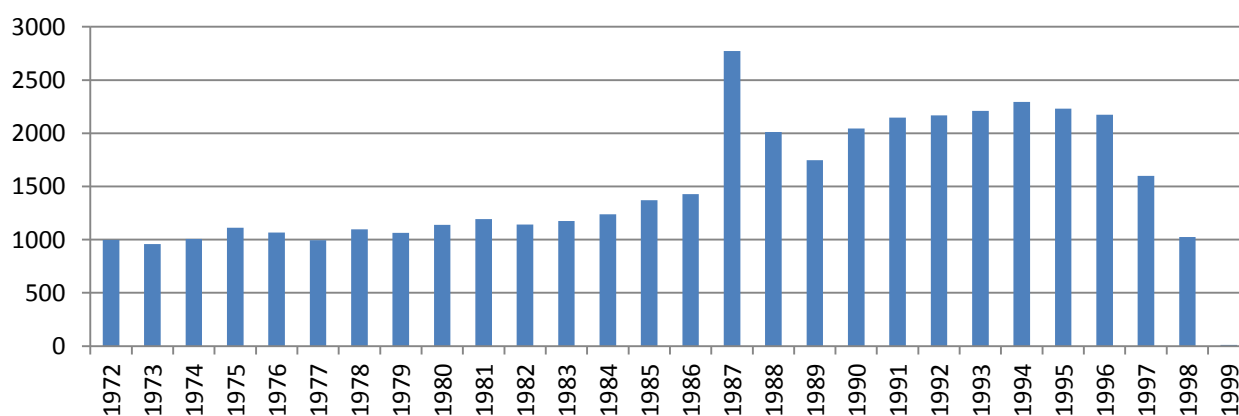
The final part of the article examines what happened to the employees at Danyard Frederikshavn after the shipyard closure. The source for this study is register data from Statistics Denmark. The *Integreret Database for Arbejdsmarkedsforskning* (Integrated Database for Workforce Research) is a unique database that covers the entire Danish Workforce and all Danish companies. In November every year since 1980 data has been collected giving a unique opportunity to follow the movements of the Danish workforce.⁶ The database allows us to identify 1,376 shipyard employees that left Danyard in the three years leading up to the closure in December 1999. From this dataset it is possible to examine what had happened to the population of former shipyard workers in November 2003 with regard to employment rate, geographical mobility, migration to other sectors, additional training etc. This gives several indications as to where and how the competences from the closed shipyard were used.

The article shows that knowhow and competences from Danyard were applied in new and more value added activities as the site was transformed from a shipyard into a business park with several small and medium sized companies engaged in maritime service activities.

Danyard Frederikshavn

The closure of Danyard Frederikshavn in December 1999 marked the end of a series of Danish shipyard closures in the late 1990's. The shipyard – which was founded in 1870 – had by the early 1970's established itself as the sixth largest shipyard in Denmark with approximately 1,000 employees and a dock capacity of 7,000 dwt. Situated in Frederikshavn – a town of app. 20,000 inhabitants in the northern part of Jutland – the shipyard was an important workplace for the local community. In 1987 it was merged with Aalborg Værft which increased the number of employees at the shipyard to 2,000 during the 1990's. At that occasion it was decided to change the name from Frederikshavn Værft to Danyard Frederikshavn.⁷

Figure 1: Average number of employees at Frederikshavn Værft (1972-1986) and Danyard (1987-1999)



Source: Annual reports from Frederikshavn Værft 1975-1986 and Danyard 1987-1999

Note: 1999 shows the employment at the end of the year and not the average employment

Danyard was in many respects very representative of the average Danish steel shipyard. As most Danish shipyards it was owned by one of the major Danish shipping companies. In 1913 it had been bought by DFDS (*United Steamship Company*) and in 1964 it became part of the Lauritzen Group, when the shipping company J. Lauritzen acquired the majority of shares in DFDS. In the late 1990's the Lauritzen Group was among the 15 largest companies in Denmark with an annual turnover of around 17 billion kroner. As a daughter company of J. Lauritzen Holding (JLH) Danyard had a strong owner who could support the shipyard with orders or capital if necessary.⁸

The production profile of Danyard Frederikshavn was very similar to the majority of the Danish shipyards. After the Oil Crisis in 1973 Danyard had turned to niche production of highly complicated ships which weren't as affected by the increased global competition as bulk ships or tankers. From the mid 1970's to the late 1990's the shipyard specialized in small naval ships, RO/RO ships, reefers and chemical tankers. In 1993 Danyard had furthermore taken over a GRP (Glass Reinforced Plastics) factory – Danyard Aalborg – from the closed Aalborg Værft. During the 1980's and 1990's Danyard Aalborg built a series of 14 highly advanced GRP-ships for the Danish Navy as well as two catamaran ferries in aluminium. Apart from shipbuilding Danyard had established a pipe factory at the site in Frederikshavn. The factory was set up in the early 1990's to support the building of nine chemical tankers to Stolt-Nielsen Parcel Tankers. Even though the pipe factory had costumers outside the Danyard Group the side production of pipes wasn't nearly as important as alternative production strings on other Danish Shipyards e.g. the engine factory at B&W in Copenhagen or the boiler factory at Aalborg Værft.⁹

The troubled 1990's

By the early 1990's most Danish shipyards found it difficult to obtain new orders. In December 1993, however, the Danyard management could celebrate the biggest order in the history of the shipyard. The order on seven highly advanced chemical tankers to the American shipping company Stolt-Nielsen Parcel Tankers secured the shipyard an order portfolio worth 5,2 billion DKK. The Stolt-Nielsen order was widely celebrated but in many ways it marked the beginning of the end for Danyard Frederikshavn.¹⁰

By 1995 the shipyard management began to realize that the chemical tankers were far more complicated than had been expected. Danyard's lack of experience with the ship type caused low productivity and resulted in costly delays. At the same time the shipyard experienced several problems with deliveries from subcontractors which only served to further complicate the matter. In addition to this a falling exchange rate on dollars resulted in heavy losses on the existing orders. As a consequence the shipyard suffered a devastating deficit of 490 million DKK in 1995. Danyard's banker – Sparekassen Nordjylland – began expressing serious doubts about the company's ability to handle the large Stolt-Nielsen order and demanded a guarantee from JLH that the owner would cover any losses that the shipyard might experience in 1995 and 1996. When JLH refused it caused a rapidly deteriorating relationship with Sparekassen Nordjylland and the Danyard management was forced to look for another banker. The situation was precarious and in December 1995 the owner increased the direct control with the shipyard by placing its CFO Bent Østergaard in the Danyard board. Three months later – in March 1996 – Danyard CEO Jens Viskinge Jensen was replaced. Danyard's technical Director Torben Mejnertsen became new CEO.¹¹

During the spring of 1996, however, the problems continued. In April the quarterly account showed a loss of 142 million DKK which was 100 million DKK worse than estimated. In May the board decided to prepare a plan for a closure of the shipyard after the last chemical tanker and alternatively try to find new investors. In August Teddy Jacobsen replaced Niels Bach as board

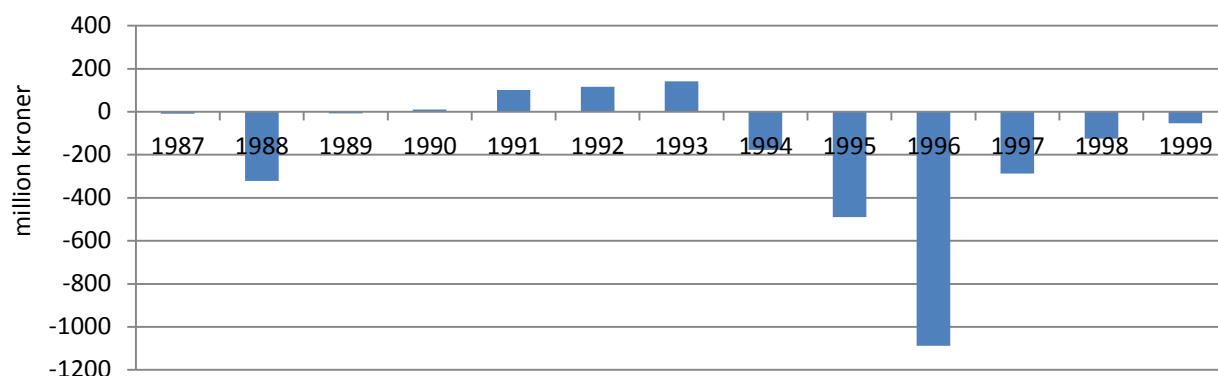
chairman and Bent Østergaard was elected new vice-chairman. Under the new chairman the board continued to work towards a closure, and by the end of August Teddy Jacobsen and Torben Mejnertsen presented a decommissioning plan to the JLH board. The parent company supported the plan and in September Torben Mejnertsen had meetings in the Ministry of Business Affairs (*Erhvervsministeriet*) to prepare for a gradual closure and secure the necessary funding for re-education etc. of the Danyard workers. Mejnertsen also met with the Steelworkers Union (*Dansk Metal*) in an attempt to increase the cooperation with the labour unions during the forthcoming closure. In order not to damage the morale of the workforce, the closure plans were, however, kept strictly confident.¹²

In late September 1996 JLH injected 500 million DKK into Danyard to reduce the debt and thus raise the confidence in the shipyard. This should secure the management room to work towards a controlled shut-down. By the end of the year, however, a new situation emerged that opened up for foreign investments and a possible sale of the ailing shipyard. In Malaysia the navy planned to expand the fleet with 27 new patrol vessels over the next 15-20 years. The ships were to be built on the naval shipyard in Lumut which, however, lacked the necessary know-how. Therefore the government planned to involve a foreign partner which should build one or two prototypes and deliver materials to further 6-8 ships. In December 1995 the naval shipyard in Lumut was bought by Penang Shipbuilding & Construction (PSC) which had been chosen by the government to lead the consortium that should build the patrol vessels. PSC was controlled by the 43-year old Amin Shah. Shah was an upcoming businessman in charge of a rapidly expanding business empire with shipyards in Malaysia and Ghana and with plans for acquiring further shipyards in USA and Europe. To Amin Shah Danyard was an ideal business partner. Danyard's daughter company – Danyard Aalborg – had exactly the military know-how Shah needed, and the shipyard in Frederikshavn could act as a European strongpoint in his expanding worldwide network of shipyards. For JLH – on the other hand – a deal with Amin Shah could be the first step towards a sale of the troubled Danyard Group.¹³

In July 1996 the two parts signed a Memorandum of Understanding. PSC offered to buy 48% of the shares in Danyard and 40% of the shares in Danyard Aalborg. The Malaysian company would inject 100 million US dollars in the Danyard Group and would afterwards get free access to the know-how pool in Danyard and Danyard Aalborg. The agreement contained three types of cooperation: (1) Shipbuilding, (2) technology transfer to the shipyards in Malaysia and (3) a training programme for Malaysian shipyard workers. The negotiations were continued and in December a Letter of Intent was signed. For Danyard the new ownership structure would lead to several changes. As part of Amin Shahs worldwide shipbuilding consortium the Danyard management expected the company to be increasingly engaged in R&D and less in shipbuilding. In March 1997 Danyard submitted a tender on the order of the first six patrol vessels in a consortium with Bath Ironworks and BAeSEMA along with four other bidders. This order marked an important precondition for the deal with Amin Shah.¹⁴

To JLH it was extremely important that nothing went wrong in the negotiations with Amin Shah. The shipyard was becoming a serious economic burden for the Lauritzen Group. In May 1997 Danyard presented a devastating 1996-deficit of 1,088 billion DKK. 400 million DKK were extraordinary provisions as part of the agreement with Amin Shah, but the loss of almost 700 million DKK meant that Danyard was becoming a threat to the stability of the entire Lauritzen Group.

Figure 2: Results for the Danyard Group 1987-1999



Source: Annual reports from Danyard 1990-1999

As part of the agreement with Amin Shah, Danyard had agreed to secure a full order book. In order to fulfil this demand the management agreed to build another two chemical tankers to Stolt-Nielsen. The contract was signed in September 1997. In the meantime, however, a potential problem had arisen. In the summer of 1997 Thailand was struck by a severe economic crisis that quickly spread to Malaysia. As a consequence Amin Shah began to postpone the deal. In September – shortly after signing the agreement with Stolt-Nielsen – the Danyard management was forced to discuss the possibility of Amin Shah withdrawing from the deal. In October disaster struck. The Malaysian premier minister Mahathir overruled Amin Shah and decided to give the order to a German consortium. Danyard – which had just prolonged the order portfolio as part of the deal with Shah – was out of the picture.¹⁵

On the 1st of December 1997 the last hope for an agreement with Amin Shah disappeared. The following day JLH implemented several changes in the management. Apart from vice-chairman Bent Østergaard the entire board was replaced. Freddy Frandsen – CEO at Aalborg Industries – was elected chairman. Danyard CEO Torben Mejnertsen was replaced by Torben Erikstrup who had previously worked as technical Director at B&W Shipyard in Copenhagen and Kaj Christiansen from Sparekassen Nordjylland – Danyard's former banker – became new CFO.¹⁶

The new management immediately began to develop a new strategy. The chairman made it clear that Danyard wasn't in a position where the shipyard could take in new orders, but stated that everything should be done to finish the remaining orders with as few losses as possible. At this point Danyard had obtained loans from the parent company of app. 940 million DKK and in December and January Freddy Frandsen tried to secure the economic foundation of the shipyard by asking the owner for further economic support. On the 7th of January 1998 JLH agreed to inject 1,1 billion DKK. The parent company furthermore promised to support the completion of the remaining chemical tankers with another 1 billion DKK over the following two years. JLH thus kept on supporting the ailing shipyard.¹⁷

The new management saw two possible scenarios for Danyard: (1) to sell the shipyard, or (2) to shut it down. At first it was decided to search for new investors and from December 1997 to November 1998 the management made an effort to sell Danyard and Danyard Aalborg. During the summer of 1998 Freddy Frandsen had serious negotiations with Odense Stålskibs Værft and Aarhus Flydedok both of which showed an interest in Danyard Aalborg. No agreement was reached, however.¹⁸

It was equally hard to find potential investors for Danyard Frederikshavn. At a board meeting in May 1998 the chairman suggested that the shipyard should be offered to the neighbouring Ørskov Christensen's Stålskibsværft for free. This was, however, never carried out. Instead the board hired the consultants from Aros Securities to identify potential buyers but it was a difficult task to sell a shipyard that came out of 1997 with a deficit of 288 million DKK and a negative equity of 1,091,858,000 DKK. In the summer of 1998 the Danyard management had negotiations with one of the large Danish pension funds KP (*Kommunernes Pensionsforsikring*). KP, however, refused to invest in the shipyard without other industrially based investors. The management also had negotiations with Stolt-Nielsen and the Norwegian shipyard Mjellem & Karlsen in Bergen but without any results. On the 29th of October 1998 the chairman called off the search. Instead the board decided to work towards a closure of the shipyard after the delivery of the last chemical tanker in December 1999. In order to secure that the remaining orders were finished on time the board decided to keep the closure a secret thus avoiding damaging the morale at the shipyard.¹⁹

Preparing for the closure

The Danyard management and JLH found it very important to create as many new jobs as possible after the closure. At a board meeting on the 29th of October 1998 the board discussed the possibility of establishing a business park at the shipyard site. It was not uncommon that the management decided to establish a business park or a real estate company at the shipyard area. This had been the case at the closures of Elsinore Shipyard in 1983, Nakskov Shipyard in 1986 and B&W in 1996. At the closure of Aalborg Værft in 1987 JLH had secured almost 2,000 jobs in a business park on the former shipyard area, and the board agreed to draw on the experiences from that particular closure.²⁰

The establishment of a business park wouldn't just create new jobs for the former shipyard employees. It also aimed at solving another problem. Danyard didn't own the shipyard site in Frederikshavn, but rented the area from Frederikshavn harbour. If the rental agreement was cancelled the contract stated, that the area should be cleaned for all buildings and pollution. It was estimated that such an operation would cost 2-300 million DKK. By establishing a business park, however, the new company could continue JLH's activities on the former shipyard site after the closure without having to cancel the agreement with the harbour.²¹

The decision to close the shipyard was taken on the 29th of October 1998, and the following day the board informed the mayor and the local business council of the decision. Later that day the county (*amt*), municipality (*kommune*) and the local business council created a Foundation for Maritime Development and Cooperation (*Fonden Maritim Udvikling og Samarbejde*). It seems reasonable to assume that the foundation was established as a direct consequence of the decision to close the shipyard.²²

In January the foundation invited several wind turbine manufacturers to Frederikshavn. The aim was obviously to convince them to establish new production at the harbour. The facilities at the shipyard were well equipped to handle the large mill wings and towers. The workforce was experienced in producing and assembling large metal structures and the vicinity to the sea meant that the mills could easily be shipped off. Windmill production was thus an obvious way to create new jobs at the shipyard site. In February and March representatives from Tacke Windenergie GmbH and Vestas visited Frederikshavn to evaluate the production facilities. In the end, however, the wind turbine producers weren't convinced. Instead Vestas decided to establish a new factory on the former shipyard area in Nakskov.²³

The spin-offs from Danyard

Despite the failed attempt to establish wind turbine manufacturing at the shipyard site the Danyard directors managed to establish several new activities at the area. Through 1999 the management launched a series of alternative plans that resulted in the establishment of six spin-offs as shown in table 1. From May of 1999 to March 2000 five spin-offs were created followed by a sixth spin-off in 2006. Most of these spin-offs were established by Danyard CEO Torben Erikstrup and CFO Kaj Christiansen with extensive financial backing from JLH.

The first spin-off was established in May 1999 when the shipbuilding activities were taken over and continued by the neighbouring Ørskov Christensen's Stålskibsværft. The idea originated from September 1998 when Torben Erikstrup had met with the managements from Aarhus Flydedok and Ørskov Christensen's Stålskibsværft to discuss the possibility of merging the three shipyards. JLH had supported the idea but had emphasized that the activities should be continued in a new company and not as part of the Lauritzen Group.²⁴ In November Erikstrup met with the two Danish pension funds – Kommunernes Pensionsforsikring and Lønmodtagernes Dyrtidsfond – to discuss the possibility of raising capital for the new company. Both funds were positive about the idea of investing in a new joint shipyard. In February, however, the plan suffered a serious setback when Aarhus Flydedok was declared bankrupt. Shortly after the pension funds withdrew from the reconstruction plans. The Danyard management, however, continued to work for a reconstruction and on the 10th of March 1999 Freddy Frandsen and Torben Erikstrup met with Niels Ørskov to discuss the possibilities of creating a joint repair shipyard without Aarhus Flydedok.²⁵ This plan was, however, never realized. Instead the Ørskov management decided to rent 40% of the Danyard site for five years. The deal was signed on the 17th of May 1999 and the idea of an independent repair shipyard was abandoned by the Danyard management. As part of the agreement Ørskov got the right to purchase the rented area from Danyard between 2002 and 2009. A few months later Ørskov concluded an order on the completion of a Stolt-Nielsen chemical tanker similar to the ones that were built by Danyard. The ship had originally been contracted at a shipyard in Le Havre, which had, however, gone bankrupt in the attempt to build the highly complicated vessel. The workers at Danyard had extensive experience with this ship type and around Christmas 1999 app. 2-300 Danyard workers were hired by the neighbouring shipyard. Ørskov Christensen continued the shipbuilding activities at the Danyard site until 2003, when the company went bankrupt. It was later reconstructed as a repair shipyard named ORSKOV. In May 2009 ORSKOV bought the rented area from the business park and the company is still operating a repair shipyard on the former Danyard site employing app. 230 workers.²⁶

The second spin-off was the business park Frederikshavn Maritime Erhvervspark (FME) which was established in May 1999. During the spring the Danyard management had negotiated with the harbour authorities and in April 1999 it was agreed to allow a new company to take over the rental agreement from Danyard. FME was created on the 6th of May 1999 as a daughter company of JLH with Kaj Christiansen as CEO. The parent company made a direct investment of 20 million DKK in the business park and FME was furthermore given a loan on 50 million DKK from JLH. A loan of another 30 million DKK in Nykredit was at the same time transferred from Danyard to FME. On the 1st of June 1999 all fixed assets – worth app. 100 million DKK – were transferred from Danyard to FME. The first tenant was Ørskov Christensen's Stålskibsværft which expanded its activities to the Danyard site. The remaining area was rented to Danyard during the completion of the final Stolt-Nielsen chemical tanker.²⁷

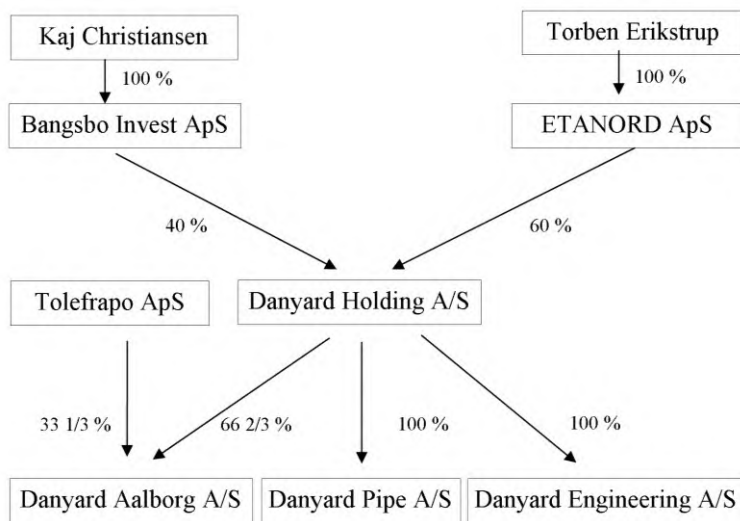
Table 1: Spin-offs from the closure of Danyard in 1999						
Company	Background	Activity	Established	Closed	Entrepreneur	Investor
Repair shipyard sold to Ørskov	The shipyard	Shipbuilding	17.5.1999	No	Niels Ørskov & Danyard CEO+CFO	Ørskov Christensen's Stålskibsværft
FME	The shipyard	Business park	1.6.1999	No	JLH & Danyard CEO+CFO	JLH
Danyard Engineering	Design & engineering department	Counselling engineers	1.11.1999	Sept. 2003	Danyard CEO+CFO	Danyard CEO+CFO
Danyard Pipe	Pipe factory	Pipe Production	1.11.1999	No	Danyard CEO+CFO	Danyard CEO+CFO
Danyard Aalborg	Danyard Aalborg	GRP-shipyard/Factory	Sold on the 27.3.2000	30.6.2009	Danyard CEO+CFO	Danyard CEO+CFO backed by JLH
CH Marine Consult	Design & engineering department	Counselling engineers	Jan. 2005	No	Engineer from Danyard	Engineer from Danyard
Source: Olesen, 2012, p. 251						

In November 1999 another two spin-offs were created. The first was the pipe factory which was spun off as Danyard Pipe and the second was a consulting engineering company named Danyard Engineering.²⁸ The pipe factory had been established in the early 1990s as a consequence of the Stolt-Nielsen order. The Chemical Tankers required extensive piping and the shipyard management had invested several millions of DKK in new pipe production facilities.

The idea of establishing a pipe factory as an individual company arose in December 1998 – approximately a month after it was decided to close the shipyard. Initially the management had attempted to sell the factory. During the summer of 1999 the Danyard management was in contact with the pipe manufactures Logstor, Flensburg Shipyard and the steel manufacturing companies Sanistål and Bladt Industries. The attempts to find external investors were, however, unsuccessful. Instead Torben Erikstrup and Kaj Christiansen decided to acquire the pipe factory in a management buyout. The company only needed a very limited fixed capital as the production facilities were rented from FME. Danyard Pipe was established on the 1st of November 1999. Initially 13 former shipyard employees were hired. The company was established as a subcontractor for shipyards and the offshore industry but later managed to get orders for power plants and industry.²⁹

Danyard Pipe was closely linked to the newly established Danyard Engineering which was also acquired by Erikstrup and Christiansen in a management buyout. Danyard Engineering prepared the pipeline drawings and the pipes were afterwards produced at the pipe factory. Both companies soon became daughter companies of a newly established Danyard Holding which was also owned by Torben Erikstrup and Kaj Christiansen. The Danyard-name was acquired from JLH.³⁰ In a half year the number of employees had increased to app. 40. The company mainly had orders for shipyards in Denmark, Germany and Croatia. In 2005 Danyard Pipe was sold to Frederikshavn Køleservice and the two companies were afterwards merged under the name Victor Industri. During the gradual closure of European shipyards the company managed to find new costumers inland and in the offshore industry. These included BWSC (power plants), Logstor (pipe manufacturing) MAN Diesel (Ship engines) and National Oilwell (offshore and land drilling). In 2011 the Victor Industri – now named VICTOR – employed app. 70 workers.³¹

Danyard Engineering was established along with Danyard Pipe on the 1st of November 1999. The entrepreneurs were Torben Erikstrup and Kaj Christiansen who bought the company in a management buyout. The idea of creating a consultant engineering company went back to the beginning of 1999 when the design and engineering department at Danyard had initiated a close cooperation with Hauschildt Marine which was an engineering and design company. Hauschildt



was highly specialized in construction drawings and Danyard had great experience when it came to outfitting. The two companies establish a joint venture and in March 1999 they obtained their first design assignment for Flensburg Shipyard. The project was further expanded during 1999 and the Danyard management began to consider establishing a consultant engineering company. Through the autumn of 1999 Erikstrup and Christiansen searched for external investors for the company but it proved impossible. Instead the Danyard managers bought the design

and engineering department in a management buyout, and on the 1st of November 1999 Danyard Engineering was established.³² Apart from the drawings to Danyard Pipe the company had design and engineering assignments for shipyards in Germany, Poland, Croatia and the Netherlands. Until 2002 it employed between 12 and 15 former Danyard engineers. From 2002, however, it became increasingly difficult to get new assignments. In an attempt to find new costumers the company tried to enter the offshore sector and the land based oil industry. The management wasn't, however, able to obtain new orders and in 2003 it was decided to shut the company down.³³

The fifth spin-off was Danyard's daughter company Danyard Aalborg which the Danyard management had tried to sell since 1996. First to Amin Shah and PSC and later to Aarhus Flydedok and Odense Stålskibs Værft. On the 27th of March 2000, however, Erikstrup and Christensen decided to buy 2/3 of the shares in the GRP-factory in a management buyout. The remaining 1/3 of the shares were sold to the investment company Tolefrapo ApS. The sale was made on very favourable conditions as JLH was eager to disengage from the shipbuilding activities. Danyard Aalborg became a daughter company of Danyard Holding and sister companies to Danyard Pipe and Danyard Engineering. At the time of the sale the GRP-factory employed app. 150 workers, and the order book was full.³⁴ In 1999 Danyard Aalborg had signed a five year maintenance agreement with the Danish navy on the 14 Standard Flex 300 patrol vessels which had been built at Danyard Aalborg from 1988 to 1995. Danyard Aalborg had furthermore obtained an order on a 38 meter super yacht for the Danish shipbroker Royal Denship. Erikstrup and Christiansen saw great possibilities in the markets for naval ships and luxury yachts. The Danish navy planned to build a new series of surface ships and the extensive experience with naval ships meant that Danyard Aalborg had a good chance of obtaining the order. The widely celebrated Standard Flex 300 vessel had furthermore resulted in increased attention from foreign countries that planned on expanding their navy. The market for luxury yachts was equally promising. In 1999 the shipbroker Peter Johansen from Royal Denship expected that he could sell another five or six yachts to the American market before 2006. On the 9th of August 2000 he ordered a second luxury yacht from Danyard

Aalborg, and in the following years Danyard Aalborg had a close relationship with Royal Denship³⁵. The shipbroker found potential buyers via sales offices in St. Tropez and Fort Lauderdale and had the ships built at shipyards in Denmark. In December 2003 Danyard Aalborg delivered its third luxury yacht to Royal Denship – the 77 meter Princess Mariana. From 2004 a falling exchange rate on dollars, however, made it too expensive for Americans to buy their yachts in Europe. And when the maintenance contract with the Danish navy stopped in 2005, the management was unable to obtain new orders. From 2006 to 2009 the Danyard Aalborg had no activities and in June 2009 the company was dissolved.³⁶

The Danyard site after the closure – from manufacturing to service activities

On the 14th of December 1999 Danyard delivered its last ship – the chemical tanker *Stolt Innovation*. At the time of the closure app. 450 new jobs had been created at the shipyard site. 15 companies had rented 52% of the shipyard area (table 2) and it was estimated that app. 200 former Danyard-employees had found a new job in the business park. In 2003 it was decided to turn an old silo at the harbour into an office building. To this purpose *The Kattegat Silo Foundation* was established by FME, the municipality and the business council in January 2004. The project amounted to app. 100 million DKK which was partly financed by The European Union (17 million DKK) and a loan from JLH (30 million DKK). In April 2006 the Silo was finished and 12,500 square meters of office space was added to FME.³⁷

Most of the jobs at FME were created by outside companies which moved into the business park. Apart from Ørskov Christensen's Stålskibsværft these companies included KK-Electronic and SEMCO Maritime which could use the facilities and the know-how among the former Danyard employees. Both companies produced electronic devices. KK-Electronic's main costumer was the

Table 2: tenants in FME 31.12.1999	
Tenant	Activity
Altek Isolering A/S	Insulation
AMCNC	Carpenter
CC Nordjylland	Call-center
Danyard Engineering A/S	Maritime Engineering
Danyard Pipe A/S	Pipe factory
Delta System DK A/S	Scaffolding and Tents
ISS Industriservice	Cleaning
KK Electronic A/S	Electronics
Marine Innovation Group	Marine consultant
Sanistål Marine	Steel wholesale
Semco Maritime	Maritime Electronics
Skagen Sansblæseri	Painting/sandblasting
Sonofon	Telecommunication
Ørskov Chr. Stålskibsværft	Shipyard
Aalborg TVR	TV & radio
Source: "FME: Internt regnskab for 1999 og estimer for 2000-2003", FME	

wind turbine industry while SEMCO Maritime had many costumers in the maritime industry and had been an important subcontractor for Danyard. Both companies moved into the business park in 1999 and hired most of the electricians from the shipyard. SEMCO was later sold in a management buyout and the name was changed to Scanel International. Today the company provides technical solutions and a wide range of service activities for the marine and offshore sector. KK-Electronics gathered its activities in Herning and Ikast and is no longer present in FME.³⁸

The continuation of alternative maritime activities and the vast know-how about shipbuilding in the area also resulted in the establishment of several new companies in the business park. Among these was Vestergaard Marine Service which was established in 2003 by two entrepreneurs. The company provides repair and maintenance services on diesel engines on

maritime and offshore installations and on power plants. In 2011 the company had expanded to app. 110 employees. Another example of a successful upstart was the counselling engineering company CH Marine Consult which was established in 2006 by a former Danyard engineer and thus marks the sixth Danyard spin-off. CH Marine Consult builds on the extensive knowhow on pipeline constructions that was present at Danyard. The company has successfully managed to find new

costumers after the decline of European shipbuilding. Today the main costumer is the Norwegian offshore industry including companies like PGS, STX Offshore and Rolls Royce Marine and land based industry counting companies like Victor (pipe manufacturing), Vestas (wind turbines) and BWSC (Power plants). The company had 10 employees in 2011.³⁹

In April 2011 app. 964 jobs had been established in FME divided among 59 companies. This was approximately equal to the number of jobs at the shipyard in the 1970's and the early 1980's.⁴⁰ Only 90 jobs, however, derived from Danyard spin-offs and app. 320 if the jobs at Orskov were included. The reason for the low number of jobs in direct spin-offs is obvious. Danyard didn't have any important production strings apart from shipbuilding like the boiler factory at Aalborg Shipyard or the Engine factory at B&W in Copenhagen. This means that the spin-offs were few and small. The creation of FME, however, resulted in the creation of several new jobs at the site as new companies were established or moved to the area. The fact that expensive equipment could be rented at reasonable prices lowered the cost on fixed assets and created good conditions for new upstarts. The closure of Danyard furthermore gave easy access to a vast pool of know-how on shipbuilding and maritime activities. Finally the clustering of many maritime activities on the site makes way for know-how transfer and cooperation among the companies.⁴¹

FME was still dominated by maritime companies in 2011. Since 2000 the number of employees in maritime companies has risen from 482 to 792. The share of workers engaged in maritime activities has, however, decreased slightly from 92% in 2000 to 82% in 2011. From the late 1990's to 2011 the area has seen a gradual shift from manufacturing to maritime service activities. The clearest indicator of this development was the transformation of FME's largest tenant – Ørskov Christensen's Stålskibsværft – which was closed down as a newbuilding shipyard in 2003 later to re-emerge as the repair shipyard Orskov.⁴² As a newbuilding shipyard Ørskov Christensen's Stålskibsværft was exposed to competition from shipyards low-wage countries all over the world but now the main competitors are repair-shipyards in the Baltic region.

The dispersion of know-how from Danyard Frederikshavn⁴³

Whereas the previous pages have examined the creation of spin-offs and new activities at the Danyard site the following part examines what happened to the workers which lost their jobs at the shipyard. The study of workforce movements in the Danish labour market is possible thanks to a unique register data base from Statistics Denmark. Every November since 1980 Statistics Denmark has gathered data about the entire Danish workforce and all Danish companies in The Integrated Database for Workforce Statistics (IDA). By comparing changes from one year to the other it is possible to follow movements in the workforce very accurately. The database thus allows us to identify the population of workers who left the shipyard between November 1997 and November

Table 3: Training, mobility and dispersion of employed workers from Danyard Frederikshavn		
Data collection	1997-1999	
Population	1,376	
	Number	percentage
Employed in November 2003	884	64,2 %
Of which...		
... has a higher education	47	5,4 %
... has moved municipality	78	8,8 %
... is employed in a top-5 company	205	23,2 %
Source: Statistics Denmark, the IDA Database		
Note: Top-5 companies are the five companies in which most workers from the population has been employed		

1999. According to IDA this population included 1,376 persons. By examining what had happened to this population in November 2003 – app. four years after the closure – it is possible to identify changes in employment, education, residence etc. It is thus possible to examine where the workers were reemployed, if they received additional training, if their competences could be used in the local business community or if they

were forced to move in order to get a new job.

In order to determine to what extent the competences from Danyard Frederikshavn were actually used in other parts of the Danish labour market the reemployment rate among the workers has been examined. According to the data in table 3 app. 64% of the 1,376 Danyard employees had found new jobs by November 2003. This is more or less the same rate of reemployment as was seen at the closures of other Danish and Swedish shipyards in the 1980s and 1990s. Two and a half years after the closure of Elsinore Shipyard in 1983 app. 66% of the former shipyard employees had found new jobs and at the closure of the Uddevalla Shipyard in Sweden in 1986 app. 63% found new jobs within 2½ years.⁴⁴ Studies of the closures of Nakskov Shipyard in 1986, Aalborg Shipyard in 1987 and B&W Shipyard in 1996 further shows that between 60% and 70% of the laid off workers had found new jobs after three years.⁴⁵ The reemployment rate at Danyard was thus more or less equivalent to that of other contemporary shipyard closures in Scandinavia.

Table 4: Employment rate by November 2003 divided years by age	
	Danyard
Population of laid off workers	1376
Employment rate among workers aged.....	
... under 26 years	73,1 %
... 26-40 years	75,2 %
... 40-55 years	65,5 %
... more than 56 years	15,7 %
Average employment for shipyard	64,2 %
Source: Statistics Denmark, the IDA-database	

In order to further examine the level of reemployment the population of Danyard workers has been divided by age and level of education. From table 4 it is evident that the reemployment rate was above average for the workers under 56 years of age. For workers who were older than 56 years of age the rate of re-employment fell remarkably to app.

16%. The explanation is most likely that aged workers retired from the workforce. Compared to other Danish shipyard closures, however, an employment rate of 16% for this population is very high. At the closures of Nakskov Shipyard in 1986, Aalborg Shipyard in 1987 and B&W Shipyard in 1996 only 7-12% of the workers who were older than 56 years of age found new jobs. The high level of reemployment among this group of workers suggests that their competences were sought for. Interviews with former Danyard workers has shown that many of the Danyard employees aged 56 and above were hired by the neighboring Ørskov Christensen's Stålskibsværft.⁴⁶ Furthermore it is very likely that many were hired by the new companies that were established in FME.

Table 5 shows the reemployment rate divided by level of education. Like most other shipyards the population of Danyard workers consisted of app. 25% white-collar employees and 75% blue-collar workers. App. 16% of the population was unskilled workers while 58% were

Table 5: Employment rate by November 2003 divided by education at the time of closure	
	Danyard
Population of laid off workers	1376
Employment rate among...	
... unskilled workers	64,9 %
... skilled workers	64,4 %
... further (non-academic) education	62,5 %
... higher education	78,6 %
Average for the shipyard	64,2 %
Source: Statistics Denmark, the IDA-database	
Note1: Unskilled workers are persons with elementary school or high school as their highest level of education	
Note2: The term "further education" refers to the Danish "kort eller mellemlang videregående uddannelse". It includes non-academic degrees of 2-4 years. Nurses, teachers etc. are included in this group.	

skilled workers.⁴⁷ Studies of other Danish shipyard closures show a clear link between level of education and the rate of reemployment.⁴⁸ At the shipyard closures in Nakskov, Aalborg and B&W the level of reemployment was highest for employees with higher education and lowest for unskilled workers. At the closure of Danyard Frederikshavn, however, the link between level of education and reemployment rate is less clear. Table 5 shows that the reemployment rate was the

same for unskilled and skilled workers and even a bit lower for the group with further education. The relatively high level of reemployment among skilled and unskilled workers is probably related to the local business structure in Northern Jutland which was characterized by several maritime service companies – shipyards in Frederikshavn and Skagen and engine factories in Frederikshavn and Hirtshals. The lower reemployment rate among workers with further education is probably caused by a relatively limited public sector and few service jobs in the area compared to larger cities.

In order to evaluate to what extent the competences from Danyard could be used in other parts of the Danish business community the level of additional training among the 884 reemployed workers has been examined. A low level of additional training suggests that the competences could be used in other parts of the Danish business community whereas a high level of reeducation suggests a lower demand for the know-how gathered among the workers. From table 3 it appears that only 5,4% of the reemployed workers had been reeducated. In the IDA-database, however it is only possible to identify changes in the “highest level of education”. This means that a worker who received a truck-certificate or person who has taken a lower degree than his/her highest level of

Table 6: Rate of reeducation among reemployed Danyard workers divided by age	
	Danyard
Employed workers by November 2003	884
Reeducated workers aged...	31.6 %
... under 26 years	3.5 %
... 26-40 years	1 %
... 40-55 years	0 %
... over 56 years	31.6 %
Average for the shipyard	5,40 %
Source: Statistics Denmark, the IDA-database	

education won't appear in the data. The actual level of additional training is thus probably somewhat higher than the 5% shown in table 3. Even when this is taken into account the level of retraining is extremely low which suggests that the competences could be used directly in other parts of the Danish business sector.

Table 6 shows that it was almost exclusively workers under 26 years of age which were reeducated. This seems reasonable and corresponds well to studies of shipyard closures in Nakskov, Aalborg and Copenhagen.⁴⁹ However table 4 shows that the workers aged 26 to 55 had exactly the same reemployment rate as the workers below 26 years of age – even if this group received very little or no additional training. This further indicates that additional training was of minor importance.

Table 7: Types of reeducation after three years		
		Danyard
From	To	
Unskilled worker	Skilled worker	49,0 %
Skilled worker	further (non-academic) education	29,8 %
Other types of re-education		21,3 %
Total		100,1 %
Source: Statistics Denmark, the IDA-database		
Note1: Unskilled workers are persons with elementary school or high school as their highest level of education		
Note2: The term “further education” refers to the Danish “kort eller mellemlang videregående uddannelse”. It includes non-academic degrees of 2-4 years. Nurses, teachers etc. are included in this group.		

reeducation, table 7 shows that app. 50% of the reeducated workers were unskilled workers taking some kind of vocational education while 30% were skilled workers taking a further non-academic education of 2-4 years. No Danyard workers took a higher education. It is, however, important to keep in mind that this group only includes 5,4% of the reemployed Danyard workers. Most Danyard employees were, thus, able to move directly to a new job without additional training.

When examining the mobility of the 884 reemployed Danyard workers, table 3 shows that 8,8% moved to another municipality in order to find new jobs. This is a remarkably low mobility compared with other Danish shipyard closures where between 12% and 20% of the reemployed workers moved municipality in order to find a job.⁵⁰ The low rate of mobility among the

When examining the type of

reemployed Danyard workers suggests that their competences could be used in the local and regional business community. It is necessary to keep in mind that only app. 50% of the Danyard workers actually lived in Frederikshavn so the competences didn't necessarily stay in Frederikshavn. It seems reasonable, however, that many found new jobs at the remaining shipyards and engine factories in the region or in the new companies which emerged in FME.⁵¹

Finally table 3 shows a relatively high dispersion of the former Danyard workers. By November 2003 only 23% of the 884 Danyard workers had jobs in the five companies that hired the most Danyard employees. This is a much higher level of dispersion than was seen on the Danish shipyard closures in the 1980's. At the closures of the shipyards in Aalborg and Nakskov app. 30-40% of the workers were re-employed in the top-five companies. The Aalborg closure saw several

Table 8: Migration of Danyard workers to other sectors in percentage (November 2003)	
Population	884
Primary Sector	1,9 %
Manufacturing of...	
... food and textiles	5,8 %
... wood and paper	0,7 %
... chemistry and plastics	1,9 %
... iron, steel and machinery	19,2 %
... electronics	6,0 %
... transport (incl. shipbuilding)	17,7 %
Manufacturing	51,2 %
Supply	0,1 %
Construction	15,8 %
Trade, hotels and restaurants	5,4 %
Transport	4,1 %
Business service	8,6 %
Public	8,6 %
Other service activities	4,2 %
Service	46,8 %
Total	100 %
Source: Statistics Denmark, the IDA-database	

large spin-offs which secured new jobs for many of the shipyard workers and in Nakskov there were only few companies left in the region to pick up the workers. This explains the low level of dispersion in the two cases.⁵² In Frederikshavn the spin-offs were few and small and the regional business structure characterized by many small and medium sized companies. This caused a much larger dispersion of the former employees. The geographical dispersion might, however, be lower than the number indicates. It seems very likely that the Danyard employees were scattered among the many smaller companies that were established in FME after the closure. So even though only 23% were employed in top-five companies the number employed in the FME-area is probably much higher.

In order to examine how the competences from Danyard were used it has been examined in which sectors the 884 Danyard workers were reemployed by November 2003. From table 8 it appears that app. 51% of the workers continued in manufacturing. The workers mainly went to neighboring sectors like manufacturing of

iron and machinery (19,2%) or shipbuilding (17,7%). This was probably the result of a regional business structure characterized by many maritime manufacturing and service companies. Many workers continued in shipbuilding at the remaining shipyards in the region – primarily at the neighboring Ørskov Christensen's Stålskibsværft – and others probably went to the engine factories in the region – Alpha Diesel in Frederikshavn and Wärtsilä in Hirtshals. Furthermore many found jobs in the new companies that were established in FME.

Table 8 also shows that app. 47% went to the service sector – mainly to construction (16%). This group included painters, carpenters and electricians but probably also many unskilled workers. Furthermore many former Danyard workers – namely electricians – were hired by KK-Electronic and SEMCO Marine which moved into the business park in 1999. In the database these companies

would most likely appear under “construction” even though they were actually engaged in maritime service activities.

Finally the table shows that only very few (1,9%) went to the primary sector. The number might, however, be much larger. The 884 workers only include those who have found jobs in Denmark. With its close vicinity to Norway it seems reasonable to suggest that many would seek jobs in the expanding Norwegian oil industry. These workers would, however, not show in the database as IDA only covers the Danish labour market.

The relatively high level of reemployment combined with a low level of additional training and migration to neighboring sectors suggests that the competences from Danyard were actually widely used in other parts of the Danish business community. The low level of mobility among the reemployed workers further indicates that the competences were mainly used locally and regionally. This is probably the result of a regional business structure that matched the shipyard workers competences well.

Conclusion

The past 60 years has seen an increasing dislocation of industrial production from the western world to low cost countries. The decline of European shipbuilding is in many ways a key example of this development. In contrast to most existing literature on the decline of European shipbuilding this article has examined what happened after the closure. The analysis has shown that a shipyard closure didn't necessarily lead to a loss of workplaces. Instead it forced the local companies to rethink their business strategies and use their competences in new ways.

When Danyard began to experience problems in the mid-1990's the owner, J. Lauritzen Holding, made several attempts to sell the shipyard. This strategy was given up in October 1998. Instead a plan was developed for the continuation of the viable activities and for the establishment of a new business park in the area. In the meantime the heavy losses of more than 2 billion DDK were covered by the parent company in order to secure a controlled shutdown.

In December 1999 the unprofitable activities at Danyard were finally shut down. The viable activities – the pipe factory, the GRP-factory and the design and engineering activities – were sold in a management buyout and continued after the closure. Even the shipbuilding activities were continued on the Danyard site by the neighboring Ørskov Christensen's Stålskibsværft. The closures of B&W Shipyard in 1980 and Aalborg Shipyard in 1987 saw many large spin-offs which continued divisions like the engine factory at B&W or the boilers division in Aalborg. These spin-offs created several thousand jobs for the former shipyard employees.⁵³ At the Danyard closure, however, only few jobs were continued in the spin-offs. Instead the establishment of Frederikshavn Maritime Erhvervspark paved the way for entrepreneurs who wanted to use the competences at the shipyard in new ways. After the closure a vast pool of know-how on shipbuilding and maritime activities was easily accessible in the area and the business park limited the need for investments in fixed assets for companies which established themselves on the Danyard site. In the following years the establishment of several companies engaged in maritime service activities helped to create a business environment with good conditions for knowhow transfer and cooperation in the area.

The former Danyard owner, J. Lauritzen Holding, has played an important role in this development. Even though the Lauritzen Group refused to engage in the continuation of activities from the shipyard its investments in FME were decisive for the development of the business park.

Since the late 1990's the activities at the Danyard area have seen a gradual change from manufacturing activities to maritime service activities. In 2011 app. 1,000 jobs had been created at the former shipyard site. Approximately the same number of employees worked at the shipyard in

the 1970's and early 1980's. This article has shown that the closure of Danyard Frederikshavn wasn't just a closure but a transformation to new and more viable activities. This brings a new perspective in a time where the loss of Danish manufacturing jobs is more relevant than ever.

Sources and literature

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The various sources from Danyard Frederikshavn – board minutes, internal notes etc. – are found at the Danyard archive in Frederikshavn Maritime Erhvervspark in Frederikshavn.

The statistics on workforce movements have been found in the IDA-database provided by Statistics Denmark.

Interviews:

Kaj Christiansen: CFO at Danyard Frederikshavn from 1997 to 2000 and from 2000 until present was CEO in Frederikshavn Maritime Erhvervspark.

Torben Erikstrup: CEO at Danyard from 1997 to 2000.

Bent Østergaard: CFO in JLH from 1993 to 1996; CEO in JLH from 1996 until present and vice-president in the Danyard board from 1996 to 2000.

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² Stopford, 2009, p. 615-626; Bruno & Tenold, 2011, p. 8-9; Jonsson, 1996, p. 26-30, 60, 77-86, 96 & 122; Amsden, 1989, p. 269-277; Poulsen & Sornn-Friese, 2011, p. 561-2

³ The B&W was reconstructed in 1981 under the name B&W Shipyard which continued shipbuilding activities on Refshaleøen in Copenhagen until the final closure in 1996.

⁴ Jeppesen, 2001, p. 43-48; Kamedula, 1987A; Søndergaard, 2007; Olesen, 2012a, p. 4

⁵ For the only exceptions see: Olesen, 2012a; Olesen, 2012b; Storrie, 1996; Andersen, 1996; Storrie and Andersen, 1996

⁶ Zeuthen (et. al.), 1990, p. 4

⁷ Danyard Frederikshavn and Aalborg Værft were both owned by the Danish shipping company J. Lauritzen. The merger in 1987 was decided after Aalborg Værft ran into economic problems in the mid 1980s. The merger didn't, however, solve the problems and in March 1988 the steel shipyard in Aalborg was finally shut down. The spin-off company, Danyard Aalborg, continued shipbuilding in GRP (Glass Reinforced Plastics) for the Danish Navy during the 1990s. See Olesen, 2012a, p. 145-149 & 165-168; Nielsen, 2012, p. 249-61

⁸ Olesen, 2012a, p. 214-216

⁹ Ibid.

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²³ Letter from Ove Sørensen (Danyard) to Mogens Filtenborg (Vestas) dated 18/3 1999; Fax from Frederikshavn Kommune to CFO Kaj Christiansen dated 8/2 1999; *Status på salgsaktiviteter*, internal note from Danyard dated 12/2 1999; *Internt mødereferat fra møde med kommunen*, internal note from Danyard dated 26/1 1999; *Børsen*: "Danyard vil bygge vindmøller (Uffe Hansen & Niels H. Carstensen)" 19/3 1999; *Børsen*: "Vi kan ikke bruge værfter (Bjarne Bang)" 14/4 1999

²⁴ Board minutes from Danyard 24/9 1998 and 29/10 1998

²⁵ Board minutes from Danyard 19/11 1998 and 11/3 1999; *Beretning til statsrevisorerne om LD's engagement i Aarhus Flydedok A/S*, RB C101/00, February 2000, p. 11-12

²⁶ Board minutes from Danyard 11/3 1999 and 30/11 1999; *FME: Prognoser 1999-2003*, internal Danyard note dated 3/6 1999; Directors reports for board meeting at Danyard 11/3 1999 and 8/6 1999; Interview with CFO Kaj Christiansen; *Nordjyske*: "Reparationsværft er kommet godt fra start (Hanne Albæk) 2/4 2004; <http://www.orskov.dk/>

²⁷ Board minutes from Danyard 19/2 1999, 11/3 1999 and 22/4 1999; Letter from Frederikshavn Harbour Council to the Danyard management dated 13/4 1999; *Status på udlejningsaktiviteter*, internal note from CFO Kaj Christiansen to the Danyard board dated 15/4 1999; *Prognoser 1999-2003*, internal Danyard note dated 3/6 1999; Letter from JLH to the Danyard board dated 15/10 1999

²⁸ "Danyard Pipe A/S, Danyard Engineering A/S" in: *Yarden*, nr. 8, 2/11 1999

²⁹ Board minutes from Danyard 19/11 1998; Interview with Danyard CFO Kaj Christiansen

³⁰ Interview with Danyard CFO Kaj Christiansen; *Nordjyske*: "Ny konstruktion (Hanne Albæk)" 7/12 1999; *Nordjyske*: "Sjovere at bygge op (Hanne Albæk)" 11/12 1999; "Danyard Pipe A/S, Danyard Engineering A/S" in: *Yarden*, nr. 8, 2/11 1999

³¹ *Nordjyske*: "Gennembrud for Danyard Pipe (Hanne Albæk)" 29/7 2000; *Nordjyske*: Kølefirma har købt Danyard Pipe (Hanne Albæk)" 13/11 2005; *Medarbejdere på FME området*, internal note from FME dated april 2011; <http://www.victor-as.dk/Rørsystemer.asp>

³² Board minutes and Directors report from Danyard board meeting 11/3 1999; Interview with Danyard CFO Kaj Christiansen

³³ *Erhvervsbladet*: "Maritim specialist vil nu også på land (Johnny Carstensen) 27/8 2002; *Nordjyske*: Ingeniørfirma er klemte (Hanne Albæk) 7/4 2003; *Børsen*: "Danyard lukker ingeniørselskab (Niels Carstensen)" 22/9 2003

³⁴ Press release from Danyard Holding 27/3 2000; Olesen, 2012a, p. 246

³⁵ Press release from Danyard Aalborg 9/8 2000: *Danyard Aalborg og Royal Denship indgår ny kontrakt om motoryacht*; *Børsen*: "Han tror på Danyard (Niels Carstensen)" 12/4 2000

³⁶ *Børsen*: "Luksusbåde koster Danyard (Niels Carstensen)" 21/6 2001; *Børsen*: "Danyard på vej (Niels Carstensen)" 25/6 2002; *Nordjyske*: "Sidste ud kald (Peter Brock)" 29/1 2004; *Nordjyske*: "Danyards fremtid (Peter Brock)" 12/3 2005; Interview with Danyard CFO Kaj Christiansen

³⁷ Board minutes and directors report from Danyard board meeting 30/11 1999; Christensen, 2010, p. 278-287; interviews with JLH CEO Bent Østergaard and Danyard CFO Kaj Christiansen

³⁸ Interview with Danyard CFO Kaj Christiansen; <http://www.scanel.dk/competences>

³⁹ <http://www.chconsult.dk/References.html>; *Medarbejdere på FME området 2000-2011*, internal note from FME in April 2011; Interview with Danyard CFO Kaj Christiansen; <http://www.vms.dk/>

⁴⁰ *Medarbejdere på FME området 2000-2011*, internal note from FME in April 2011

⁴¹ VICTOR: app. 70 employees, CH Marine Consult: app. 10 employees and FME: app. 10 employees. App. 230 workers are employed at ORSKOV

⁴² *Medarbejdere på FME området 2000-2011*, internal note from FME in April 2011; Interview with Danyard CFO Kaj Christiansen; Christensen, 2010, p. 283-287; *Nordjyske*: "Ingeniørfirma holder værftsbyen i hævd (Hanne Albæk) 26/6 2008; Olesen, 2012a, p. 249

⁴³ This part of the article wouldn't have been possible without invaluable help from assistant professor, PhD, Jacob Rubæk Holm from Department of Business and Management at Aalborg University who has extracted the data from the IDA-database.

⁴⁴ Storrie, 1996, p. 195-201; Andersen 1996, p. 182

⁴⁵ Olesen, 2012a, p. 278

⁴⁶ Interview with Danyard CFO Kaj Christiansen

⁴⁷ Olesen, 2012a, p. 285

⁴⁸ Olesen, 2012a, p. 287

⁴⁹ Olesen, 2012a, p. 288

⁵⁰ Olesen, 2012a, p. 278

⁵¹ Interview with Danyard CFO Kaj Christiansen

⁵² Olesen, 2012a, p. 278-282

⁵³ At the closure of Aalborg Værft in 1987 the spin-off activities secured app. 2,000 new workplaces. At the closure of B&W in 1980 most of the workers continued directly over in the spin-off activities which led to a minimal loss of workplaces. Olesen, 2012a, p. 180 & 294