

## 4 A digitalisation journey!

*“The decentralised decision making in Danfoss need not only be negative. Look at it in this way: it may take a long time before a case is put on the agenda, but the decentralised decision making also means that once the case is on the agenda and provides business value, it will be prioritised, and actions will be taken promptly!”*

- Marketing director

*“We are scared stiff of that kind of that type of cross-organisational projects, but after all, a few times, we have succeeded in getting them to work (...) but it always boils down to budget thinking: “Are we paying too much? Who benefits the most? Just like in the public sector.”*

- Marketing Specialist

The general requirements of the narratives are an understanding of Danfoss and its historical context. The purpose is to gain insight into the factors which define the context in which the narratives take place, and this justifies a study of the process in the first place. The digital journey lasted from 2003 to late 2006, and the pivotal point was digitalisation of relations among industrial enterprises. The story began in 2003 when I was employed as a business Ph.D student with Danfoss. At that point in time, the Internet bubble had just burst, the American technology exchange NASDAQ had plummeted, and there were daily accounts of dot.com businesses which had been forced to close down due to inadequate performance and related problems, including inability to secure further capital from the stock market. Many people – both within Danfoss and in other businesses – were wondering about which role digital technology would play in the subsequent development of their business. Would it only be companies such as Dell who could be successful in utilising this technology, or was it possible for a Danish industrial giant that sells products cast and moulded in iron and copper to be successful in applying the digital technology?

Historically speaking Danfoss embarked on a digitalisation project headed by IBM. Although the project has been crucial in terms of defining the digital challenge Danfoss faced at that time, there were not many employees who remember this project, and fewer are able to identify specific tools and applications that came out of this digitalisation initiative. As will be seen later, there is no doubt, however, that the project was important for understanding the digitalisation initiatives that Danfoss needed to implement internally. The IBM project was especially important in documenting the lack of digital infrastructure, including the inadequate data foundation which the company had around the turn of the millennium. Nevertheless, many of the customer-related digital endeavours which the project encouraged did not materialise.

The above situation, which holds a lot of questions but few answers, is the point of departure of the story. During the digitalisation journey we are going to see how the employees of Danfoss, for three years, were struggling with digitalising the customer related processes. Despite problems encountered, the different perceptions and agendas, the company achieved some

results by early 2006. Now there were homepages in 30 different countries of which the vast majority were in local languages, and these had been visited by more than 236,000 people<sup>1</sup> from 1<sup>st</sup> July to 15 August. Germany, Denmark, the USA, Russia, Poland, and China, respectively, were the countries with most visitors.

Besides the homepages the company has a well-functioning digital commercial platform called DeCom, several successful connections to e-marketplaces, several somewhat old EDI connections, and the first set of Internet-based integration projects with customers have also been implemented. The integration projects ensured a frictionless flow of information between the companies. E-marketplaces, DeCom and integration between companies will be discussed later in the story.

The succeeding sections will provide an in-depth treatment of how these competences have arisen, and how the digitalisation process has been handled at Danfoss. To start with, though, I will outline Danfoss' history in the 70 (or more) years the company has existed. The primary focus will be on how the company has developed from a small and medium-sized innovative, opportunity-driven enterprise to a global, decentralised and management-oriented company.

#### **4.1 A global enterprise emerges on the outskirts of Jutland, Denmark**

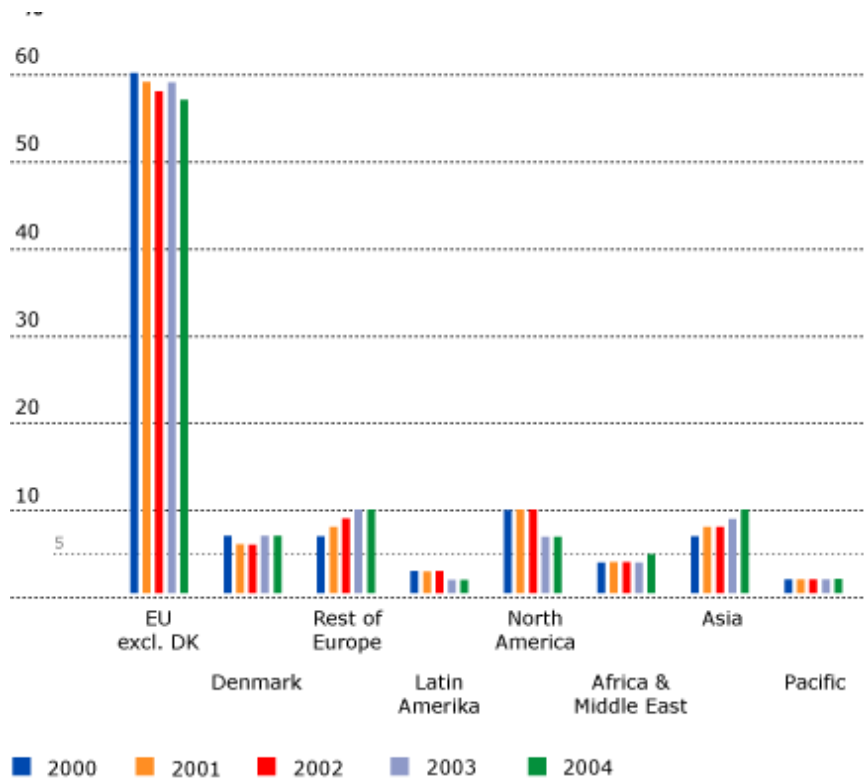
Since its establishment in 1933, Danfoss has found itself among the most successful Danish manufacturing businesses. Danfoss is the story about a Danish, global enterprise which began in a modest attic at Mads Clausen's native farm on Als. Here Mads Clausen had his bed and his workplace. He fitted valves and pressure tested them in a bowl of water in the middle of the attic. The fascination with the contrasts can be detected as early as in the 1950's by newspaper headlines such as "*Industrial tycoon in the small attic*", "*Global company from a plough field on Als*", and "*Mads' patent started a million-kroner enterprise in Dad's hen house*"<sup>2</sup> (Hansen, 1994). Throughout its existence the company has generated a profit, and today Danfoss is one of Denmark's biggest industrial companies with a turnover of more than DKK16bn in 2005. In 2005 the enterprise employs app. 18,000 employees, of which 6,000 are working in Denmark and another 8,000 in the rest of Europe ([www.danfoss.com](http://www.danfoss.com)). The fact that more than 2/3 of the employees are in Europe also reflects the company's position on the world market. As can be seen from Figure 6 (next page) more than 50% of the turnover is derived from countries in the EU, which is also designated *our domestic market*' by Danfoss employees. In 2005 Danfoss made 65% of its turnover in Europe. (*Jyllands-Posten*, 7 March, 2006:4).

Figure 6 – Distribution of turnover in Danfoss

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<sup>1</sup> All data relating to the homepage derive from WebTrends which is the tool Danfoss uses to generate statistics on the visitors to the homepage. These data were supplemented by a study Espace undertook from 14<sup>th</sup> December 2005 to 10 January 2006. The study was based on 657 responses regarding how they perceived the homepage.

<sup>2</sup> Actually, it is a myth that Danfoss was started in a hen house. The legend has most likely come about because the first factory buildings that Mads Clausen constructed were placed in his mother's vegetable garden, and as time went by the buildings took up all the space in the vegetable garden, and the production had to be moved.



Kilde: <http://www.danfoss.com/AboutUs/FactsAndFigures/InfoKit/>

In the perpetual search for growth Danfoss has increased its focus on China and other Asian countries, which the management believes will constitute the company's 'second' domestic market in the future. In an article in *Mckinsey Quarterly* 2006, Jørgen M. Clausen explains how in the mid-1990's Danfoss embarked on its initiatives in China. He remarks that in the beginning there were no actual long-term strategies for the activities. Gradually, as China and major parts of Asia have become more and more important for Danfoss, a whole range of initiatives have been launched to turn China into Danfoss' second domestic market. To pursue this goal Danfoss expects to make a couple of significant purchases in China. (*Berlingske Tidende*, 17 November 2005:6).

Today (2006) Danfoss is represented internationally by 53 factories in 21 countries, and 10 sales companies, traders, and distributors placed across the world. The international foundation forms the basis of a further expansion through organic growth and more acquisitions of companies, which altogether are expected to produce a turnover of no less that DKK24bn by 2008 (*Jyllands-Posten*, 5 March 2006, *erhvervsmagasinet*:4).

#### 4.1.1 The company's origin and fundamental strategy

The origin of Danfoss goes back to 1933, the year in which Mads Clausen returns to the place he was born and sets up his own business which he named DANSK KØLEAUTOMATIK- OG APPARAT-FABRIK. In the first year the turnover was DKK12,681.67. During that year Danfoss exported products to Sweden and Belgium. This was the beginning of a rapid internationalisation, and only 17 years later, by 1950, Danfoss was exporting to 22 countries. In line with the growing internationalisation Danfoss developed more new products and product variations, which – together with the existing product programme – turned out to be a strong basis for the company. The continued success achieved by Danfoss was described as follows in a case description by Iversen & Christensen (1999):

*'Its ability to identify and exploit new market opportunities through the innovative application and combination of different assets in the corporate technology base and through the ability (and luck) to build new technological capabilities that mesh well with the existing ones and provide new commercial opportunities.'* (Iversen & Christensen, 1999).

The overall strategy in the first 30 years or so of the existence of the company was one of organic growth through internationalisation which provided the opportunity for mass production of products developed by Danfoss along with product variations. The most appropriate term for the strategy pursued in this early period was probably 'budding', where one thing led to the other. A few branches have been cut away, but most of them were allowed to grow, in one form or the other (Hansen, 1994). Over the years acquisitions have become a supplementary strategy, and thus acquisitions of companies have increasingly become important for the company. In the 1980's and 1990's this strategy accelerated, and from 1990 to 1999 another 27 companies were purchased (*Børsen*, 18 January 1999:6). Today acquisitions are also a central activity which will continue to be pursued according to the top executives of Danfoss, in 2006 alone it has so far bought up 6 companies, including one of the biggest ever in the company's history, namely *American Scroll Technologies* (Danfoss.com/nyheder).

Generally, most acquisitions have been made to ensure and strengthen the existing market position and not to gain access to critical research and developmental competences (Iversen & Christensen, 1999). In its accounts from 1992 Danfoss wrote that the overall strategy concerning acquisitions of European companies was to localise companies with products that complemented the product programme of Danfoss, and which could be marketed through its existing sales companies. The objective of the acquisitions outside Europe was to increase product capacity and create credibility in relation to local partners (*Annual Report 1992*).

Whether the issue is acquired or self-developed products the objective remains the same: to function as a sub-supplier. Thus Danfoss has never manufactured a finished refrigerator, and today - as always - the company virtually functions as a traditional supplier of components, although it is highly automated. But the most recent acquisitions of companies, especially in the Heating Division, have begun to paint a slightly different picture, because these are acquired companies that manufacture ready-made systems to e.g. heating plants. But on the whole, Danfoss is primarily a supplier of components.

#### **4.1.2 From an entrepreneurial organisation to a decentralised global company**

Until 1956, Danfoss was an entrepreneurial organisation strongly influenced by its founder Mads Clausen. The company had an informal but centralised management style as Mads Clausen wanted to be part of all decision making. This resulted in too many decisions being made by the top executives of the organisation (Hansen, 1994). The first formal management team with individual areas of responsibility was set up in 1956 as recommended by the American consultancy *Yulke* (Hansen, 1994). In 1961, Danfoss was incorporated as a limited company.

Through the 1960s and until the death of Mads Clausen in 1966 the company pursued a growth strategy which meant that the company underwent massive growth. In the 1960's, due to its huge stocks the company encountered liquidity problems which almost cost the company its life. This

had the effect that the growth strategy was replaced with a consolidation strategy which entailed that the business responsibility was moved downwards in the organisation. After the death of Mads Clausen in 1966, his wife Bitten Clausen was appointed chairperson of the board of Danfoss, and the former finance manager Andreas Jepsen became the managing director. In the ensuing years, expansion continued with sales to several countries and a further expansion of the product line. By 1970s, there were more than 300 different products. This fact, combined with the number of markets Danfoss served, created administrative problems and a corresponding huge workload. This situation gave way to discussions of how the decision-making processes could be simplified.

In the late 1960's, the top executives of the company began working on plans that meant that the organisation would be split up in six divisions reflecting the six largest product groups. The plan was evaluated by McKinsey & Company in 1971 which recommended the formation of three product groups and a sales group in addition to the management of the Danfoss Group. The new structure was implemented in 1971 and brought about an overall organisation comprising five main areas: Group Management, the Compressor Group, the Automatic Controls Group, the Oil Group, and the Sales Group.

The reorganisation meant that the product groups were to handle their own development, sales and book-keeping functions which should increase their operational independence. However, production and purchasing were shared by the three product groups. The advantages of this reorganisation were – according to the consultants – that the operational decision-making processes would be faster, and strategic planning would improve, as the top executives would no longer deal with operational tasks. At the same time, these measures were to facilitate recruiting competent management staff for the company.

The plans had an implicit assumption that the number of product groups would grow so as to keep pace with new product areas, or the expansion of existing product groups. Especially the Automatic Controls Group, which was the group with the biggest diversity in the beginning, witnessed significant changes when the individual product units that made up the product group grew so big that they evolved into independent product groups.

#### 4.1.3 Delegated Business Responsibility – the new mantra

In the mid- and late 1980's it became evident to the top executives that the organisation was caught between a centralised structure representing the old Danfoss organisation, and a decentralised structure of divisions, caused by the expansion into new product groups and the desire for increased decision making. The McKinsey & Company was summoned once more in 1988 to examine the organisation of the company, and provide recommendations for a new reorganisation.

Following their recommendations, functions within the central purchasing unit was divided among the different product groups and they individually became responsible for their own purchases. The production of components that hitherto had been handled collectively was divided, and control and economic responsibility were delegated to the product groups that had most in common with the different production companies. Parts of the production (plastics, electronics, etc) remained in a common production company as these supplied all the product groups of Danfoss. The decentralisation meant that the principle of Delegated Business Responsibility (DBR) was introduced. This principle meant that all product lines and subsidiaries were to act as independent units which settled at market prices when they traded with each other (Hansen, 1994). It also meant

that individual units could obtain their supplies outside the Danfoss group if this proved more advantageous. A direct result of the recommendations from the consultants the sales companies became autonomous profit centres, and in special cases they were allowed to sell products from other manufacturers than Danfoss. In terms of structure, the sales organisation was divided into two sales divisions which were in charge of separate geographical regions. These changes were the first steps towards an 'internal market' organisation where a fee was to be paid between the different organisations when services were required. In the beginning of the 1990's the concept of business unit was changed into division. At this point Danfoss already had ten divisions, as seven new ones had been added to the three original ones. These 10 divisions correspond to business units later on in the digitalisation journey.

#### **4.1.4 The most recent reorganisation**

The big reorganisation in 1996 was the latest major reorganisation Danfoss undertook. This reorganisation meant that the 10 divisions were combined in three *product families* Refrigeration Controls (RC, later changed into RA) consisting of the divisions of Air Conditioning, Automatic Controls, Compressors. Heating Controls (HE) consisting of the divisions Automatic Control for Buildings, Burner Components, Comfort, Industrial Instrumentalisation and Water. Motion Controls (MC) consisting of the divisions Mobile Hydraulic and Transmission Technology / Engineering. Add to these the two Sales Divisions (Northern and Central Europe) and (UK, Latin Europe & Overseas) and the four group functions of Coordination, Central Production & Service, Economy and Planning, Technology & Research.

It is important to note that on the product family level (MC, HE, and RA) RA is distinctively the only product family which operated with common support staff that catered for the different business units in the product family. MC and HE were thus product families which were exclusively made up by a number of autonomous business units, each with its own organisation. RA was thus the only product family with common organisations and at this point (i.e. end of 1990's) the product family had a mutual research and development organisation. In the succeeding years, a number of mutual units emerged from the product family. As a result there are, today, common organisations in the following areas: marketing, logistics, technical service, 'claim handling' and sales. The two other product families, to a wide extent, operated as a conglomerate of autonomous companies that had been gathered into product families without common support units. Thus each business unit in HE and MC had their own organisations, which handled tasks such as marketing, research, development, etc. The three divisions were, however, similar in the sense that the business units had their independent organisational and financial responsibilities.

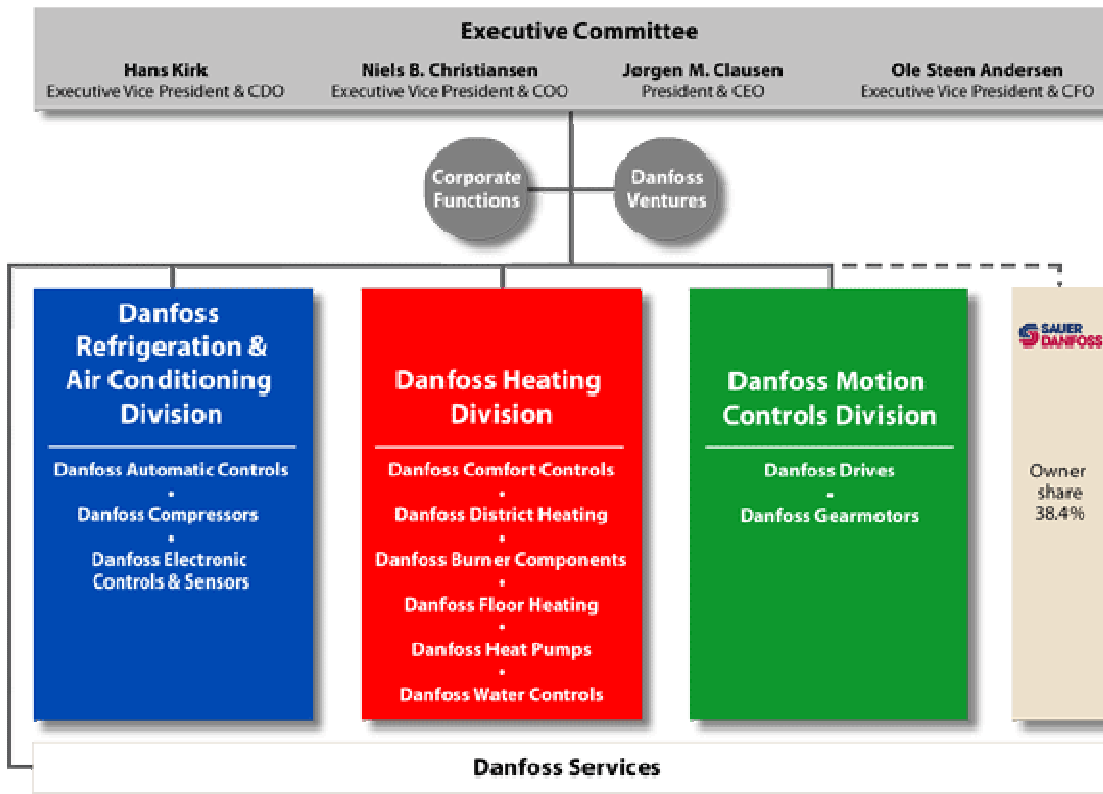
The organisations that were common for the new product families were also reorganised. The common research and development organisation was closed and placed in other parts of the organisation. This reorganisation was to give the three new product families the responsibility for their own research and development. New common organisations were set up, one of them was a unit for information technology (IT).

The biggest change was that the sales organisation was divided so that the three product families were given ownership of and financial responsibility for their own part of the sales organisation. This meant that the sales companies were split up and divided between each of the three product families so that each product family had its own sales force in the various countries. In Denmark, for instance, there was a group of salesmen who belonged to MC, and similarly there were groups

that fell under RA and HE. If customers wanted to buy products from more than one product family, it meant that they would be in contact with different salespeople who did not automatically have knowledge about the activities of the other salespeople. The sales office of the three divisions was – with some exceptions – placed at the same location in the various countries. Thus, Hasselager near Århus housed the Danish sales organisation of all three product families. Later, the ten product families were replaced by segments, and today (2006) the applied terminology is divisions containing a number of Business Units. These business units are thus the 10 former divisions. When I use the concept of division (RA, MC, HE) it relates to the product families and the designation of business units relates to the business units that were merged and thus make up the individual divisions.

At the beginning of the narrative in early 2003 Danfoss is organised as shown in Figure 7 below. Danfoss consisted of three divisions plus SauerDanfoss (which was created from a merger between Danfoss Mobilhydraulik A/S and Sauer Sundstrand Inc. in May 2000). Danfoss owns a share of 38.5% of this company, which is not part of the digitalisation journey).

Figure 7 – Danfoss organisational diagram in 2006



As can be seen from Figure 7 the company is today made up of three autonomous divisions: Heating (HE), Refrigeration & Air Conditioning (RA), and Motion Controls (MC). At the top of the organisation we find the Executive Committee (EC), which constitutes the top management of Danfoss. Under the Executive Committee there are two staff functions Danfoss Ventures (DV) and Corporate Functions (CF). DV is defined by the cross-cutting venture activities Danfoss is involved in. The development of new products thus takes place within the individual divisions and in DV. CF

functions as consultants for the Executive Committee and the Division Management. CF consists of Human Resources, Communications & Reputation Management, Finance & Treasury, Merger, Acquisition & Legal, and Accounting & Control

Danfoss Services (DS) is an internal service organisation providing services ranging from maintenance of buildings to canteen arrangements, IT, etc within the organisation. DS is divided into three units, Industrial Service, Danfoss Distribution, and European Interservices, Danfoss IT was separated from DS in the beginning of 2003, and today it operates as an independent unit within Danfoss.

#### **4.1.5 Is the company *one* company?**

Danfoss has thus, during a period of several years, worked on decentralising the decision-making process and structure in such a way that the entrepreneurial company - managed by the top executives - that Mads Clausen left behind has been reorganised and managed through 'Delegated Business Responsibility'.

This means that an organisation has been created in which many of the employees have their own small accounts to operate with. Consequently they are empowered to determine how and when they want things to be handled, which elements they are to invest in, and which are to be prioritised. The essential criterion for measuring the success of the organisation is the ability to live up to a specifically defined yield, measured as RONA<sup>3</sup> and EBIT<sup>4</sup>. This means that RONA and EBIT are calculated in terms of each business unit, and are cumulatively built up to the divisional level. This strong type of economic management has many advantages, and one of its consequences is that decisions which make sense in the local area of the company (in a business unit or division) are executed immediately and without much talk or bureaucracy. In contrast, where an investment does not immediately seem warranted locally or is found to generate less value to specific local units / divisions, there would be difficulties in its implementation, although it may be crucial from a corporate viewpoint. In addition, substantial investments can rarely be justified in terms of one business unit or division, as it typically will have an adverse affect on the RONA or EBIT in a given year.

A Vice President from Danfoss describes Danfoss in the following:

[Question:] *'How would you describe Danfoss?'*

Vice President: *'It is not one company. I usually describe Danfoss as a federation of companies.'*

It is interesting that this Vice President uses 'federation' as a metaphor for the way the company is managed and described. The concept of federation and the states belonging to it is a terminology that is often used by the staff at Danfoss, and which can be seen in articles describing the company (*Børsen*, 29 October 2000:6/7). A federation is defined in the following way by *Wikipedia, the Free Encyclopedia*:

"Federation (from Latin *fædus*, 'covenant') is a state comprised of a number of self-governing regions (often themselves referred to as 'states') united by

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<sup>3</sup> Return On Net Asset is an internationally recognised definition of a company's profitability

<sup>4</sup> Earnings Before Interest and Tax are closely associated with profit in relation to the daily running prior to interests and tax.

a central ('federal') government. In a federation, the self-governing status of the component states, are typically constitutionally entrenched and may not be altered by a unilateral decision of the central government.” ([www.wikipedia.org/wiki/Federation](http://www.wikipedia.org/wiki/Federation)).

The definition aptly describes the situation at Danfoss, and the type of management that the company has adapted to since the late 1950's. Through a number of decisions and reorganisations the organisation has moved towards a number of self-governing business units (states) united under a central management organ (Executive Committee). The overall management organ can chart out the general guidelines or topics that need focus, but the daily operational decisions are left to the self-governing divisions and business units. One of the ways in which EC launches different new initiatives in the divisions is by focusing on different issues within the annual perspectives. Examples of such focus areas are: How are core competences created and exploited? Where in the company can the flow of money be improved, or how is the Internet used optimally?

The perspectives are prepared at five-year intervals and are revised every third year. Thus these contain three-year plans and strategies for each division, and they are prepared on the basis of a standardised format created by McKinsey & Company. The format builds on a 17-page report which each of the three divisions can use to describe the plans and strategies that are to be pursued in a given period. In the daily operations the Executive Committee has the possibility of suggesting different projects to the divisional management, but the divisions are not forced to accept the projects (Iversen & Christensen, 1999). This is also in line with the organisational style of a federation. It should be noted, though, that at the end of the day, the Clausen family has full ownership and control of the company – through the Foundation Bitten and Mads Clausens Fond.

From the end of the 1990's and up to the beginning of the new millennium Danfoss was therefore organised and managed on the basis of a federal idea, and responsibility was to a wide extent decentralised, and an internal market had been established. This means, for instance, that the IT organisation or the internal advertising agency, in principle, sells its services to the rest of the organisation on market terms, and that, in principle, they cannot act without having a sponsor from the business supporting them. Tasks or projects which, for various reasons, have immediate priority (read: projects with a short-term payment period because the investment is of a manageable size, or projects with evident justification, or projects of immense business value due to the customer or competitive situation) are thus embarked upon and completed without problems. In contrast, projects with a longer repayment period, which involve several or all the divisions of Danfoss, experience more difficulties in being launched or implemented, as the investments typically are of a size that cannot be justified on the basis of the local *kings*<sup>5</sup> perspectives. Naturally, this means that there is a tendency of applying short-term perspectives on the projects that are launched, and the overall coordination of the projects that are launched within the different divisions are often rife with problems.

Thus Danfoss is a decentralised and federally organised company with all the advantages and limitations of such an organisation. I will discuss how this organisation influences the digitalisation of sales-related relationships in the succeeding sections.

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<sup>5</sup> The concept of kings is chosen here, as this term is often used by staff at Danfoss. “*There are too many kings*”, or “*We cannot convince all the kings*”, are thus phrases that are often heard within the organisation.

## 4.2 There is no potential in digitalisation - or is there?

*“The meeting (with the customer) was a little more strenuous, they were cross (...), we were informed that they had approached us a long time ago [regarding trade in an e-marketplace], but nothing had happened since then; (the customer) had not received anything, whatsoever. If we did not deliver something at a certain point, we would be sacked as a supplier. Afterwards we could sit back and think about it.”*

- E-business Manager

*“The initial prices are entered, and they are visible to everybody. The different prices can be seen, but one cannot see who is submitting the offers at different prices, and thus one cannot see who is participating in the auction. However, one can guess at who is participating because the refrigeration market is a niche market. After this stage it is like a normal auction where the price is moving downwards.*

- Marketing Director

The historical development of Danfoss has been outlined and the different reorganisations that have led to a company with a decentralised decision-making process have been described. We will now move deeper into the part of the narrative which relates to digitalisation of sales relations. To begin with, there will be a brief introduction into how Danfoss IT (the dedicated IT organisation at Danfoss) works and the cooperation between Danfoss IT and the divisions. After that, I will look at how the business units of the three divisions experienced digitalisation in the early 2003, and which problems they experienced in relation to the digitalisation of customer and supplier relations. Or rather: We shall experience at the problems from the angle of the staff of the divisions, the way they perceived them at this point of time in the narrative.

### 4.2.1 Digitalisation is between two stools

The decentralised responsibility upon which the Danfoss federation is built and organised also influenced the interaction between Danfoss IT and the individual divisions and business units. Briefly, the cooperation between the two parties was perceived as problematic, which understandably did not have a positive effect on the application of digitalisation in the Danfoss federation. But before a more elaborate treatment of this issue, I will provide a short historical development of Danfoss IT.

Danfoss IT has the IT responsibility globally in Danfoss. In recent years this organisation has absorbed more than 50 former local IT departments (*Jyske Vestkysten*, 5 February 2005, *Erhvervsdanmark*:2). Thus the creation of the organisation derives from the centralisation of IT competences where local departments have been closed down and placed under Danfoss IT. This development runs totally counter to the development in the rest of Danfoss which has been through several decentralisation rounds. Danfoss IT has taken over both IT departments in subsidiaries and in the individual business units and divisions. Thus, in 2004, the IT organisation, which had handled most of the Heating Division's IT tasks, was taken over by Danfoss IT. Around the same time a minor IT organisation in Refrigeration & Air Conditioning was also taken over. With few

exceptions the individual divisions and business units have not had their own local IT resources since 2004; instead they have had to meet their IT needs by using Danfoss IT as their supplier. Danfoss IT has thereby gained a global monopoly within IT-related tasks in Danfoss. Danfoss IT is paid through a specifically determined 'seat price', which is a payment made for each employee plus a project payment made each time the divisions and the business units need to carry out projects that contain IT components, be it implementation of a new IT system, development of IT-based application, or another IT component.

In line with the decentralisation processes that the Danfoss federation has gone through, and the introduction of Delegated Business Responsibility thinking, Danfoss IT has been organised as a cost centre. It is to serve the divisions and the individual business units as their customers, and in principle they cannot act unless they have a customer who is willing to pay. That is, Danfoss IT has to invoice man hours, etc, as if Danfoss IT were an external supplier. These working terms have the effect that the rest of the Danfoss organisation perceives the cooperation with Danfoss IT as burdensome and rigid.

[Marketing Director] *"When one asks Danfoss IT about something, then lo and behold, we have to establish a project – we have to join a project group with a steering committee, and before we have even started we are beginning to sweat."*

The employees of Danfoss IT does not consider these structures and terms of operation optimal, but on the other hand, it is how the company has decided to organise and manage the IT tasks within the company. The advantage is naturally that Danfoss IT only acts when there is a customer who is prepared to pay for the services. This means that dubious, often high-cost projects are not launched, unless there is a clear business-related foundation for them. On the other hand, the divisions often perceive Danfoss IT as being far too inflexible and their focus on their pay often obstructs or even kills off the digitalisation projects before they commence. One of the directors explains the situation as follows:

[Director] *"Danfoss IT is so big, that it is almost looked upon as one which comes from the outside, and which has as good as little understanding of our local needs as if it is serving a totally different company, such as Lars Larsen. Danfoss IT operates as if it were a state within the state, and it serves the business as if it were an external company with contracts for this and that, feasibility studies, etc."*

This lack of understanding that the divisions and business units experience in their business relationship with Danfoss IT is a substantial problem. The employees of the divisions and business units say that it is precisely the combination of insight into, and knowledge of, their business that is crucial to understand the issues the business units have, and thereby how the IT solutions can be defined and applied. The lack of understanding is also said to be reflected in the fact that Danfoss IT speaks in language totally incomprehensible to the business units. The business units feel that every time a project is commenced Danfoss IT must acquire new knowledge at the expense of the business units.

[Director] *“It is symptomatic of a professional IT organisation which does not have an insight into a particular business that even its pre- and post analysis is generally as expensive as if we did the job ourselves.”*

That the staff in the business units feel that Danfoss IT does not understand the business units and therefore have to pay dearly every time a project is to be launched, is an impediment for launching new projects. But the perceived inadequate business understanding also adds to the feeling that the divisions and the business units do not feel challenged by Danfoss IT. The staff and the business units do not feel they can use the IT organisation as a sparring partner because Danfoss IT does not understand the issues and their context. In other words, they want a supplier that is pro-active and which presents the IT competences it has so the daily business becomes more efficient, and ultimately the customers will be served in a better way. The employees in the divisions and business units find it difficult to define their own needs with regard to the application of digitalisation-related tools, and they want Danfoss IT to fulfil this role far better than is the case.

In contrast to this perception, the employees of Danfoss IT perceive the divisions and business units as very demanding customers. The reality is that Danfoss IT is organised and run as a cost centre, and for that reason it focuses intensely on the project costs. By far the majority of Danfoss IT's budget is earmarked for maintenance and running of the IT infrastructure at Danfoss. This structure leaves limited resources for a pro-active action towards the divisions and the business units. Danfoss IT typically experiences its involvement in the different projects as occurring far too late in the process, and therefore it feels that it is presented with the IT-related problems long after they should have been solved. This means that Danfoss IT has difficulties planning the future focus areas and thus tries to be ahead of things so that it is prepared when needs arise in the business. Danfoss IT usually wonders why it is often presented with short-term wishes from the business units, and it fails to understand why the divisions and business units do not 'just' say what it is they need. As the IT organisation sees it, it looks as if the divisions and business units do not pursue an actual strategy. Danfoss IT is perplexed by this method of operations.

The interactions among the staff of Danfoss IT, the divisions and the business units are therefore not optimal, and this situation is anything but satisfactory for the employees who are to bring out the digital applications to the customers. It can be said that digitalisation falls between two stools as the staff in the divisions and the business units often experience that they do not receive the pro-active support and commitment they want from their IT supplier. In other words, they need some persons who can help define their digital needs. This also means that the employees in the divisions and the business units find it difficult to launch digital projects, and the result is that nothing really happens until the customers make actual approaches. Danfoss IT does not see it as its task to act as consultants, and due to the way IT is organised it is difficult for Danfoss IT to take on this role. As a result Danfoss IT waits for the customers to present their need and then Danfoss IT provides the technical solutions.

Although the cooperation between Danfoss IT and the rest of the organisation is not optimal, Danfoss is not to be seen as a digital novice. In spite of the difficulties, the company has met the demands from the customers. And the company has a good IT technical infrastructure that produces benefits in the daily work. Although the divisions and Danfoss IT experience conflicts relating to (a) technical insight; (b) problem-oriented approach; and (c) business insight, the individual organisations have each had exciting experiences and achieved knowledge about digitalisation. These experiences and knowledge are discussed in the following sections.

#### 4.2.2 A cunning attitude to e-business

The Heating Division, which sells the renowned radiator thermostats, is the most decentralised division of the three divisions at Danfoss. The division is made up of four<sup>6</sup> business units which act as individual enterprises with their own organisations that handle marketing, sales, digitalisation, etc. Thus, the business units in the division do not have joint organisational units. This means that when the business units cooperate key employees from the individual business units meet and coordinate the different joint initiatives.

Like the remaining divisions in Danfoss, the Heating Division has, throughout the 1990's, established different connections to customers via the Electronic Data Interchange Standard (EDI). Through this technology the division has gained access to substantially more customers than is the case in the two other divisions. This has been possible because the North European customers to the Heating division are attached to a common industry solution. This means that one digital connection from Danfoss to this industry hub provides access to a large share of potential customers in the respective countries. The Heating Division is clearly the division in Danfoss which has used the EDI standard the most, and therefore it is also the division of Danfoss which by the middle of 2003 had received most digital orders.

As mentioned, Heating consists of four different business units each operating as a single enterprise. The enterprises that make up the Heating Division have traditionally had significantly more local IT resources than the two other divisions. The reason is that many of the local adaptations of the SAP system, etc, have been handled by local staff of the Heating Division whereas the IT infrastructure has been maintained by Danfoss IT. In the middle of 2004 all employees who had an IT technical position were transferred to Danfoss IT. A few business units in Heating, however, kept their local IT operation centre and thus their local IT resources.

The area of responsibility for digitalisation in Heating has always been clearly divided between the head office and the subsidiaries. This has had the effect that the national sales companies have played a significant role in the digitalisation of the customer relations in the Heating Division, which is unique compared to the two other divisions in Danfoss where digitalisation has been grounded in – and run by – the headquarters. A director explains:

[Director] *“E-business is decentralised in the Heating Division. The case has been that if the German sales company together with its customers agreed that electronic commerce is important then it has been implemented at their end. Heating has had a decentralised philosophy where it has totally been the pull from the customers that has defined the solutions Heating has had. Heating adopted a wait-and-see approach but when our wholesaler made a request for VMI<sup>7</sup> - Heating said of course we can provide that.”*

The organisational responsibilities for managing the homepage and supplying information on products, images and technical specifications were thus grounded in the organisations of the

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<sup>6</sup> Digitalisation has primarily been run from two business areas in the Heating Division, and therefore these have basically been used as a source for this part of the story.

<sup>7</sup> Vendor Managed Inventory (VMI) is a system by means by which the supplier manages his stock at the customer's end through IT systems. The customer still owns the components in stock, but the supplier guarantees that the products are always in stock because of real-time data from the customer.

business units in Denmark, whereas the digitalisation of customer relations or e-commerce, as it is coined in the division, was left to the individual sales companies, as they were close to the customers and were geographically located where the customers would direct their approaches if they had questions of a digital nature. The management of the relevant single business units in the Heating Division thus decided on a wait-and-see approach to adapt to the needs that the customers presented.

The single business units within the Heating Division then shared different tasks among themselves. A director says:

[Director] *“One business unit has run the information and Content Management System while the other business unit has managed the logistics”* (digitalisation of the customer relations).

The perception is supported by a manager in e-business from another business unit:

[Manager e-business] *“We forged a strong cooperation with other business units; they took our system (Content Management System) and took it further.”*

The individual business units cooperate with each other and share various tasks among themselves. In the beginning of the new millennium, the business units of the division also decided that they would not commit to investing in DeCom<sup>8</sup>, the system that was meant to be a joint Danfoss e-commerce system. The main reason for not investing in the system was that the individual business units in Heating did not have the financial resources to participate in several digitalisation tasks at the same time. Therefore a customer analysis was made which was to help define and determine how the various digitalisation tasks were to be prioritised. A director explains:

[Director] *“We undertook a customer analysis and found that at that time the customers did not demand actual e-commerce. They rather wanted information in before- and after sales, so that is the primary reason we did not commit completely to DeCom.”*

Another director from another business unit in Heating confirms his decision in an interview:

[Director] *“It was a concrete and specific need to bring updated reliable information to the sales subsidiaries and later to the customers that was the number one focus for Heating.”*

From then on the focus was to deliver information for the phases before and after the actual transaction. Digitalisation of the transaction process (e-commerce) was given less priority due to the information the customer survey produced. It was decided not to participate actively in DeCom, as the employees in the Heating Division believed DeCom focused too much on the actual transaction, and therefore it was not the ideal tool for the phases prior to and after the actual transaction. That meant that generally the division did not market e-commerce solutions but only reacted on customer inquiries. The first set of priorities was to categorise different types of

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<sup>8</sup> DeCom is a joint platform for ordering of goods, etc. The system can be used by all divisions and business units in Danfoss. The system will be described later on in the digital journey.

information, to implement the new Content Management System, and to construct Heating's homepage which was to become the joint Internet universe for Heating.

When Heating chose a wait-and-see attitude to the digitalisation of customer relations, different solutions materialised, in line with customer approaches made to the different national sales companies. The development took an interesting turn when, after a couple of years, it turned out that it was predominantly wholesalers who wanted to digitalise the relationship. In an interview a manager in e-business said:

[Manager in e-business] *“E-commerce in Heating has only been used in relation to wholesalers.”*

That meant that wholesalers, especially in northern Europe, were interested in getting their suppliers to offer the opportunity of communicating electronically. The view that it was exactly this customer segment that had such a need was justified by the fact that wholesalers within plumbing and heating industries have huge stocks and even more code numbers. These wholesalers had a major coordination problem when they ordered, took stock of their inventories and added new products to the catalogue, etc. The fact that these industries often were organised in huge trade organisations also had a positive effect on the digitalisation issue in these industries. A director commented on the electronic connections that the division had with the wholesalers:

[Director] *“The customers are linked together in industry-based solutions, for instance on the German market, and we hooked ourselves to these industry-based solutions. In that way we become electronically connected with all who are attached to this industry-based solution. Heating in Germany receives EDI orders from 685 sales outlets. It is obviously not a smart solution if we were to create individual connections to each of these 685 sales outlets; it is smarter to opt for the industry solution (...) imagine if each of these more than 600 customers has different IT systems, it would have been daunting (...) In Denmark we also use this industry-based solution, which is similar to the German one. The Danish solution is also EDI-based.”*

The fact that all wholesalers on the German market were organised in trade organisations was then a highly positive factor in terms of creating an electronic link to these wholesalers; the task could not have been much easier. Thus the HE division managed – without much difficulty – to link itself to this impressive data network, and although the area was not given initial priority, the division ended up being the division which received the largest share of digital orders in Danfoss ever.

The employees who were involved in these different implementations describe the ability to experiment and to be able to keep the costs at a minimum in the early phase as the essential criteria for success. In an interview a director explains how the first solution was made:

[Director] *“If we look at the total costs of bringing updated information out to the sales companies, to begin with, then I would say that DeCom was about 2-3 times more expensive than the way we actually had it made. The solution that the other business units opted for was came from a former Danfoss employee who together with another person set up a company. Try to imagine two men who work day and night and weekends who know the Heating business inside*

*out. They would at any time be able to do it cheaper than a large organisation with retirement pay obligations and lieu days every other day. Add to this that things move much faster because they knew the Heating business in advance, which meant that they quickly achieved a result, and did so very cheaply. I will not make a secret of the fact, either, that today we have reached a cross-road because now it is becoming too big. The outcome will be that Heating will end up paying the same to an external supplier as it pays to Danfoss IT. Will we then continue to pay an external supplier for the solution if it will be as expensive as when we purchase the service internally from Danfoss? No, of course not. But another aspect is timing – when is it prudent to change? All in all, it has been an incredibly inexpensive way to get as far ahead as we have today, and the supplier has been very determined, since it was a Danfoss marketing person who left and started his own company. He knew exactly what we needed. He could explain the possibilities in Danfoss language.”*

In the running-in phase the cooperation with a small cheap supplier has thus been essential in defining and delivering the solution that Heating uses today to deliver web-based information to the sales companies and customers respectively. The fact that the local IT organisation<sup>9</sup> and the sales companies work closely together in the Heating Division created an environment open to experiments where the different solutions can be tested and launched with relatively small resources. This approach which is described as a ‘*cunning attitude to everything called e-commerce*,’ has – after all – its limitations. A Danfoss director explains it this way:

[Director] *“When you get to the point where it becomes important for your business that the systems are up and running all the time due to safety, the operational situation and a number of other things, including quality, it means that there is a need for another organisation to support a digital platform of this type (..) In line with the development of the different applications and new applications the complexity increases, which contributes to the need for different support systems.”*

Thus the division mentioned the need to experiment in close relation with the customers as a crucial element towards the immediate success that the division has experienced. It also recognised that gradually as the experiments grew and became important for the business other competences were required in terms of securing the operation of the applications.

The story about how this impressive data network and the solution that supported the Heating Division’s web universe came about was told without much drama, and the language was quite different to the one used when other divisions, that will be introduced subsequently, spoke about their experiences in relation to the digitalisation of customer relations. In the Heating Division the digitalisation of the customer relations has to a wide extent emerged from actual customer approaches, and due to the industry organisations and the experimental approach to digitalisation, these approaches have been favoured without much ado. In reply to whether this division would continue its strategy into the future an executive said:

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<sup>9</sup> The local IT organisation in Heating was transferred to the central IT organisation in Danfoss – Danfoss IT, in 2004.

[Director] *“Let us hold on to firm ground. What we have described here is the story of how we have reached the point where we are today. We have had a conservative strategy: when the customer demands something he gets it. We have not marketed this to our customers, but we are likely to do so in the future.”*

So there is an opening for change in the approach the division has had to digitalisation of customer relations, and the reason to such a change is rather simple for the executive:

[Director] *“In logistics major things will happen in the future, and we will move towards a fully integrated Supply Chain, so it says in every textbook, and that is also what we see. It is the rate with which the change is happening that is different from the textbook.”*

The challenge in the near future is new, however. As can be seen in the above statement, it is in the cards that in the future the division will, to a higher degree, market different digital solutions to the customers to obtain certain advantages. This solution does however give way to some problems as such a pro-active strategy requires a different understanding of the customers and their needs in regard to offering them the digital applications they find interesting. How this understanding is to be reached, and which work patterns and procedures are needed to bring about this pro-active attitude are uncertain. Therefore we will now move on to the other divisions and have a closer look at their experiences in relation to the digitalisation of the customer relations.

### **4.2.3 The fax is alive and kicking!**

Refrigeration & Air Conditioning is the biggest division in Danfoss and can be traced back to the original inventions by Mads Clausen, the founder of the company. The end consumer does generally not know the division's products because they are mainly components for handling different processes for refrigeration. In other words, the division manufactures a great deal of components which are built into different machines and products that are used for freezing, refrigeration, and ventilation in the industry and private homes.

The division consists of 7 business units with different common functional areas, including marketing of which digitalisation is a part. The digitalisation responsibility in Refrigeration & Air Conditioning is thus placed in a central divisional organisational unit which cooperates with *'the business'* and IT organisation to handle the technological part of the digitalisation tasks in the division. At a point in time the division has had a minor IT department which planned and implemented different minor solutions, etc, for the division, but this organisation was swallowed by Danfoss IT in 2004.

*The business* is the designation the employees in the central organisations use for the different sales companies and production units within the division. The central marketing unit does not have actual formal power in the decisions relating to digitalisation. Therefore the organisation has had to convince *the business* of the usability of the specific ideas before they could be implemented. In terms of digitalisation *the business* must not only accept new initiatives that involved relations with the customer but it must also produce parts of – or all – the resources needed in order for initiatives to be launched and implemented. The central marketing and digitalisation unit thus functioned as a competence centre the different business units can draw upon if they feel the need to do so.

The digitalisation process in Refrigeration & Air Conditioning can be traced directly back to the project “Danfoss Industrial Selling on the Internet” (DISI) where the competence centre, which was set up because of the IBM project, was closed down after a year or so and taken over by Refrigeration & Air Conditioning. In this way the division also took over the experience and expertise the competence centre had built up at that point in time. The recommendations IBM and the DISI report presented were thus not implemented slavishly. But the division continued working with many of the ideas and issues the report threw light on. A director who moved from the competence centre to the marketing unit in Refrigeration & Air Conditioning says:

[Director] *“There are a lot of the basic ideas that were made in the report which we have influenced our way of working up until today.”* (2003).

With the takeover of the competence centre the division’s knowledge and competences were thus kick started within the digitalisation area. Some of the test cases that originally fell under the competence centre were also taken over, including Refrignet<sup>10</sup>, which was a digitalisation concept that was tested in Belgium and England. As a singular project, Refrignet was not a success. But as a Danfoss director remarked, it was the experience from this project which later formed the foundation for the Danfoss E-commerce platform (DeCom), which, to start with, was used by Motion Controls and Refrigeration & Air Conditioning, and later by the Heating Division.

[Marketing Director] *“At this point in time the marketing organisation had a solution called Refrignet which was running in Belgium. The experience made from the establishment of the Refrignet solution was used to make DeCom.”*

To begin with the objective of DeCom was to create a Danfoss homepage containing the information the individual divisions needed to pass on to the customers. Later the wish arose to add trade facilities to the platform so that it would be possible for the customers to see the stock inventory and order goods through the DeCom platform. The DeCom platform was born as a minor project and was established in cooperation with a small business unit within Refrigeration & Air Conditioning and Motion Controls. A marketing director involved in the development of DeCom explained:

[Marketing Director] *“Our first goal with the Internet was to make an information portal so that our customers could collect the necessary information, including data sheets, drawings, all kinds of things. So that it would be easy to get such information.”*

[Question:] *‘And DeCom was used for that?’*

[Marketing Director] *‘DeCom was – and is – used for that, yes! We began this project in February – March 2000, and by May the project had been developed. So at this point in time DeCom was born. There were two players at this time, i.e. Motion Controls and us. Later the marketing unit in RA joined us. We became airborne before we went on Christmas vacation the same year, as we had planned. At that point we had homepages for our business unit, and after a few months we had specific sites for the single countries.’*

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<sup>10</sup> Refrignet was a digital solution that was born in the IBM project and focused on serving the Wholesalers to the RA division. The pilot project was not successful and thus not implemented on a larger scale.

In the beginning of 2000 it was minor business units in Refrigeration & Air Conditioning that signed up as front-runners within digitalisation. The objectives were clear. Create a homepage where the customers could obtain the information they wanted. In the specification phase of the DeCom project there was also the intention to develop an ordering module to make it possible to offer a platform to the customers wherefrom they could order the products of the business unit. An employee says:

[Marketing Director] *“We had two goals. We wanted an information portal and at the same time we wanted an ordering module. We did manage to set up the ordering module but it just did not work. It has now become upgraded in the course of the past few years, and by the end of 2001 we had something that only worked tolerably.”*

The early work of specifying and developing the DeCom platform amounted to pioneer work that was undertaken by persons from the business who had seen the need for applying digital tools. The DeCom platform was set up and later this platform became a joint project between Motion Controls and Refrigeration & Air Conditioning. The remaining business units in Refrigeration & Air Conditioning were forced to use DeCom as their technological platform when they had to establish themselves on the Internet.

The work was relatively problematic and there were many obstacles that had to be removed, especially when it came to the digitalisation of the offline data that was to make up the core of the new homepages. The projects were organised in such a way that they were operated and run by the central marketing unit, but it involved many people placed elsewhere in the organisation. Thus the projects expanded and impacted on many employees who were not directly connected to the digitalisation projects. Often these employees acted as ‘producers’ of the data that were to be digitalised for the different digital applications to be able to work. The process of digitalising these data has been described by one of the marketing directors:

[Marketing Director] *“If you look at the organisation then you’ll see that quite different persons are responsible for our back-end and product data. If we go back and look at how these data were organised and stored, it was quite a mess. Now we have started clearing up the mess by implementing some Product Data Management systems (PDM). But it is not sufficient to implement the system. Afterwards there are invariably problems about who is to maintain the data in the systems, which organisation is to do it, and why. On top of that, you have the whole systems set-up and workflow of creating code numbers and supplying data. There is the issue of sharing responsibility – who is responsible for this part of the data, and who is to add extra data which perhaps prove to be marketing data information? This whole process and the workflow combined with an efficient method from IT, in a context that is brand new to people is a challenge. Why am I entering these data, and why is our product data to be used for this purpose? Well, you have to do it because we are going to make a configuration on the Internet.”*

In the succeeding years the divisions used a considerable amount of resources to get control of the different product-related data by transferring the offline data (images, descriptions,

documentations, etc) to the IT-based Product Data Management system. That is, the construction of the information portal (the homepage) received undivided attention, whereas the ordering module and the other tools did not receive so much attention. Although the result was a well-functioning edition of the ordering module by the end of 2001, it was not until the middle of 2003 that the module roughly lived up to the wishes the business actually had. The lack of attention towards the digitalisation of the customer relations can, in a way, be explained by the lack of appropriate tools. The first versions of the ordering module for the DeCom platform were too poor, and moreover the work on the information portal was given more priority. Besides, there was little demand for digital tools to increase the efficiency of the trade with the customers from the business unit. Actually, it was only the business unit that was the first to present the demands for the information portal which tried to find different alternative technological possibilities to increase the efficiency of the trade with the customers. It was assessed that it was not profitably (financially speaking) for the business unit to implement more EDI connections, and therefore the business unit tried to find other technological solutions that were cheaper and less complicated to apply. A marketing director has this to say about EDI:

[Marketing Director] *“EDI was created by the Devil. It is complex, expensive – we don’t want more of that. We are going to have something that is cheaper and easier to use. Therefore we are working with other technologies.”*

Another marketing director supported this attitude by commenting as follows:

[Marketing Director] *“When we speak of transaction [automatisation of trade between the customer and Danfoss] there are many ways of doing it. At the low end we have fax and e-mail. We can’t use that for anything at all, but we have lots of it. The next level is the homepage and our DeCom where the customer keys in what he wants and it is automatically stored in our system. Then we have something called full integration, but one of the problems we have had in this whole process is that we can make the low levels work. Full integration we also have the solutions for, including EDI, the only problem is that it is bloody expensive and damn complicated because you need to make changes in the customer’s and our system, and you need to configure the protocols. EDI has been an impediment and if you look at how many EDI connections we have then everything stopped once it reached a certain level, and we are not getting any further. We are unable to move things further with this technology, and therefore we need an alternative.”*

At this time in the middle of 2003 the division was well on its way to establishing an information portal for the customers and convert the off-line product-related data. Focus had been towards creating a general view of the different types of data which the division was to use for the information portal (the homepage), and to get it digitalised so its accessibility was improved. This left the division in a situation where no digital applications were used besides the homepage and the few older EDI connections. Generally, in the organisation there was not much focus on digitalisation in relation to the customer. A leading employee explained how digitalisation was used in the division:

[Vice President] *“In actual fact we do not have any digital initiatives besides our homepage. The Internet is only used for marketing since we put everything on our homepage and thus show the customers what we can provide. We put all our literature on the net so the customers themselves can fetch it, which means that we can provide a better service for them when they have a need.”*

The reason that digitalisation was not used in a more pro-active way was – according to the division itself – that it worked within a very conservative industry, so conservative that the customers did not ask for relations that were digitally supported. There may well have been examples where the customers have used auctions but apart from that it is the perception among the staff of the business units that the need among the customers was insignificant. Digitalisation was primarily used where the marketing organisation had power and opportunity to push the process internally within the company. A vice president said the following about the potential of digitalisation:

[Vice President] *“We have conducted a customer survey in which we can see what is important to the customer. That is the list of important issues. These are the issues which are most important for the customer, and all the way down here is e-business. After all, they are people with big hands who are out using screw drivers and welding. We are working with people who are workmen. We have talked about using the Internet more pro-actively towards the customers. But we tend to think that we are lucky if they have a lap top.”*

An executive from another business unit confirmed that the application of digital tools is not characterised by buoyant growth.

[Director] *“Much of our communication is today sent by fax. Orders and order confirmations. Yes, it is old-fashioned.”*

The use of digitalisation in the context of customers could thus be almost fully attributed to the homepage and the few somewhat old EDI connections the division was using. The business or the sales companies with the exception of few business units, which in this narrative was described as pioneers, did not launch digital projects relating to customers. This naturally meant that the digitalisation was almost invariably used in an internal context or as a marketing tool in relation to the homepage.

The only digital application used regularly by the customers was net-based auctions. This application was not used with the division’s blessings because, in the eyes of the staff in the Refrigeration & Air Conditioning division, the auctions have negative consequences. The auctions focus significantly on the price which was not seen as a positive development for a high-quality supplier such as Danfoss. It was the customers with huge power who forced the division to participate in these auctions, and the fact that the divisions did participate in these auctions meant that their experience with digital applications were markedly different from the two other divisions in Danfoss.

Net-based auctions are, and have since early 1998 been widespread, much to the regret of the staff. Generally, the attitude was that the auctions were a necessary evil that Danfoss would only use if

the individual business units were pushed into doing so. Different top executives recounted, independently of each other, their experience of net-based auctions in 2003 as follows:

[Vice President] *“I have not participated in any net-based auctions yet, but this is not because I have not been invited. It has happened 3-4 times, but each time we have turned the offer down. Among the biggest customers and suppliers there is an implied acceptance that we do not use these tools. The relation to the customer often suffers because the auctions’ tender material often states that the customer takes the liberty not to accept the lowest bidder as the supplier. This is done as the lowest price only can be used to press further down the existing suppliers.”*

[Director] *“We have also encountered auctions but we have not participated in any. We have said ‘Yes’ to one auction but that was only to see how the process worked. We did not submit a price. It is against our attitude to enter into auctions, as the only focus is the price. Customers who have invited us have not been attractive enough, and therefore we have not been interested in participating. The power of the customer has not been strong enough.”*

[Marketing Director] *“All suppliers hate auctions and all purchasing organisations love auctions. Auctions create transparency, and if there is one thing the seller is not interested in, it is transparency.”*

So auctions are well-known in the different business units of the division where all the business units, more or less, have been invited to join net-based auctions. But as has been explained above, the business units have chosen to ignore the auctions and decided not to participate where it has been possible. Whether this is an example of ‘ostrich’ policy, where the hope is that the auction is a phenomenon that will be gone once its head is no longer buried in sand, or whether the customers who have applied to the auctions are simply not interested enough, is difficult to say. There are indications that the customers’ attractiveness has been too unimportant, and thus much potential business has not been lost by not participating in the auctions. Few, highly attractive customers have, however, chosen to use auctions, and in these instances the business units have chosen to participate. Some auctions have been won, others have been lost. But to the big surprise of the staff, winning an auction by offering the lowest price does not necessarily mean that you are selected as supplier. A business development manager remarks:

[Business Development Manager] *“We often experience that although we submit the lowest price on an auction we do not get the order. Often, the customers will go back to the existing supplier and show him the price obtained at the auction. If he is able to sell at the same price they will keep him as supplier, and then they also save on costs that are usually incurred when changing suppliers. In this way the auctions are only pressing down prices, and that is not an acceptable behaviour.”*

In the eyes of the staff the auctions represented a new and less pleasant reality. The auctions focus immensely on price, and as the division, traditionally speaking, has not had the lowest price on the market, this focus meant that the enterprise was now experiencing a price pressure as a result of net-based auctions.

Therefore the division is facing a problem: on the one hand considerable resources had been used on digitalisation of internal functions in the division and on the other hand they had produced a homepage with high-quality information. They had participated, although ‘reluctantly’, in the net-based auctions when it had been necessary, but beyond that there had been no other activities on the agenda. The challenge in the succeeding years was not so much of a technical nature, but rather a strategic or management challenge. This is how a marketing director phrased it:

[Marketing Director] *“From the end of 2003 where we are on top in regard to our data, it is not so much a technical problem, anymore; it is rather a strategic / management problem – how are we going to go about it? We have to know which contingency we should plan for – which challenges we are facing on the transaction side and the relation side.”*

#### **4.2.4 The Germans are over us!**

The Motion Controls Division basically consists of one enterprise: Danfoss Drives. The division manufactures and sells the frequency converter, which is one of the most complex and advanced technological products in Danfoss’ product portfolio. The product is used to control the speed of electrical engines running different production processes, such as conveyor belts. Danfoss Drives is the only enterprise from this division that has been included in this study. Danfoss Drives operates with independent organisational units that handle such functions as marketing, sales and digitalisation. As is the case with Refrigeration & Air Conditioning, the digitalisation responsibility is placed in the central marketing unit. The central marketing organisation does not have any formal power in terms of digitalisation, and therefore it has to convince *the business* of the usability of the different ideas before they can be implemented.

By mid-2003 the division had implemented some digital connections to customers via EDI, and these connections had been running for several years. As was the case with the other divisions in Danfoss there were no plans to implement more EDI connections with customers, as it was considered expensive and difficult. Danfoss Drives was one of the business units of Danfoss that was the first to recognise the opportunities of the Internet, and therefore it was deeply involved in the development of the Danfoss E-commerce platform (DeCom). The original plan was that the platform was to play a significant role, both in terms of handling the Danfoss homepage, and the e-commerce with customers. As has been described earlier on, the e-commerce module proved to be too poor, and therefore the platform was primarily used as a platform for the homepage.

Although the division was among the pioneers that launched the DeCom work, and therefore had a pretty good understanding of the opportunities of the Internet at a relatively early stage, it was an approach from two major and important customers in the autumn of 2002 which triggered the start of the digitalisation wave in Motion Controls. These two approaches defined the actual beginning of the digitalisation of customer relations through net-based technology. The two approaches made it clear to Danfoss, and especially Motion Controls, that digitalisation of industrial relations had a high priority among (some) customers, so high that there was a risk of losing these business associations unless Danfoss fulfilled the customers’ wish in this respect.

The inquiries from the two German customers were made to Motion Controls’ German sales office in the autumn of 2001. A few months later the inquiry was directed to Motion Controls’ head office in Gråsten where the e-business department was located. The inquiry concerned commerce via e-

marketplaces, and at this point in time, it was only something the employees had heard of, but had not worked with. That is, e-marketplaces were not a phenomenon that the organisation was familiar with and the existing technological infrastructure in Danfoss was not prepared for this. An e-business employee commented on the e-marketplace wave as follows:

[E-business employee] *“In the autumn of 2001 there was a contact from two customers. They were both end users which means that they use our frequency transformers in their production. They were both end users from Germany, and therefore they contacted our German sales company. Therefore the contact goes from the customer to the German sales company where he was being directed back and forth. Thereafter in the beginning of 2002 the inquiry reached the head office in Gråsten, where it was also circulated a bit before it landed on my desk. This process had in itself taken some time. But in this situation you must bear in mind that this was the first inquiry of its nature, and therefore it took some time.*”

[Question:] *“That means that there were two end users who made the inquiry in the end of 2001 and beginning of 2002? What did they demand?”*

[E-business employee] *“What they wanted was that in their organisations they had decided to do electronic purchasing. That meant that they wanted to buy all MRO-products (Maintenance, Repair and Operations) as electronic purchases from all their strategically preferred suppliers. You may suspect that they had invited all their suppliers to participate, but they said that it was only specially selected suppliers who had been invited. Thus the organisations had chosen to run the purchases electronically, and they wanted to do so in cooperation with an e-marketplace. The all-important reason was that the e-marketplace would handle the transactions, and that was really as plain as a pikestaff – with the technology we have at hand today it is understandable that e-marketplaces are gaining ground as never before, for they are smart. They march in and replace everything we have in terms of digital connections including EDI, that is easy to understand.*”

*After we received the first information from the customers – that is how it should be done – and that is the e-marketplace we are to use – we received a standard invitation from both customers to present ourselves in Germany. At the meetings the e-marketplace explained how it worked. Then we were informed that: “The customer has invited you today, and you are to deliver this and that – do you have any questions?” And then it was just goodbye. We were not told much and we did not receive much of an answer on a lot of things. This process we have seen over and over again – this is how it works. They just get down to it!”*

[Question:] *”What happened later on in the process?”*

[E-business employee]: *“What happened was that we consented to both e-marketplaces. But let us stick to one of them. We then received a letter from the marketplace with further information and a contract. In this situation we all of a sudden had to get hold of the headquarters and its lawyer, as the contract had to be read through. And also, it was a long process to go through the contract*”

*and find out what we wanted to accept, and what we did not want to accept. We also realised that no matter what we wanted changed, even a small comma, it was impossible. It was all or nothing – it simply had to be like that or out we would go. There is no mercy. When we asked about the data format and integration the reply was just that the e-marketplace is able to do this and that, everything else is your problem; it is your company that needs to be in control. So everything was done the hard way. It has been incredibly exciting to experience, but also very hardcore.”*

The customers' inquiries concerning the e-marketplace therefore came as a big surprise for the staff. What is more surprising for them is that Danfoss is treated just like any other company and it is pressed to accept the conditions that are already defined, although Danfoss is a big and well-renowned company that is typically spearheading the development in terms of exploitation of a new technology in this situation. At this point Danfoss is unprepared for this type of digitalisation of customer - supplier relations, and therefore it takes some time before the wishes of the customers reach the right employees, and the inquiry is processed further. But as the employees said, it is the first time this type of inquiry was treated within Danfoss, and therefore it was only natural that the organisation needed time to find its own feet.

Already, in the initial phase of the e-marketplace contract the employees realized that the customers were determined to carry through the digitalisation of the supplier relations. The customers were willing to let the digitalisation become the crux of the matter meaning that if Danfoss decided to remain their supplier it had to react to the inquiry. The considerable pressure the company is under concerning trade by means of e-marketplaces can also be seen in an article from *Børsen* of 12 June 2001. In the article, IT manager Kenneth Schmidt stated:

*“We have become pressed by several major customers to participate in the e-marketplaces.”* (Børsen, 12 June 2001:9)

It became clear for the staff fairly quickly that the customers were prepared to suit the action to the words, and that purchasing via e-marketplaces actually represented a new reality, which they would have to deal with. An e-business employee added:

[E-business employee] *“It took us app. 9 months to get our whole internal set-up ready, including investments, installation and adaptations of our systems. Seen from the customers' point of view it took about six months from the time they contacted Danfoss the first time to when they got our commitment, i.e. from when we are on the case and participated in the meeting. In this period the sales curves went down all the time because they did not hear from us at all. Then they announced that if trading by means of this e-marketplace were not implemented shortly, they would run their purchases towards a zero position. This was also what happened so it was reasonably good proof that this was how it was going to be.”*

[Question:] *“So the customer reached zero before you had your solution up and running?”*

[E-business employee] *“The customer reached zero; I'm not quite sure if they fully reached zero but that was the message from our sales manager in*

*Germany. This added to the pressure. After we became airborne with the first catalogue on this e-marketplace we have experienced that the sales curves have gone up again.”*

The employees have faced the tough realities. The fact that the customer behind the first e-marketplace inquiry chose to discontinue purchases of Danfoss products because of the lapsed time underlined the seriousness of the customers' intention of digitalising the customer-supplier relations. Thus, more than six months passed before the said solution was ready for the customer. If Danfoss had not quite realised the seriousness of the matter at this point, a customer meeting in Germany showed just how uncompromising they were on the matter. An e-business manager said:

[E-business manager] *The customer had assigned a huge company within the company to be responsible for everything relating to electronic purchases. They had also approached us in the autumn of 2001, but by this time (middle of 2002) they had not received anything and therefore they were disappointed, so if nothing happened we would be fired.”*

The German customers who made the inquiry about trade by means of e-marketplaces in the period from autumn 2001 to the summer of 2002 were fiercely determined to carry through the digitalisation of their supplier relations. The focus of digitalisation apparently overshadowed everything else, and the customers were willing to discontinue their business with the suppliers who did not live up to these demands, which was actually what happened in the case with one customer. After this somewhat daunting beginning the e-marketplace inquiries began to change, and by mid- and late 2002 they were more positive in their numbers. An e-business employee said:

[E-business employee] *“When we had delivered the first catalogue to the e-marketplace two months lapsed. Then we were contacted by another customer who was also linked to this e-marketplace. They were our customers already, but they had seen us on this e-marketplace and if we could deliver a catalogue to them they would upgrade us to their preferred supplier. Thus they upgraded our association due to our competences within e-marketplaces.”*

The customer offered the division to upgrade the status he had had thus far as a supplier to the company. Here, it must be mentioned that it was a German customer of significant size. The customer was several times bigger than Danfoss and had huge global purchasing volume. Now Danfoss was reaping the fruits of massive work and investments that had gone into the different e-market-related systems and competences. The customer demanded new catalogues, but since he was linked to the e-marketplace that Danfoss was already linked to, it only took three days to deliver this catalogue. This was an immense improvement when the very same solution took more than six months the first time.

In the period up to the summer of 2003 there were additional inquiries from customers who wanted trade by means of e-marketplaces, on top of the seven inquiries already mentioned. At this point it thus seemed that trade through e-marketplaces was going to become a significant way of handling relations between purchasers and suppliers in the future. A few of these new inquiries were from customers who demanded e-marketplace competences concerning signing global contracts with Danfoss. The relatively new e-marketplace competences were placed centre stage in these situation, as they were crucial in the choice of selecting Danfoss as a supplier. With the exception of few

customers these were customers that Danfoss placed in the end-user category. That last customer was an Original Equipment Manufacturer who stood out from the end user definition in-as-far as it built the frequency transformer into its engines which later are sold to other industrial companies. Therefore the Danfoss product was considered an important component. An end user applies the product in a different way because, typically, the frequency transformer has already been placed in the engines the customer uses to manufacture the articles he sells, i.e. chemicals, cars, etc. Therefore, the Danfoss products are bought when there is a need to replace already purchased components or extensions or enlargements of the manufacturing systems.

The customers who made inquiries concerning trade through e-marketplaces were – in their own right – large customers and therefore the operational aspect of the area received significant focus. However, the experience of these aspects was never extensively passed on or reported, and therefore the experience and understanding of this potential, etc, rested with very few employees who in one way or the other had been involved in the process; this was especially the staff in Danfoss IT, the head office in Gråsten, and few persons involved in the German sales company.

The digitalisation of the customer relations within Motions Control were thus, at this point, to a high degree, connected to trade through e-marketplaces. Although there had been much fuss about the incidents relating to trading via e-marketplace, digitalisation had not earnestly been put on the agenda and therefore very few was involved in digitalisation. The sales companies had the formal responsibility, but they had very little knowledge of which digital opportunities they could offer their customers, and they did not market these at all. As a result, Motion Controls had a wait-and-see attitude to the digitalisation of customer relations at this time.

#### **4.2.5 Digitalisation in Danfoss anno 2003**

At this point in time, the digitalisation of customer relations could best be described as extremely customer oriented, as virtually no project was launched unless a customer demanded it. If being customer oriented is to be understood as doing what the customer says, then Danfoss was highly customer oriented in relation to digitalisation of customer relationships. But if customer oriented is to be understood as surprising the customer with solutions that solve problems or needs he has not himself identified then Danfoss is less customer oriented. There was no clear or general perception of which initiatives were to be launched at Danfoss, and there was no clear understanding of what the customers wanted within this area – if they wanted anything at all. The general perception across the three divisions was that the customers did not prioritise – and did not demand – digital applications to increase the efficiency of the customer-supplier relationships. Even in the MC division that had experienced some German customers supporting their words with actions, the perception was that this had been an exception. In spite of belonging to different divisions the perceptions were surprisingly similar when listening to the different employees of the business units in the divisions expressing their understanding of the customers' need for digitalisation. Therefore this section takes a cross-examination of the three divisions and takes a deeper look at the perceptions that existed among the employees that dealt with sales, marketing, and business development within the individual business units of the different divisions.

The common perception among the commercial<sup>11</sup> employees in the three divisions was that if the customers did not demand digital applications then the need had to be negligible. The financial

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<sup>11</sup> 'Commercial' is used here in the sense that it includes the staff responsible for customer relations at Danfoss. They are salespeople, business development employees, etc. All have a responsibility for the handling and development of the relations with the customers.

leeway in the decentralised business unit was also limited, which additionally restrained the development. A business development manager explained the situation this way:

[Business Development Manager] *“If a common platform exists our business unit may be interested in using the digital tools. But making huge investments in digitalisation exclusively in this business cannot be justified.”*

Thus there was a reservation towards digitalisation of customer-supplier relations, but at the same time it was accepted that there could be advantages in applying different digital tools. The tools were to be part of a common Danfoss platform as it was expected to keep investments for the individual business units at a minimum. Accordingly, substantial investments cannot be justified as most of the business units perceived especially the west European markets as mature, and therefore experienced modest growth. The anticipated investment for digitalisation of the customer relations was generally seen as a major barrier to the individual business units in Danfoss, and therefore the development was brought to a halt until the different customers made inquiries expressing specific needs. Two top executives expressed the situation this way:

[Senior Director] *“We will accommodate the customer if he wants something in this direction.”*

[Question]: *But this is not something you are running?*

*“Not from our side. Our main customer, who buys for more than DKK40m a year, had just one PC in its entire purchasing department when I first started here! This customer cannot be bothered to have e-business relations with us. The employees there use fax, mail or phone.”*

[Director] *“It is only recently that our most innovative customer in Germany has started sending us mail orders, that is the most hi-tech and advanced tool we have.”*

Although individual customers, as we have seen earlier, have contacted Danfoss making clear demands for digitalisation of the relations, most of the business units had the understanding that their customer groups in particular would not have much use of digitalisation. There was not a negative attitude towards the Internet and digitalisation as such, but it was just that the particular customers of the different business units did not need the service at that point. The staff in the business units and the sales subsidiaries seemed to think that if the customers had the technical possibilities for digitalisation and they prioritised the area, they would automatically have contacted Danfoss. As an example it can be mentioned that with the exception of the Heating Division the vast majority of the customer orders was received by phone, fax or e-mail. This form of an employee said could not be used, earlier on in the narrative. Many employees were of the perception that when the customers used these old-fashioned modes of communication it meant that the customers generally did not prioritise digitalisation or that they were technologically unprepared to digitalise relations with Danfoss. When asked why it was continued, and as to why the customers did not demand these elements, the replies were relatively unequivocal:

[Senior Director] *Our industry is one of the most I have ever experienced.”*

[Question] *“Conservative? How?”*

*“The product has not developed much. Basically the product looks the same as it did 30 years ago – it does not change.”*

The fact that product development is limited in two of the three divisions that make up Danfoss was used as an argument that customers did not demand different digital applications to a large extent. It had the effect that most of the business units were waiting for the customers to approach them, and to respond to these requests. As a business development manager explains:

[Business Development Manger] *“We want to link ourselves up with our customers as soon as they are ready. We cannot be pro-active and lead the process, but we can be ready when they are ready. We cannot enter and interfere with their systems and make them ready!”*

It was thus a question of being ready and basically of adapting to the customers' wishes and demands. The agreement of using this approach was, however, not complete all over Danfoss, as few business units – that were called pioneers earlier on in the narrative – had quite a different view on digitalisation of customer relations:

[Marketing Director] *“That the market is conservative and the customers are not ready is a bloody good excuse because they [the other divisions and business units in Danfoss] have been brought up to think that they have to do what the market requires. I don't care what the market wants, and what the market says. If I can give the customer something he perceives as an improvement and save a lot of resources internally, then I'll do it – then I have won, haven't I?”*

He continues:

*“The other divisions are still standing there talking about whether they are going to do it or not, because they lack the internal drive needed to get started. We believe digitalisation must be a natural part of the way we work. It must be a natural part of our business. But in order to reach that point you must have a lot of people who work with these tools and feel it is a natural part of their everyday.”*

Besides the few business units that based on the assumption that digitalisation offered many advantages and thus, decided to push the development forward towards more digitalised relations with the customers, the overall approach to digitalisation in Danfoss was reactive and adaptive. This approach had been chosen although the staff in the business units and sales companies realised that substantial resources were used in handling quite basic customer-oriented processes which had the potential of being digitalised. A marketing director from a sales company put it this way:

[Marketing Director] *“Through different discount arrangements, etc. we are trying to get our customers to process their orders as few big orders, rather than as many minor ones. But the reality is that we receive many small orders which create a dramatic workload for our salespeople. This workload we would like to decrease through electronic links with our customers.”*

Therefore there was a potential for digitalisation of the various processes, but the staff in the divisions and business units did not find themselves capable of marketing or pushing the development towards more digitalised relations, and therefore they waited for the customers' initiative.

The lack of marketing of the digital possibilities could also be reflected in the many different customer surveys that Danfoss carried out at regular intervals. In April 2005 there was a customer survey made in one of the divisions. It reached the following conclusion:

*“The e-business offered by Danfoss is in general not known to our customers.”*

Although the above conclusion only covered one division, there was nothing in the present narrative to indicate that the situation would be essentially different in the two other divisions. Thus, the customers had no knowledge of the opportunities Danfoss had to offer, which was not surprising since the majority of the local sales companies and decentralised business units of Danfoss had little or no focus on this area and consequently a negligible knowledge of the digital possibilities that existed. They waited to see what developments would bring, both internally in Danfoss and among the customers.

The homepage and the applications placed on the homepage were thus the only digital offers Danfoss pro-actively made to the customers. No other solutions were brought to the attention of the customers as the overall perception was that Danfoss needed to adjust to the customers' development, and in that respect the employees were convinced that by far the vast majority was not technologically prepared to participate in the different solutions.

The perception of the customers' readiness was, however, not unanimous. Many employees reported of customers who used impressive IT-based production and stock-control systems. The systems were state-of-the-art systems which staff from all three divisions talked about with envy, which is explicitly illustrated in the account below from a customer visit in England:

[Senior Director] *“I have also seen other customers where they simply have ‘state-of-the-art’ systems with complete digital processes, ranging from ordering to packing and delivery. When they write out an order it turns up on the PC out in the warehouse. Here the employee will take it with a hand-held PC which will guide him around in the warehouse to locate the things that are to be packed. Of course it selects the most advantageous way for the employee. The computer knows that the item has been packed, and the stock will be updated and a consignment note and invoice will be written out.”*

Later, the executive made the following remarks in more general terms about the market situation:

[Senior Director] *“In our business the IT resources are relatively limited. Well, now I have to be careful about what I'm saying, because once it has reached the warehouse of the customer some have highly advanced production management systems and stock control systems. Definitely. But to get the goods into the warehouse seems to be done on a very primitive level, as we see it, and we have been unable to reflect our interest in making it more advanced. We made an offer for EDI to a customer – he was positive, but nothing ever came out of it.”*

So, the customers could appear innovative and could be using highly advanced digital tools, to support and make more efficient their internal processes, but when it came to relations with their suppliers, they were very primitive and seemed to settle for fax, phone, homepage and e-mail to communicate and place orders. A few customers across all three divisions had also set up what was called 'reverse e-commerce', that is the customer placed the order for the single suppliers on a homepage from which the supplier could fetch his specific order by using a special log-in and password for the homepage. This was not a solution Danfoss employees were particularly pleased about as it often took more time to check such a homepage several times a day than merely receiving an order by fax or e-mail. This special procedure we are going to hear more about in the next section where the customers will be included in the digitalisation debate.

Thus the perception among most Danfoss employees was that the customers were not ready to digitalise their relation with Danfoss. Basically it was a question of Danfoss being ready when the customers demanded these applications. The question was, how was that achieved? Many mentioned the homepage as a good tool, but otherwise there were no digital customer-oriented initiatives in the pipeline. In short the view was that if the customers did not mention digitalisation to Danfoss it must mean that they did not prioritise this area. That many still ordered by fax confirmed the staff's perception; the customers were not technologically prepared to participate in this type of relation. Many Danfoss employees viewed the fact that few customers had made inquiries to Danfoss about digitalisation as an exception rather than the rule. In the next section we are going to see if this assumption is correct, and what the customers had to say about digitalisation of industrial relations.

## 4.3 The myths are dispelled

*”The future for the companies is absolutely the web – it is the only way – you can save money, time, everything.”*

- Manufacturer

*“IT and the Internet are a very large part of our overall strategy – it is used in all processes in the company.”*

- Wholesaler

*“We want to avoid ordering by fax (...) you are not sure to receive the fax – in the electronic format we can be sure that you have received the order – this means a better relationship with the supplier.”*

- Manufacturer

Barely a year has lapsed from the start of the digitalisation project to this point in the narrative where we have now reached the period late 2004 to early 2005. Now it is the time for the customers to be included in the digitalisation debate, through 23 interviews and 74 questionnaires<sup>12</sup>. That means that we take a giant leap away from the protective walls of Danfoss. Now the laboratory was moved out to the customers. What did they think of the digitalisation of customer/supplier relations, and which attitudes did they have to this area generally? Based on the perceptions that were prevalent at Danfoss at this point in time the conversations became relatively brief and unequivocal. However, it became clear that the customers wanted things to be different.

### 4.3.1 Digitalisation and Darwin

The excitement was great. I was driving my car through the western part of Jutland and I was on my way to the first customer interview. My GPS was directing me, so nothing could go wrong. But nevertheless I was anxious, tense, and I was sweating. It was important that the interview would go well so that everything would not be over before it actually started. I was approaching my destination. I parked my car in the parking lot. It goes without saying that I had arrived in good time, and therefore I had time to just run through my question guide one more time.

I went to the reception and before long two people came to fetch me: a purchasing manager and a logistics manager. I do not know what I had expected, but the fact that two managers were willing to spend a couple of hours on a Ph.D. student was somewhat surprising to me. We briefly went through the production area and the conversation was smooth. I told them a bit about what I did and the reason for my visit. We ended up at the other end of the production area in a conference room. Coffee was served and the interview could commence.

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<sup>12</sup> The data foundation for the present chapter is both customer interviews and the questionnaire that followed. 23 customer interviews were made from October 2004 to January 2005 in four countries. Five interviews in Denmark, four in Germany, six in Holland, and eight in Italy. The questionnaire was sent to 226 customers in 10 countries in June-July 2005, of which 74 responses could be used. This made up the total of 97 customers that was included in the research.

[Question] *“Why don’t we just start with your names, titles, and work areas so I’ll get an idea of who you are, and what your every day jobs are about?.”*

[Purchasing manager] *“I am the purchasing manager, and I have been here since 1997. I work with strategic purchases seen from a commercial angle, i.e. supply chain management and which type of supplier we are to work with and focus on. We are also responsible for our product development as we participate in project work concerning development of new products. To us it is relevant to look at which suppliers we work with in this context. Finally, I also have a global coordination role in relations with our factories in the rest of the world.”*

[Logistics Manager] *“I am the logistics manager and I cover the operational aspects of the purchasing functions, component purchases, production planning and inventories.”*

That means that the two respondents covered both the strategic and daily functions of purchasing in an industrial context. I was pleased as it was precisely persons with such profiles I had wanted to interview. It was interesting to see how they perceived Danfoss as a supplier and also to shed light on how they used and planned to use digitalisation, in relation to customers and suppliers in the future.

[Question] *“Is digitalisation used for purchasing in this company, and how has it developed over time?”*

[Purchasing Manager] *“Yes, indeed, very much so. Specifically we have a couple of purchasers sitting in China. As I do not know the market for compressors in China we have asked them to make some Internet research so that we can locate potential suppliers of compressors in China.”*

[Question] *“So you are using it for market research?”*

[Purchasing Manager] *“Yes, very much so.”*

[Question:] *“How is digitalisation used in other contexts?”*

[Purchasing Manager] *“Among other things we have an EDI connection up and running to a supplier – not Danfoss. Our experience is that EDI is too rigid and the trial did not go well because the data quality was not good enough. We have tried it but it did not live up to our expectations. When you ask how it has developed I think that in terms of purchasing we and our company in general are incredibly far ahead in terms of using IT as optimally as possible. For many years we have been able to send our purchasing orders directly via our system without having to print it on paper and sending it by snail mail. We have also become better at absorbing electronically documents that we receive.”*

[Question:] *“Is this also possible with documents sent from Danfoss?”*

[Purchasing Manager] *“They often send out papers but what we receive electronically we also file electronically.”*

[Question:] *“Are there other areas where you want to use digitalisation in the future?”*

[Logistics Manager] *“The whole forecast part, is somewhat heavy today and we are contemplating changing it. We prepare 15-day forecasts based on news we receive from the market, which we then process in our system and send to the suppliers. We want to change this so that the information is put on an extranet site in order that the suppliers themselves can fetch what they need from here. Apart from this we would like to introduce VMI solutions<sup>13</sup> for several commodity groups. We use this solution for few commodity groups today, but we must expand this type of collaboration. As was the case with the EDI solution, we tested, the VMI solution with the objective to minimise some of the administrative costs in connection with transactions with our suppliers.”*

[Question:] *“Will this be a parameter in the future when suppliers are going to be selected?”*

[Purchasing Manager] *“That could easily be the case. It has been a parameter for a few commodity groups where we have been faced with choosing among suppliers. Here it has been an important parameter in the choice of which supplier to pick. But in general we have not assessed all suppliers in relation to the total cost of ownership including IT capabilities. But I can easily imagine that if a supplier does not have special IT competences we will incur extra costs. It has to be made clear to the supplier that if he is unable to deliver these things it invariably leads to extra costs for us, and that means that the price of the product has to be reduced accordingly.”*

[Question:] *“Also products and product types that Danfoss supply?”*

[Purchasing Manager] *“I can assure you of that! If you look at the range of products we buy from Danfoss then 80% is standard goods – the remainder are customised goods. But for the 80% the supply capacity just has to be in place, and it has to be done as easily and cheaply as possible. If they are unable to do things we expect to be done electronically the outcome will be additional costs for us.”*


The interview was over and I was sitting in my car reflecting on things on my way home. The confusion had not been diminished. I was speculating on the extent to which the customer's statements could be generalised for all Danfoss customers. Was this perhaps a unique and one-off experience? What was most surprising about the interview was that, to a high degree, the customer did use digitalisation in the company. And that, in the mind of the customer, digitalisation of the customer-supplier relations could contribute to bringing down costs. Thus digital competences could help remove the intense focus on price and products. That this reasoning could also be used for the different product types that Danfoss sold was not in line with the general understanding at Danfoss. All in all, the interview indicated that digitalisation could be used in the relationship between the customer and the supplier, and the customer very much expected that in his future relations with suppliers. The customer indicated that digitalisation of the customer-supplier relationship had its justifications in many areas, ranging from electronic transactions to research and development. There were thus many opportunities in digitalising the customer-supplier relations – the question whether this was a unique and single experience became all the more important to find out.

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<sup>13</sup> Vendor Managed Inventory or supply chain managed inventory

In the following months I moved around in every little nook of Denmark. Furthermore, I travelled to Holland, Germany and Italy to gather impressions and hopefully find the answer to the above question. Naturally, the case was that each of the customers was unique and had unique problems. There were, however, elements in the 23 customer interviews that could be used to group the customers in a way that would produce an understanding of their IT technological preparedness and attitude, and their understanding of digitalisation of the customer-supplier relations. This IT technological preparedness and understanding of digitalisation (both internally in the companies, and among the companies), is used in Figure 8, to classify the 23 customers into different groups. The figure must not be read in the way that the customers merely go through different phases of development moving automatically from the left to the right. They represent four distinct groups. The customers' individual placing in one of the four groups determines whether they are prepared and interested at all in digitalising the customer-supplier relations. The two parameters 'preparedness' and 'understanding' would be repeated many times in different interviews and therefore represent the key parameters in customers' selection of partners for digital cooperation. The figure below sums up the most important results from the 23 interviews.

**Figure 8 – Accumulation of the 23 customer interviews**

				
	<b>Novice</b>	<b>Wait-and-see attitude</b>	<b>Proactive</b>	<b>Pioneer</b>
<b>IT infrastructure</b>	Non-existent or fragmented in many different IT systems	Present, or to a wide extent ready	Non-existent or fragmented, but involved in the implementation	Highly advanced, and digitalisation supports many processes in the companies
<b>Attitude to digitalisation</b>	Reactive	Reactive	Proactive, but was waiting for IT systems	Proactive, using digitalisation whenever possible
<b>Focus on digitalisation of inter-organisational relations</b>	None	Had decided not to seek digital possibilities of an inter-organisational nature	When the IT solutions are implemented, they have a clear understanding of which advantages can be gained	Committed to the implementation and constantly seeking new possibilities
<b>Reported results of digitalisation</b>	None	Internal advantages such as improved information and basis for decision making	None, but clear understanding of the potential advantages of digitalisation.	Improved efficiency, speed and flexibility, customer service and satisfied, new potential revenues
<b>Share of respondents</b>	2/23 = 8.5%	2/23 = 8.5%	7/23 = 30%	12/23 = 52%
<b>Share of respondent types</b>	Manufacturers = 2 Wholesalers = 0	Manufacturers = 0 Wholesalers = 2	Manufacturers = 5 Wholesalers = 2	Manufacturers = 6 Wholesalers = 6

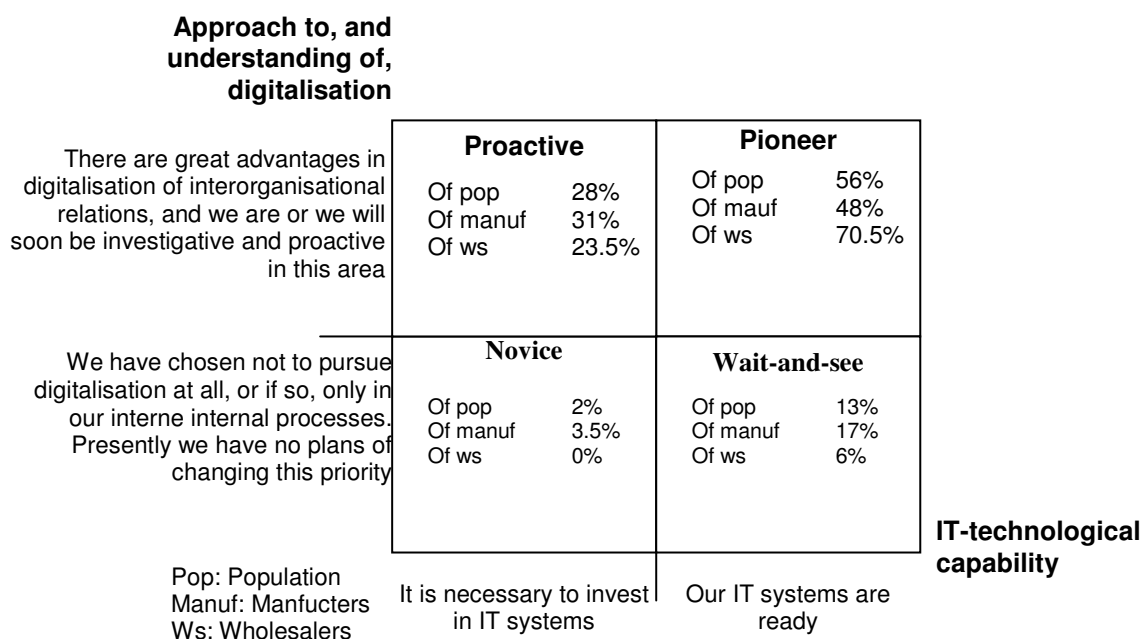
As can be seen in Figure 8 it is the construction of the different parameters that in combination provides a characterisation of the customers in different digital situations. The IT infrastructure

must be seen in terms of the extent to which the various partners were ready to enter into digital relations at the time of the interviews. Focus on digitalisation in an inter-organisational perspective accounts for the attitude concerning the digitalisation of customer and supplier relationships. That last parameter emerges from the results the respondents reported they had achieved in the digitalisation of their business processes. When the 23 customers were classified in terms of these parameters, the four categories emerged: Novice, Wait-and-see attitude, Proactive and Pioneer.

The trips through Europe presented quite a different picture of digitalisation at the customers' end than the one I had been given by the staff at Danfoss. Although some of the 23 customers, for different reasons, did not immediately focus on digitalising the customer-supplier relations, by far the majority had a positive disposition towards digitalisation and hoped to automate the different processes between the customer and the supplier, e.g. getting easier access to vital information or to support other processes such as research and development by means of digital applications. More than half the interviewed customers thus had very advanced IT structures and a proactive attitude to digitalising the customer-supplier relations. Almost every third of the interviewed customers were waiting for IT systems to be implemented but had a clear opinion of how the systems were to be used the minute they had been implemented, and of how digitalisation of customer-supplier relations could bring value to both the customer and the supplier.

The above results were later supported by an Internet-based questionnaire to 226 customers in ten different countries. The questionnaire was made to measure the extent of the perceptions and results that had been generated from the in-depth interviews. Figure 9 sums up the results of the survey, especially in relation to IT-technical capabilities and the perception of the same, as well as the approach to digitalisation of customer-supplier relations.

**Figure 9 – The customers' digitalisation status**



As can be seen from Figure 9 the digital readiness among the respondents using an ERP system was more than 80%<sup>14</sup>. These companies can be characterised as proactive or pioneer indicating that, depending on the stage of their present IT-technological capabilities, they were, or expected to become proactive concerning digitalisation of the customer-supplier relations. If the figures are calculated in relation to the total population (N=74) a little over half of the respondents can be characterised as either proactive or pioneers. Through the interviews where customers from all the three divisions were interviewed it became clear that the customers' view of digitalisation did not vary much across the three divisions. As we will see later on, the wholesalers attached to the Heating Division were the most developed pioneers and therefore the customer group with the highest level of e-readiness. But across the three divisions the interviews showed that both wholesalers and manufacturers were either e-ready or were expected to be so within one or two years. Thus, there were no indications that customers from a special division opted out of digitalisation, or were in any way significantly less prepared than was the case in the other divisions. Therefore the divisions will henceforth not receive much individual attention in this presentation, unless there are clear differences between the customers attached to them.

In conclusion, there was no indication that the argument that 'the customers are not ready' was representative of what the reality looked like among the customers of the three divisions in Danfoss. Additionally, there was no information in the round of interviews (that only covered customers in Europe) that could justify treating the countries individually. The perceptions concerning digitalisation were by and large similar across the four countries. However, the questionnaire did document a difference between the application of digitalisation between the countries that are traditionally called the West (Western Europe and the USA) and the East European, Asian and Latin American countries, in-as-far as the West is far more e-ready than the remaining countries included in the survey.

Therefore the questionnaire confirmed the results from the interviews. The digitalisation was an important component of the daily activities of the customers. Digitalisation of the customer-supplier relations was already an important component for many customers, and in the near future it would become even more important among customers in achieving different advantages e.g. automate non-value-adding processes between the customer and supplier. The picture of the customers' digitalisation demands and needs was, unsurprisingly, more nuanced than originally depicted. Some Danfoss employees responded to the information with a 'What-did-I-say' reaction whereas others found it difficult to believe. In all fairness most of them accepted the information and a few pilot projects were launched to test the evidence. We will come back to these pilot projects in the next section.

The natural question which the reader and probably many employees of Danfoss would ask themselves at this point is this: how could there be such a big difference between the customers' technological capability and wishes, and the picture that emerged when the customers were included in the digitalisation debate? How could part of the customers be so involved in digitalisation, both internally and externally, without a supplier such as Danfoss becoming part of the plans? Naturally, I asked the customers about this, and in the next section we are going to see their answers.

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<sup>14</sup> Only respondents who said 'Yes' they were using an ERP system had the possibility of answering this question. Therefore there were only 45 respondents who had the opportunity to answer this question. The argument that it was only the customers who had ERP systems who were to answer this question is the fact that ERP is the basis for an automation of transactions between companies.

### 4.3.2 We focus on our customers – don't you?

Thus the surveys document that there was a major group of the customers who focused very much on digitalisation, both internally and inter-organisationally. It quickly became apparent that many customers went through quite a logical and understandable IT development process. A development which was very identical to the development Danfoss had been through in the first years when the focus had been on internal processes. In this period many different systems were often replaced with one system, and the internal processes were digitalised, and a uniform and updated data foundation had been created after which the company became experienced with digitalisation and use of IT application. With this, learning opportunities and needs emerged which were beyond the organisation, and thus digitalisation of the customer-supplier processes was initiated. An IT manager from the Netherlands explained:

[IT Manager, the Netherlands] *“Up to 2003 the focus was exclusively on our internal processes – to get our internal processes to run effectively by using IT-systems. After 2003 we have had our focus on external processes and partners.”*

An IT manager from a wholesaler in Germany explained the digitalisation process of his company which began more than 30 years ago as follows:

[Leiter eCommerce, Germany] *“Concerning the IT area we began, like most other companies. We began with book-keeping and the accounting functions, about 25-30 years ago. Since the financial record-keeping was IT supported we were looking for a system that could support the whole administration of our company, including the inventory. Because we couldn't find one, we began to develop one ourselves. In 1994, we began to use and implement SAP R3, and in 1999 the whole company started using SAP R3. In 1998, we began using EDI as a ‘neben bei’ possibility. Today EDI is strategically important to us, and we have more than 60 suppliers attached via EDI, and we are getting new ones daily. In 1999 we began an on-line system for our customers. It is a digital-information-and-ordering system.”*

The customers told of processes where they had spent a lot of resources on trying to digitalise the company as such. To begin with finance and accounting functions were often digitalised, and then followed inventory, sales and purchases. Later on the focus turned to the customer-supplier relations, and as can be seen from the above quote the digitalisation of both the customer and supplier processes were initiated around the same time. It should be noted, however, that most of the respondents started out focusing on internal matters, and after that they focused on applying the technology towards their customers. Later again suppliers came into focus. This prioritisation where the internal and customer-oriented processes had the highest priority, and the supplier-oriented processes received less priority was also confirmed by the survey. A few quotes from the interviews would illustrate the point. The first is from a respondent in Italy:

[EDI specialist, Italy] *“At the moment not so many of our companies are engaged in digital relationships with their external suppliers. We have been focusing on our customers.”*

Along the same lines, another respondent added:

[ITC Manager, Italy] *“Digitalisation and automation has mainly been used internally in our company and focused on customers. Our suppliers will be involved later.”*

A third supported this:

[Question:] *“Everything you explained here are digital initiatives targeted at your customers. There aren’t any similar initiatives targeting your suppliers?”*  
[Sales Engineer, no. 1, Denmark] *“No, concerning that aspect we are probably like our customers.”* [the customers’ focus is on their customers]

It turned out to be a recurrent theme in the different interviews that the customers of Danfoss focused on their customers and generally many had planned digital initiatives and had already implemented them in relation to their customers. Contrary to this the initiatives toward the suppliers (Danfoss) were fewer. The customers who had taken digitalisation initiatives towards their suppliers were often wholesalers, and naturally they focused on the suppliers who, seen from their perspective, offered the biggest potential savings. A customer whose focus was on suppliers but had not yet contacted Danfoss said:

[Manager, the Netherlands] *“We focus on external processes in relation to our partners. We want to connect to these partners via IT. In the future we want to continue to tie us closer to customers and suppliers and their IT-systems. We are currently actively searching for suppliers that we can connect to via IT and the focus is initially on the 20 biggest suppliers and the rest will follow afterwards.”*

[Question:] *“Would you be interested in connecting to Danfoss?”*  
[Manager, the Netherlands] *“Yes, absolutely, however Danfoss is not among the top 20 of our suppliers. However, if you are ready to connect to us then we are interested.”*

The customer clearly signalled a wish for digital cooperation with Danfoss, provided Danfoss was ready and willing to enter into such a relation. Generally, (and this was not a major surprise), most customers were positively disposed towards measures that would help them in their daily tasks, as shown from the statement below:

[Purchasing employee, Italy] *“If you have tools or systems that can help me, I am happy to use them.”*

Thus the customers were not daunted by the digital possibilities, and they would like to use different tools if they could help them in their work. The fact that they themselves could key in orders, check deliveries, etc, added so much value that some customers accepted the extra work load of keying in their own IT systems and later the DeCom system. It should be noted, though,

that not all customers accepted this extra work, and therefore asked for digital connections that automate various processes and thereby reduce costs in customer-supplier transactional relations.

Seen from the customer interviews and the survey there were not many arguments why digitalisation of customer-supplier relations should not receive a high priority at Danfoss. However, the trees do not grow up to the digital sky. As various interviews revealed, different elements impeded the digital development in relation to customers and suppliers. One of the oft-mentioned arguments was that digital documents in different countries did not hold the same legal status as traditional paper documents. This and other judicial elements had an impeding effect on the development and indicated that the customer-supplier relations were still moving along in a border area. There were several examples that these problems could be solved, and the anxiety of the Danfoss customers to digitalise the relations, especially with their customers, showed that where there was a will there was a way. We will have a closer look at this in the next section.

### **4.3.3 Wholesalers or e-marketplaces – What are we to call them?**

In the first section of the digitalisation journey, where the divisions' different experiences of digitalisation of the customer-supplier relations were told, it was obvious that one of the three divisions had experience with e-marketplaces, whereas the other two divisions had no off-hand experience with e-marketplaces as such. When the customers were included in the digitalisation debate new perspectives were added. It quickly became clear that as a phenomenon the e-marketplace did not so much imply new actors, it rather transformed the existing ones from physical companies to having a status of e-marketplaces. Actually, the information did show that e-marketplaces were certainly not dead, although that gradually had come to be the perception among the Danfoss staff and the media. In the future, all three divisions were to get to know e-marketplaces.

In connection with this I would like to go one year back to have a look at how individual Danfoss employees perceived the wholesalers and the role they were to play in the future. Independently of each other two directors from two of the divisions said:

[Director] *“Wholesalers are actually an e-marketplace”*

[Marketing Director] *“Many of our wholesalers are in fact e-marketplaces, and act as e-marketplaces. They act as an e-marketplace towards all their customers. Quite a number of the wholesalers who are spearheading the normal digital development act as e-marketplaces. It is not only in Denmark, but in many other countries, Holland, Belgium, Germany, etc.”*

A few employees across the three divisions of Danfoss were thus familiar with the fact that the wholesalers as a result of applying the digital technology, both internally and especially in relations to their customers and suppliers, would increasingly take on the form of e-marketplaces. Here it is important to note that in the first years of the new millennium, the e-marketplaces were predominantly launched as new players that moved into existing industries and value chains. It was therefore new actors who tried to find a place in already existing relations between customers and suppliers. Many e-marketplaces failed in this, and therefore they were forced to close down after only a few months or years. A wholesaler in Germany explained how these years were perceived, where many e-marketplaces tried to get established in lines of business that he served:

[Leiter eCommerce, Germany] *“Two or three years ago there were many new e-marketplaces that would like us to join, and preferably they wanted a couple of EUR100,000 from us as well in return for our participation. Our strategy was to stay away from all e-marketplaces. A customer has since forced us to participate in an e-marketplace and we have done so, but apart from that we have not participated. We are on two other e-marketplaces where our catalogue is visible to the individual customers – we are not in e-marketplaces where everyone can see our catalogue. It is also obvious how many of these e-marketplaces have survived – there are not even 10% left. Within certain industries there are e-marketplaces left but generally there are not many left. Especially in the automobile and energy industries there are still e-marketplaces left.”*

The wholesalers' strategy in terms of the e-marketplace was quite symptomatic of the strategies experienced at Danfoss, but also in relation to many other wholesalers and manufacturers' attitude to e-marketplaces. Danfoss and the customers agreed that e-marketplaces with catalogues reserved for single customers could be used, but e-markets where everybody could participate were unwanted. Both customers and suppliers wanted to protect their relations and did not generally want the transparency that some e-marketplaces had. The selling companies' main argument for not participating in e-marketplaces was that, to a high degree, prices were based on an individual assessment, and therefore there was a wish to be present in catalogues where individual customers could have their individual catalogues with special prices. The customers argued that there were many other elements in the customer-supplier relations and therefore they used e-marketplaces for suppliers whom they knew could live up to the demands required, and they would seek new suppliers as they had always done.

In this connection it is interesting that the surveys clearly documented that especially the wholesalers were far ahead in terms of digitalisation, both internally and externally, in relation to customers and suppliers. In the surveys, the wholesalers were defined as digital pioneers and the fact that this digitalisation, in time, would transform them into the e-marketplaces that no one initially wanted, neither Danfoss nor the customers, is an interesting phenomenon which I discussed with a few wholesalers in my interviews:

[Question:] *“How long time will it take you to become an e-marketplace?” You are highly digitalised and are becoming more and more digital. You have many tools and know-how to handle many things in a digital mode, both in terms of customers and suppliers. To me it looks as if you will become a relationship-based e-marketplace.”*

[Leiter eCommerce, Germany] *“We have two things which we would like to do with our on-line initiatives towards our customers. We would like to reach the end users who would like to build their own house – they must be able to fetch the information from us. They can use a password-protected area on our homepage to order and to see the inventory. But we do not want to create an actual e-marketplace – it won't be a classic e-marketplace.”*

[Question:] *“What is a classic e-marketplace?”*

[Leiter eCommerce, Germany] *“To me a classic e-marketplace is a venue where customers and suppliers meet.”*

[Question:] *“We have a supplier – Danfoss and then we have your customer. They meet on your homepage?”*

[Leiter eCommerce, Germany] (Silence) *“Yeah, uh, it could be viewed from that angle.”*

[Question:] *“You have X numbers of pre-qualified suppliers in different product commodities. The customer knows that you have pre-qualified these suppliers and thus the quality is okay. The customers choose the wanted products among 3,4,5 different suppliers – is that not an e-marketplace?”*

[Leiter eCommerce, Germany] (Silence) – *“You can put it that way: I have never seen it from that angle. You could run a business as an e-marketplace (...) but it is not a classical e-marketplace where everyone can go to buy. It may be an e-marketplace for a closed user group.”*

Although the wholesaler obviously had not thought along those lines earlier, he accepted the views that over time they could be seen and understood as actual e-marketplaces. But he also stressed that it was not an e-marketplace where everybody could go to shop, it was an e-marketplace for a closed user group. The question was which significance this had for Danfoss? A marketing director at Danfoss said this about the wholesalers' possibilities of acting as e-marketplace:

[Marketing Director] *“The wholesalers are coming from ‘bricks and mortar’ companies where the act of electrifying the processes give them a whole lot of opportunities because they have the whole distribution system which provides rather good conditions for running an e-marketplace.”*

Thus, gradually as the wholesalers digitalised their businesses and thereby their relations to the customers and suppliers the wholesaler typically changed from being a physical player to becoming more of a digital player.

Thus the conclusion was that the e-marketplaces did not move into the industries from the outside, but rather consisted of existing players who by means of digitalisation were transformed into e-marketplaces. Therefore the wholesalers were designated pioneers in the surveys across the three divisions. Although the wholesalers were seen to be the most progressive ones within digitalisation there were differences among the wholesalers of the three divisions. Thus the wholesalers of the Heating Division were the ones spearheading the digital development, which meant that the companies were highly digitalised and used IT systems to support basically all internal processes in the company. They also had many digital initiatives targeted at the customers and the suppliers. Although the wholesalers, especially RA, were not far ahead in the development, they shared the same fundamental perceptions of the possibilities that digitalisation left behind, and therefore it was a matter of time before they would be on the same level as the Heating wholesalers.

#### **4.3.4 The Original Equipment Manufactures (OEM): a lonely digitalisation polka**

The other big customer group Danfoss serves beyond the wholesalers is the manufacturers of different engines and equipment. Naturally, the manufacturers had another agenda compared with the wholesalers we have just looked at. In their context Danfoss acts as a sub-supplier and therefore supplies products that constitute a part of the production at the OEM' end. It quickly became obvious that there was a wide range in the usage digital components among the various manufacturers, a range that was wider than among the wholesalers. The fact that the customers often had more focus on internal and customer-related processes than on suppliers and their related processes was also more obvious among the manufacturers than among the wholesalers. Although there were differences among the manufacturers the largest group was, however, still found in the pioneer and proactive groups that were either ready or expected the implementation to take place soon. The interview results show that eleven out of thirteen OEM's would be placed within these two categories. A manufacturer from Italy explained how they used their IT system in the company:

[IT Manager] *"The ERP-system takes care of everything, from the customer order to production. It schedules all the logistics and what is required to make our products. It creates the bill of materials. The ERP-system takes care of ordering the parts that are needed, the inventory, and the goods that are received. The system also creates the shipment documents and the invoice. The invoice is sent depending on what country we are talking about, either digitally or via paper mail. The administration is also handled by the system. The system almost handles everything in our company."*

[Question:] *"What about the suppliers. Do you send the orders digitally and receive confirmations, etc?"*

[IT Manager] *"We send the order in many ways. One way is by fax overnight. The system sends it for us. Another way is by e-mail and 'ctonet'. Ctonet is a webpage where we post our orders and the suppliers log in and look at them. The invoice from the supplier is sent by surface mail. The aim is to receive everything electronically."*

It is obvious that the Italian manufacturer was highly digitalised internally and had an IT system that supported by far most of the processes in the company. The IT manager commented on the digitalisation priority in the company in this way:

[IT Manager] *"Digitalisation is very highly prioritised in all areas of the company. We are trying to optimize everything by using digitalisation. IT is a first priority in the group."*

Digitalisation and use of IT in relation to the company's operation were highly prioritised which was also indicated several times throughout the conversation. The manufacturers' supplier portal 'ctonet' (earlier in the narrative this application has been referred to as reverse e-commerce) was a central tool in the handling of their supplier relations. Portals of this type were mentioned several times in different interviews, both with customers, Danfoss staff, and by the suppliers who used them. Danfoss did not see these portals as being a step forward, as they often led to higher resource

consumption for Danfoss. Before we go deeper into this issue let us have a look at how this portal works, and why the customer implements and uses it.

The ctonet portal was a password-protected homepage where the manufacturer placed some information that could prove interesting for the suppliers, e.g. orders, daily consumption, forecasts of future consumption, drawings, stipulated pricelists and status for payments of invoices. Thus the portal represented the manufacturer towards the supplier, and it was only possible for the manufacturer to place information on the portal. Danfoss could not place information on the portal, and therefore the portal was not characterised as an actual cooperation forum. Rather, it was seen as a supplier-focused portal. The manufacturer's argument for creating a portal of this type was quite clear:

[Strategic purchaser, Italy] *"The reason why we use ctonet is that the system compiles all the information that the supplier needs from us (...) We collaborate with many different types of suppliers, from worldwide suppliers as Danfoss to the small supplier around the corner where we count 90% of their turnover. This is also the reason that we developed ctonet, we don't want to force big costs onto small suppliers that can't handle these investments. If you can handle the order in a more efficient way, we would be happy to help but we could never force all suppliers into this solution."*

The portal is a comfortable arrangement for the manufacturer as it collects all the information the manufacturer needs to pass on to the suppliers. The information was delivered to the suppliers via the Internet, and the manufacturer did not have problems of adapting the information to many different systems which they expected different suppliers used. The purchasing orders were automatically placed on the portal via the IT system and through the homepage the manufacturer could see when the supplier had read and received the order. It was mentioned as an advantage compared to faxes which did not give the manufacturer the guarantee that the order had been well received. There were other advantages to the portal seen from the manufacturer's point of view:

[Strategic purchaser, Italy] *"The fact that our production never creates an order is a big advantage. They only have to check the goods that arrive, and here they really save a lot of time. The system orders automatically, and if IT had not developed that solution, we would use 5 instead of 2 people to handle the ordering. This is also the reason why we create orders with only one line – we are not grouping because orders are created automatically. By using ctonet and not sending by fax it is easier to see if the supplier has received the order – without ctonet we should call all suppliers to hear if they have received the order. We do not have the problem that a fax has been lost if it is in the screen the supplier has seen it. Ctonet means fewer fax transmissions, less paper, fewer people doing manual work, and fewer mistakes."*

The portal is obviously a good tool for the manufacturer as it represented a solution which all suppliers, irrespective of their technical capability, could use. This argument was used by almost all other manufacturers as being an important parameter when digital tools were to be implemented. The following provides an Italian manufacturer's comment in view of this:

[Strategic purchaser, Italy] *“The new system that we want to use has a lot of tools where we can order by mail, receive confirmation and electronic invoice. We want one system and not 100 different ways of exchanging data between the supplier and us.”*

It was precisely the above issues, relating to customer portals, which were perceived as problematic at Danfoss. With the arrival of these portals there were now, seen from Danfoss’ point of view, many different ways in which the customers wanted to handle their relations with Danfoss. Although this was a digital solution it was, in actual fact, seen as a step backwards for Danfoss. It required a bigger resource consumption since these portals had to be checked several times a day for orders and other information which was not the case when a fax or phone call was received. It was an additional disadvantage that the manufacturers who were so digitally advanced that orders were automatically created in their IT systems created only one-line orders e.g. each order only contained one line and thus one item. If a new item was ordered this would mean that a new order would be fabricated. When using manual processes these orders would be collected and placed in one order containing several lines. The high rate of digitalisation among these customers thus meant that the staff at Danfoss now had to relate to many single orders containing just one line rather than a few consolidated orders with several lines. This created a bigger workload than before the portals became a reality. That was also the reason that Danfoss employees had been reluctant to use the above ctonet portal. The manufacturer explained with a smile on his lips:

[Strategic purchaser, Italy] *“We have spent almost one year trying to convince Danfoss to begin using ctonet and now you have begun using it.”*

Due to the above problems, Danfoss had therefore tried to avoid using the portal, but at last it had had to accept this solution. What was surprising was that the manufacturer did not see a problem in engaging in a more customised solution with Danfoss provided it did not entail too substantial an investment for the manufacturer. He explained:

[Strategic purchaser, Italy] *“We are happy to help a supplier to introduce a faster way to order, we can do that. But we will never start a project to force all suppliers to do this. If the supplier can do this they can ask us. If we can do it we can help.”*

[Question:] *“You are basically saying that you are happy with the situation as it is today and if suppliers want to use other solutions they have to approach you?”*

[Strategic purchaser, Italy] *“Yes, of course.”*

The manufacturer considered the ‘ctonet’ portal to be a solution to the problems they experienced internally in the company, without if it did not lead to major investments on behalf of the suppliers. But it is important to note that the portal was not to be understood as the only possible offer, as it was the lowest common denominator, and intended as a solution that all suppliers basically should be able to use. The manufacturer was open to other individual solutions provided the investments would not be too big for him. At the end he made it clear that it was the supplier’s task to demand these solutions if he had such wishes. Thus Danfoss had the opportunity of having other solutions provided that a great deal of the information placed on the portal could be directly transmitted to the IT systems at Danfoss. But nobody from Danfoss had ever made inquiries about such solutions.

It was obvious that neither Danfoss nor the manufacturer had a targeted focus on the use of digitalisation in the relations between them. They both had primarily focused on digitalising internal process and not the processes between the different partners. A purchaser in another manufacturing company told the following story:

[Strategic purchaser, Italy] *“Our initiatives within digitalisation in relation to purchasing have mainly been internal. We began in 2000 and 2001 to see if we could use reverse auction or e-marketplace to buy direct materials – products linked to the production.”*

The manufacturer launched these portals (both e-marketplaces and reverse e-commerce) because he wished to make the internal processes efficient. Therefore the goals were not to improve the relations with the suppliers, it was rather to gain different internal advantages. If it had a positive influence on the supplier relations it would be a positive side effect, but this was not the focus at the beginning.

This means that the manufacturers clearly focused on digitalisation. However, the internal and customer-oriented processes were the primary focus, and if digitalisation projects towards the suppliers were implemented, it was often in the shape of applications with great similarities to a portal, either as one of the above-mentioned company specific portals, or as e-marketplaces which both represented a simple system with a single channel the suppliers had to relate to. From the perspective of Danfoss, which possessed digitalisation competences, these portals were a challenge because if they did not have some kind of automation they would often result in a bigger resource consumption than was the case prior to the implementation of the solution. The result of this was a lonesome digitalisation polka where the customers and the Danfoss each danced to their own tune without teaming up in a common value-creating partnership.

#### **4.3.5 We automatically send orders by fax**

The position of the fax as the mostly used medium in terms of handling the daily communication between the supplier and customer was treated earlier in the Danfoss narrative. Danfoss' perception was that the customers as such were not prepared to participate in digital customer-supplier relations, as they used the fax to a large extent.

At the customers' end another reality was presented. Both wholesalers and manufacturers were found to be interested in using digitalisation, both internally and externally. But how did these strong digitalisation wishes connect with the customers' continued use of sending orders per fax when they apparently had many other possibilities?

We need not dig too deep into the conversations before the answer to the question materialises. There turned out to be two overall reasons for the customers' choice to send the orders via fax. The first one, which is commented on below, was that the customers did not see any other possibilities since, in terms of IT technology, they were not ready for any other ways:

[Strategic purchaser, Italy] *“Today we have a normal supply chain system where we only exchange information by paper, by fax and we don't use e-mail for orders, confirmations, etc. It is a traditional system with all suppliers.”*

This is quite a traditional way of transferring of business sensitive documents such as orders, order confirmations, documents of delivery, etc. In the above situation the manufacturer handled the information flow between the customer and the supplier as he had done for many years. The argument in favour of this method was that the company did not possess the IT-technological capabilities to handle the information flow in any other way.

The above explanation matches well with the perception of the Danfoss employees and the reason that they receive orders by fax. The staff at Danfoss also told stories of how customers transmit handwritten documents on the fax as a means of ordering, and in these situations their interpretation was that the customers were not ready, which is highly probable and representative of the reality and the situation the customers found themselves in at the time. But at the customers' end there was also another reason that they sent their orders by fax. We are going to look deeper into this here:

It turned out that the customers that were highly digitalised and were referred to as pioneers in the survey also sent their orders by fax in many cases. As in the above example the Danfoss employees interpreted this as if the customer was not prepared for other solutions. But when the customers were asked another explanation emerged. Here we are going to look at a section of responses from different customers:

[Sales engineer, no. 1, Denmark] *“Our system ‘Movex’ is used in connection with the financial record-keeping, sales, inventory management, where we use bar codes, etc (...)”*

[Sales engineer, no. 2, Denmark] *“It is almost a requirement today, isn't it? One almost has to be able to run everything in that way. It is impossible to run things with paper and pencil. For instance we have chaos inventory, that means that the products need not necessarily be stored collectively. If the computer breaks down then we'll have the chaos (...) the orders are fully manual and done by fax.”*

[Sales engineer, no. 1, Denmark] *“If it is urgent we call Michael” [Danfoss employee]*

[IT Manager, Italy]: *“We send the order in many ways. One way is by fax overnight. The system sends it for us.”*

[Purchasing employee, Italy]<sup>15</sup> *“Automatically SAP writes the order and sends the fax for us. We accept the order; it is sent automatically by fax or e-mail.”*

Thus there were a number of customers, both wholesalers and manufacturers, who were highly digitalised and used IT as infrastructure in most internal processes in the companies, but which continuously chose to order by fax. In this case the fax did not represent a situation where the customer had limited IT-technical capabilities but rather customers whose digitalisation readiness was so high that it did not mean anything to them if they had to send orders and other similar documents via fax or e-mail. They had reaped a lot of benefits from the high digitalisation rate

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<sup>15</sup> The purchasing employee handles purchases for factories in France and England.

internally in the company and as they had not heard otherwise from their suppliers they sent the orders via fax, as they had always done. Therefore the Danfoss employees' interpretation of the customer's digital preparedness was not correct in this case.

Thus the customers sent a fax to the suppliers, precisely because they had no reason to believe that the suppliers wanted it in any other way, and definitely not because the customers assessed that it was especially advantageous to send it by fax. This can be seen from the customer explanations below:

[Purchasing employee, Italy]<sup>16</sup> *“In the future we only want to use the web as interface – no fax. We lose invoices in the mail and we use much time on locating these invoices – in future we want to receive these invoices via web.”*

[Strategic purchaser, Italy] *“Of course we want to avoid sending a fax, as we are not sure that you have received the fax.”*

[Arbeitsleiter Antribstechnik, Germany] *“When I send an order via fax or e-mail to the supplier I don't know what happens with the order or when it is processed. When I send it by fax or e-mail to a supplier I don't know it has been received and when it has been received.”*

The fax was definitely not the customers' preferred medium for communication with the suppliers but it was nevertheless the most common form. Many customers worked with plans of many other potential media, ranging from portals to digitalised connections to their suppliers, but neither Danfoss nor the vast majority of customers caught 'hold of this baton', and therefore the individual actors were only digitalised internally, whereas there was a problem inter-organisationally. It was not because the customers or Danfoss were not convinced of the potential advantages of having digital customer-supplier relations but for different reasons, which also are mentioned in the above section, there was no development in the area.

Until now there has been an intense focus on transactions (delivery of different documents such as orders, invoices, etc) between the customer and the supplier, but relations between industrial actors contain far more than mere transactions. In the following we will examine what the customers said about the other elements of the relations apart from the transactions and their reasons. At the end of the section we will briefly look at what the customers wanted to gain when digital applications were implemented internally and organisationally.

#### **4.2.6. Industrial relations – more than mere transactions**

Until this point the transactions between the customer and the supplier has been the focus of the digitalisation discussions. Internally at Danfoss and among the customers this has been the theme that has been extensively discussed. The documents (orders, confirmation, delivery documents and invoice) that move between the customer and the supplier as part of the transaction have a crucial importance for the industrial actors, as the sales and purchases are rooted in these documents. Large customers and suppliers spend huge resources on handling these documents and making sure that the information is seen by the persons in the organisation that need to see this information. These resources can be reduced or done away with if the process is digitalised and automated, so

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<sup>16</sup> The purchasing employee handles purchases for factories in France and England.

that the documents move frictionless between the customer and supplier's IT systems. This is naturally the most essential reason to why the focus has been on exactly the transactions and the related documents. However, the customers indicated that there was a greater potential in digitalisation than mere automation. A purchaser from Italy described the perspectives of digitalisation:

[Strategic purchaser, Italy] *“If you use the Internet in procurement you can have two different goals – one: reduce costs, the other is to improve the supply chain system between the supplier and the customer.”*

A respondent from Germany added a third perspective to digitalisation:

[Arbeitssteillungsleiter, Angribstechnik, Germany] *“We do save costs by ordering in this way (DeCom), the real benefit is that I know the order is in the system and if I send the order in the afternoon, then I know the confirmation is in my e-mail the next day when I arrive at the office.”*

Earlier on in the narrative this perspective was referred to by an Italian purchaser in the following way:

[Strategic purchaser, Italy] *“Of course we want to avoid sending a fax, as we are not sure that you have received the fax.”*

Thus digital measures were seen as safer than the fax, as it was important for the customers that the supplier had received the order and that it was being processed. That the customer could find the necessary information when he needed it or could key in, and send information directly to the supplier's IT system was seen as an advantage, because it gave the customers the power to execute the act without having to involve any of the supplier's employees. In this way the customer believed that there was a greater probability that the ordered product would arrive on time, and no mistakes would have been made in the ordering process. The German departmental manager quoted on the above page, directly focused on the power and security in digital relationships instead of focusing on the fact that he could save resources on using this IT system. Later in the interview he indicated that he would have to hire more employees in his department if he did not have the possibility of ordering and following the order via digital applications.

It quickly became clear that the customers' feeling of empowerment and security, not only, was attached to the transaction and the documents that were part of the transaction. As far as it was possible the customers wanted it to be able to seek and localise the information they needed themselves. There was quite a deal of frustration among the customers when they contacted Danfoss but did not receive the required information afterwards. These experiences contributed to customers preferring the digital media because it enabled them to keep themselves updated. Here we are going to look at a customer from the Netherlands who commented on a situation when he had complained about a product:

[Technical Manager, the Netherlands] *“After-sales is a big problem – when we contact you we get the message that you will come back in a couple of hours and we do not hear anything for several days! When we contact Danfoss it is because we have a problem!”*

The customer clearly stated that it was a problem that he did not receive the expected information from Danfoss. As he said, he contacted Danfoss because he had problems and therefore it is not satisfactory to live with several days of silence. On the other hand, he also made it clear that it was not directly the local sales company that was the source of the problem, it was rather the whole line – as he called it – from the local sales company to the mother company in Denmark:

[Technical Manager, the Netherlands] *“It is the complete line; my supplier is the Dutch sales company, that’s for me the first contact. They go to Danfoss the Netherlands and they contact Danfoss in Denmark and there is no reply or I don’t know what is happening in between and sometimes it takes long time and people get mad. (...) You must remember that sometimes the plane leaves tomorrow; we cannot wait for two days.”*

A Danish sales engineer experienced the same kind of problems and commented on how it was often difficult to get in contact with the right persons at Danfoss. This was especially important because the request for these persons were often greatest when situations become critical, which only adds to an increased level of stress of the customer.

[Sales engineer, no. 1, Denmark] *“After all, I think I know my way around Danfoss fairly well (earlier on the respondent has told he had worked for Danfoss for a long period of time), but if at the end of the day, I need to ask about something it is difficult to get through. Then when I do get through it often happens that I’ll speak with a technician, and then they’ll just need to ask Nordborg [Danfoss headquarters]. And the technician himself doesn’t know the answer, either. It takes some time, and the fitter who is having the problem finds it difficult to accept that.”*

[Question:] *“Does it make a difference whether it is a commercial or technical question?”*

[Sales engineer no. 1, Denmark] *“I would say it is worse when it concerns a technical issue. I am not the only one with technical questions, and many times it requires a good deal of time to find the right answer (...). But it is the whole of Danfoss (all three divisions) that has that problem, it is not always easy to get hold of anyone as they are out of the house or at a meeting. After all, the remaining two people are only able to talk to one customer at a time.”*

[Sales engineer, no. 2, Denmark] *“What could be done was to use a FAQ or ‘the blunders of the day’ where you could write that here we have made an error, and if you have this and that problem it can be solved in this way. This is how we ourselves could have handled the problems we landed in. I use my files while seated as I find it easier to solve the problem when I am having the customer on the phone, so I do not need to call him back again. Therefore I would rather go to the net if I could find the information I’m looking for. It means that the customer could get the answers he’s looking for while I’m on the phone with him, and therefore I do not need to call back. Such a possibility would help us tremendously.”*

In conclusion, the possibility of using the net and encyclopaedias of different types was seen as a potential advantage that would help them tremendously. They acknowledged that there were still problems which could not be solved instantly, and in such cases it was important that they knew that Danfoss was working on the problems, and could see how far they were from finding a potential solution. One Danfoss division tried to resolve this issue in collaboration with an Italian customer by giving selected employees of the customer access to Danfoss' intranet so that they themselves could monitor how the complaint process was moving along at Danfoss. Below we will follow a conversation between the Danfoss salesperson who participated in the interview and the representatives of the customer who are a purchaser and a research and development manager respectively:

[Danfoss Sales Manager, Italy] *“Just for your information we improved the complaint process with your company. It is an Internet function for the quality situation when there is a technical problem, specific persons at your company have access to our intranet with a specific password and have the possibility to check the complaint process as it is handled in Danfoss.”*

[R&D Manager, Italy] *“What information can we view on this page?”*

[Danfoss Sales Manager, Italy] *“When there is a quality problem the quality manager explains the problem and sends it to us. Every time there is an improvement, an analysis, or when the problem is solved it can be viewed on this Internet page. He also gets an e-mail when something is changed on the page and then he can go to the page and see it. It is possible to see what happens day-by-day with this quality complaint.”*

[R&D Manager, Italy] *“It is not clear for me what the difference in this process makes. Can this process not be done by e-mail?”*

[Danfoss Sales Manager, Italy] *“No, because using Internet in complaint management in Danfoss is a normal procedure and just to look at an e-mail whenever there is a change is a manual activity. Without this function the customer only gets the result of the complaint. He starts the process and gets an answer. By using the Internet in this way, the quality manager is able to follow the complaint process on a step-by-step and day-by-day basis. This is the first customer in Europe that has this possibility.”*

[The purchasing employee, Italy] *“Is it possible to see the same process when we order? Ha, Ha? We send the order and then we could see the process; that it is received and is on stock, etc.?”*

As transpired from the above conversation where my job as an interviewer moved to the side line and I let the conversation flow one can see that it was no longer sufficient for the industrial players to receive an answer at some point. On the contrary, it was deemed essential to get information about how the process was running and to have the opportunity to ensure that Danfoss was working on the task. What was interesting about the above conversation was the interest the R&D manager and the purchaser took in the possibility of monitoring the process. It was quite obvious that the

new function was seen as something positive, and the purchasing employee even asked directly if this function was not possible concerning order handling. It is actually possible by means of the DeCom system where the customer can follow the order and see when it has been dispatched from Danfoss – the only thing is she does not know!

After the meeting the R&D manager indicated that this idea could also be used in relation to developing new products when he needed to get in contact with Danfoss employees who had very specific knowledge. Often this was not possible because he did not know how to get into contact with these persons because often they would be in Denmark. In other interviews similar wishes were expressed, that generally the availability of information should be improved, and that there was a need for keeping oneself updated on the process. The fact that it was possible for highly digitalised suppliers to take over the purchasing tasks for the customers and thereby manage their inventory (also called VMI – Vendor Managed Inventory) was also an example many customers stressed. This example was also placed outside the very narrow process of placing orders or transacting. Therefore it was not only the purchasing organisation of the customer that was to be involved in the digitalisation of the customer-supplier relations; there was rather a need for a more holistic picture of the total value and information which Danfoss supplied to the customer. Thus the digitalisation project covered more than the transaction.

#### **4.3.7 The time pressure is gigantic**

At this point in the digitalisation narrative it is obvious that the customers did not at all consider the potentials of the digitalisation of the customer-supplier relations as being dead. On the contrary, the majority of the customers were prepared, technologically speaking, to enter into digital relations, and the vast majority had already involved themselves in projects that focused on internal improvements and improvements in relation to their customers. The customers who were not themselves ready technologically were not dismissive of using the tools which could help them in their workday. However, we still need some information about how the customers actually used these digital applications in the different processes, and what the customers wanted to achieve with the digitalisation of the customer-supplier relations. Which advantages and problems were in focus when inter-organisational and digital applications were to be implemented?

We need not look long for the answer. The customers voiced – across country borders and customer types – to a large extent, an almost insatiable need for information. However, the information must be customised and targeted to the individual company and the situation and need of the individual employee. But what was it in the customers' reality that influenced the workday, and made the information so essential to them? In the following we are going to hear customers in different countries tell about their workday as they perceived it:

[Purchasing Manager, Italy] *“At this moment, when we sign the order, we have more or less 3 month to deliver the plant. We can see three to four month in advance, no more.”*

[Question:] *“If you look 10 years back how has the time span on delivery evolved?”*

[Purchasing Manager, Italy] *“The time span has become shorter – sure, five-to-seven years ago we had a lead time of around six to seven months, today it is only three to four months.”*

In the above, the manufacturer expressed that the time of delivery had become increasingly shorter. This had had the result that the time of delivery within the past five to seven years had been almost halved from six to seven months to merely three to four months. That there had been an experienced time pressure in the whole supply chain was also something a German manufacturer recognised:

[Question:] *“Do you experience a development in the customers’ expectations in terms of time of delivery?”*

[Abteillungsleiter, Antribstechnik, Germany] *“Yes, indeed. Earlier, the routine was that the date of delivery indicated in the documents in the first phase of the offer could be pushed so if a period of time had been used to reach an agreement, then it was added to the time of delivery. But today the first date of delivery stands, irrespective of how much time has been used on reaching an agreement. In the component area the customers expect delivery overnight. (...) Almost no matter what the customers want – they must have it at the stipulated date otherwise the customer will take his business elsewhere. There is always someone who can and is willing to perform the service.”*

Thus the German manufacturer recognised the time pressure that his Italian counterpart also experienced. This is also recognised by the below German Wholesaler as, he indicates how important it is to add the products to the inventory before they actually arrive. This is necessary because the customers buy from the competitors if they see that the product is not on stock:

[Leiter eCommerce, Germany] *“When our supplier loads the product on the truck we get a notice and at this point we add it to our stock – meaning that we actually sell products that have not even arrived at our warehouse.”*

That means that it was necessary for this wholesaler to add products to the inventory at the time when the products left the supplier’s inventory and are on their way to the wholesaler. By doing it this way the wholesaler could give the customer the impression that the product was on stock and thus ensure that the customer would not have the impression that there was an empty stock and therefore turn to a competitor. The time pressure was also experienced in Denmark. In the following we will overhear a conversation with a Danish wholesaler:

[Sales engineer, no. 1, Denmark] *“All people need to receive offers within an hour and preferably yesterday. 20 years ago when we had to order goods in Italy we sent the drawings by post. It could take 15 days to prepare an offer. If it was really urgent it was done by telex in small codes. It was a totally different world – today people fail to understand that they cannot get a reply from Italy within 30 minutes.”*

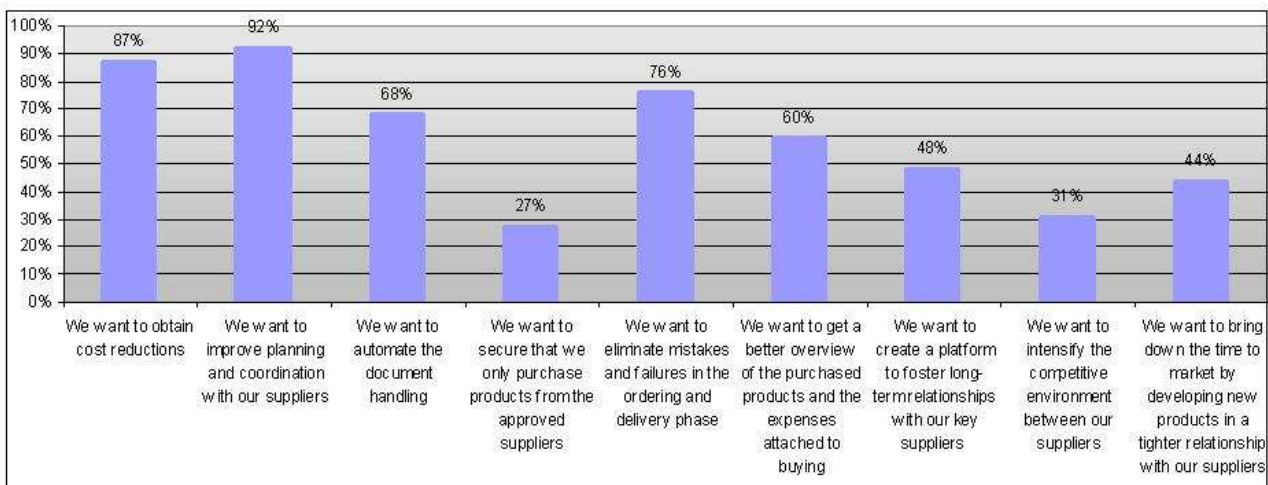
The customers, both the wholesalers and manufacturers, thus live in a reality where the increasing time pressure is an inevitable element of the workday. The increased time pressure influences the daily work in different ways, but the most obvious influence is that the coordination task the customers experience when they have to get the correct goods from many different suppliers within a stipulated time period, explodes. The acceptable error of margin from the supplier’s side naturally becomes smaller when the time of delivery is constantly pushed downwards and is becoming

shorter and shorter. This contributes to a situation where it becomes imperative for the customers to have the information on when the products will arrive, *if* they will arrive, and at the same time make sure that they will be placed at the right spot outside the warehouse. And if there are additional problems with the products they need to be solved instantly, and therefore it is essential to know how far the process of locating the error has come.

When new products are developed the right information needs to be available when and where the need arises, and it has to be in the format (different file formats, etc) that are demanded. The customers also develop different product configurations to be used by the customers to specify solutions and productions. Some of these configurations require data from Danfoss, so that their products can be found and added to these digital product configurations. It is in relation to this reality that the customers assess digitalisation as a potential tool that can contribute to an efficient flow of information between the customer and the supplier.

The coordination and flow of the right information between the customer and supplier are in relation to digitalisation thus areas that are highly prioritised by the customers. The survey results further validate this understanding as 92% of the respondents mention improved coordination with the supplier as an area where they want improvements by means of digitalisation. The other reasons for using digital applications can be seen in Figure 10 below:

**Figure 9 – The customers’ reasons for digitalised relations**



Source: E-readiness Survey 2005-2006

That is, the customers both focus on improved coordination, reduction of costs, automation of different document processes and elimination of errors in ordering and delivery. All these are a result of a perpetual search for efficiency and reduction of the coordination problems which ever increasingly shorter and more compressed terms and periods of delivery have brought about.

#### 4.3.8 Digitalisation year 2006: We know where we are heading – but how?

The results of the customers’ involvement in the digitalisation debate at Danfoss are not presented to the employees in a compressed and condensed form, as can be seen from the above. The results, on the other hand, are presented in two overall rounds, the first round is made up of the 23 interviews, and the second is the results and analysis of the questionnaires. On top of this, the information is circulated through the publication of parts of the results through mails and

conversations and meetings where tentative interpretations and results are presented. Danfoss employees have reacted in many different ways, but their reactions have mostly been low-keyed and of a reflective nature. Many seem to think that if this is the case we must do something about it. A few have reacted with scepticism and a small group says ‘what did I tell you?’

The fact that the original perception of the customers’ priorities and perception of digitalisation among the Danfoss employees was relatively disconnected with reality also triggered other processes. Few employees in the head office are using the results of the customers’ view on digitalisation to support the argument that there could be other areas where the perception at Danfoss is out of synch with the customers’. Different projects have been launched, the same way that the results in relation to digitalisation also nurture the launching of different actions and actual experimental customer-related digitalisation projects. Thus the results have generated a focus and determination in the organisation to test the results that have materialised through the involvement of the customers in the digitalisation debate. In the following section we are going to see how a more proactive approach to digitalisation of the customer relations will manifest itself, and how a few of the experimental digitalisation projects that have been launched will prove to be more or less successful in the future.

## 4.4 Prologue – the dispelled myths and the reactions thereof

*“It makes our production planning easier, as we can immediately get an overview of the product availability at Danfoss. This is good because we can provide our customers with delivery information of their cabinets with better precision.”*

- IT Director – Manufacturer, Italy

*I have, after all, been hired to optimise my business unit and create results in the context of this business unit. I can indeed see that in a Danfoss context this application and possibility are important but if I am to prioritise in relation to our agenda and the fact that recently we have bought companies we need to incorporate into our organisation then there are many projects and endeavours we need to apply our scarce resources to before we can contribute to financing a function like this.*

- Marketing Director

The customers' perspective in relation to digitalisation of the customer-supplier relationship has now spread in Danfoss and employees at different levels of the organisation have reacted differently. From the middle of 2005 to the middle of 2006 a few leading employees associated to the local sales companies and business units launched different digital experiments. The majority of the employees who may have a potential influence on digitalising the customer relations at Danfoss, however, remained passive and merely observed the experiments and the results created. Will they become a success? The following section is structured in the way that the first focus is on the actual organisational measures and decisions which document the energy that has been generated in the wake of the digitalisation debate at Danfoss. Thereafter we will look at a few of the digital initiatives that are launched, and finally we will briefly return to the perpetual Achilles heel of Danfoss: the resources.

### 4.4.1 The digitalisation forces are gathered and become focused

The customers' involvement in the digitalisation debate and the perceptions of digitalisation that arose at Danfoss through 2004 and 2005 means that more employees involved in the digitalisation of customer relations at Danfoss now are re-evaluating the usual routine-based behavioural patterns. An actual example of such re-evaluation is the organisational organ, eTeam, which was re-established in January 2006. The eTeam will be described in depth later in this section. The structure functions as a coordination and decision unit for the three divisions of Danfoss. The eTeam has thus existed earlier, but the significant difference between the former and present structure established in January 2005 is that the new eTeam functions as an actual network where, to a high degree, the participants take part because they find it important for their business units and Danfoss. The former eTeam was set up on the request of the top management.

The new knowledge of digitalisation seen from a customer viewpoint showed that no one in the three divisions in Danfoss would be able to opt out of the digitalisation issues. Thus there was a need and interest among the customers of all three divisions. The different digital needs and

perspectives that were identified with the different customers can, to a high degree, be attributed to customer types (manufacturers and wholesalers) rather than the affiliation to the three divisions. That the customers were grouped in this way was a relatively big surprise and ran counter to the sedated routines, resulting in the understanding that digitalisation was perceived as a decentralised matter which rendered coordination across the divisions a waste of time.

The new perspective of digitalisation means that the divisions have a possibility of finding a common beat in the digitalisation process and see the reason for, and actual advantages of, cooperating in the digital areas between the different divisions and their business units. A new organisational unit, eTeam, has been set up in which leading employees from all three divisions and the biggest business units and Danfoss IT participate. It is persons from sales, marketing and strategic planning functions in the business units across the three divisions and IT specialists from Danfoss IT that meet to decide the future actions within distribution.

That means that eTeam functions as a managing, coordinating and decision organ that has to prioritise and decide the launching and implementation of digital sales-related measures across the three divisions. The eTeam is thus the coordination forum for the whole of Danfoss in the digital sales-oriented area. The coordination is to ensure that the digital innovations that are discovered on the decentralised level will be re-used throughout Danfoss, and that similarly the three divisions will benefit from the experience that is gained in the individual divisions. The eTeam is a unique construction at Danfoss as it is not an organisation or decision-making group set up by the top management or other executive employees. It is a network where the members solely participate on their own initiative and because they feel it is important to pull together the experience the individual divisions and business units make in the digitalisation process at Danfoss. As a result of this the eTeam holds no formal power and thus it cannot decide or implement anything unless the participants agree and work towards carrying through the decisions in the local business units and divisions. The eTeam is to ensure that good ideas and innovative digital applications are not lost before they are tested in an actual customer context. This means that digital applications that formerly remained as an idea now are to be tried or tested via prototypes to determine whether the experiment should be continued. The formal objective of the eTeam was stated as follows:

*“The main area of responsibility of the eTeam is to ensure an alignment between the division’s e-business strategies and the needed corporate governed approach within e-business in order to create conformity and synergies. The scope of the work will be from a business point of view.”* (eTeam strategy description 2006.ppt)

The across-the-division perspective is a fundamental element in this eTeam where the exchange of experience and common initiatives are highly prioritised elements. Thus the eTeam is to launch various experiments which involve more divisions, and in that way the eTeam is to ensure that everyone pulls together in matters of the digitalisation of the customer relations at Danfoss. The eTeam covers both the initiatives relating to the homepage and just as much to other customer-oriented, digital applications that are often implemented between Danfoss and single customers. The tasks are elaborated in Figure 11 below.

**Figure 11 – Tasks placed in the e-Team**

Tasks	How	Examples
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<p>Ensure a common, uniform look and functionality at the Danfoss homepage</p>	<p>Through the Branding Team (operational employees from IT and the divisions work in this team, which are responsible for the implementation of the common Danfoss homepage). With a common appearance and structure the homepage is to be updated and expanded</p>	<p>Throughout 2004 and 2005 the Danfoss homepage has undergone a radical change. It has been converted from many individual homepages into one common homepage that markets Danfoss as a company with divisions and business units, and not divisions and business units each with their own design, which was the case prior to the reorganisation of the homepage</p>
<p>Ensure a common approach to e-business related elements, such as integration, e-marketplaces and e-commerce initiatives</p>	<p>Through the Core Team a common digital tool box is to be made, which all divisions of Danfoss can use</p>	<p>In a period of six months (October 2005 to April 2006) seven integrations to customers were launched. In the two preceding years no similar projects were launched at all. New needs of integrations are identified by the Core Team by means of its contact with actual customers, and these are discussed and shared in the eTeam. The need for a Partnernet<sup>17</sup> is another actual example</p>
<p>Specify future needs and demands to the IT infrastructure, e.g. Content Management Systems and the e-commerce platform</p>	<p>Through the knowledge created in relation to the initiatives that are taken in Branding, Core and the eTeam future needs and demands to the IT infrastructure are identified and disseminated</p>	<p>New business needs such as delivery of new types of information to special customers (Partnernet, etc) define new needs for the IT infrastructure. These needs are discussed from a business angle with the IT specialists who then present their suggestions to a solution</p>
<p>Adaptation and development of the divisions' e-business strategies</p>	<p>Through internal marketing digitalisation and success stories must be linked to the company's general strategy to a wider extent</p>	<p>As the persons in the eTeam have a central role to play in defining and implementing the strategies of the divisions and the business units a shared attitude to digitalisation must emerge.</p>

<sup>17</sup> Description of the Partnernet

		An actual example that digitalisation has entered the strategic agenda is the perspectives from the Heating Division 2006. Here digitalisation is mentioned as a future focus area
Create synergies in relation to costs and market-related synergies. Ensure common learning and knowledge sharing between the three divisions	The learning that derives from the Core, Branding, and eTeam must be shared and exploited fully. Common projects are to be defined, and digital experiments must constantly be identified	The needs and experiments that could not be funded by the local business units can now be presented to the eTeam. If several members find that it is a good idea, the resources may be found. An example of his is the Partnetnet which is a concept the eTeam is treating because of an immediate need in MC

Source: eTeam strategy description 2006.ppt; Meeting minutes eTeam meetings 30.03.06 and 16.06.06

As can be seen in Figure 11 in future the eTeam is to function as a cross-organisational digitalisation forum for Danfoss. I choose to call it forum since the eTeam very much functions as a network within which the individuals participate with the understanding that there are huge resources hidden in such networks as far as digitalisation is concerned. It must be mentioned that the eTeam's role is only to coordinate the customer-oriented and thus sales-related digital initiatives, from further development of the homepage to integration to e-marketplaces and specific customers.

The operational part of the task is delegated out to the Core Team and the Branding Team. The two teams also consist of employees from all three divisions and Danfoss IT, and they are responsible for the operational specification and implementation of the projects launched by the eTeam. The members of the Core Team are typically e-business employees who handle the practical implementation of the digital applications together with the business units, the sales companies and Danfoss IT. The Branding Team is the other operational organ which handles the development and updating of the homepage. The division of tasks between the Core and Branding Teams is that the Branding Team undertakes all the tasks in relation to the homepage, and the Branding Team takes care of the rest, e.g. the integration of customers, DeCom, etc.

Parallel with the creation of the Eteam the digitalisation of customer relations was put on top of the agenda in single business units in other ways. In relation to the annual perspective development and presentation in 2006 a business unit in the Heating Division decided that digitalisation of customer relations should become a focus area in the coming years. Similarly the local sales companies and business units have begun demanding various digital solutions in relation to customers which naturally creates a different need for coordination among the three divisions, Danfoss IT, and the local sales companies and business units.

The local Danfoss sales companies, especially in relation to Refrigeration & Air Conditioning and Heating have thus begun to present customers who have showed interest, or may be interested, in different types of digital applications with different digital alternatives. In many cases it used to be the customers at Danfoss, who approached Danfoss with specific needs and wishes. But a new pattern seems to be emerging, and that is that the local sales companies and business units, due to the support they receive from the Core Team and eTeam, are now proactively communicating these possibilities and solutions to the customers. Thus the Danfoss organisation has adopted digitalisation of the customer relations in a way that is unprecedented, and now it has begun to bring out these possibilities to the customers at several levels. An actual example of this activity is the fact that in a six-month period (October 2005 to April 2006) seven Danfoss-initiated integration projects were launched, in which the IT systems of seven customers had to be merged with the Danfoss IT systems. This number is high compare with the preceding two years in which no projects of this type was initiated at Danfoss. Another example of the activity is that from November 2005 several implementation and training seminars were held concerning the use of DeCom in the following local sales companies: Sweden, Norway, Finland, Poland, Italy, Slovenia, Hungary and the Czech Republic. In continuation of these seminars it can be documented that, in a relative short period of time, the single business units received more than 20% of all their orders digitally through the DeCom system.

It should be mentioned that at this time we find ourselves in the first hesitant beginning, and therefore a rise in the activity can clearly be detected, but there are still many employees who doubt the digitalisation of the customer relations and therefore place themselves on the side line. In other words, they keep a wait-and-see approach to this area. The eTeam is also going through a turbulent process where the participants in the networks question the 'raison d'être', but there are on-going discussions about how the network is to be used, and especially whether a new project is a local matter or whether the eTeam is to be involved.

### **Proactive means new routines**

Few vice presidents and other executives that are supervising the local sales companies and business units are beginning to change their attitudes to the role of digitalisation in 2005. Thus funds are earmarked to create new and specialised digitalisation positions and hiring of dedicated e-business consultants is initiated in several divisions and business units<sup>18</sup>. The paralysis that has characterised digitalisation of the relations to the customers are now eased, and the employees feel prepared to the extent that they are launching actual projects where the customers can get acquainted with the digital applications Danfoss is offering. The dedicated e-business consultants will facilitate this process and assist local sales companies with finding customers who may be interested in either using the DeCom system or to be candidates in the integration between the customer's and Danfoss' IT systems.

The goal is to digitalise the relationships to the customers by making different processes efficient and offering them an extra service so they can more easily gain access to vital information. This helps identify new needs among the customers which can be fulfilled by using the digital interfaces. The many orders that are received by fax or e-mail are especially at the centre of attention. The perception is that many resources are used at Danfoss to process these orders, and also strange mistakes may be made, which can be eliminated if the customers themselves place the order directly in the Danfoss IT systems. Other business units focus more on the processes

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<sup>18</sup> The MC division and the Food Retail business area of RAC hire dedicated e-business consultants in this period.

following right after the order, and they enter into a close collaboration with the customers about examining the possibilities of Danfoss receiving a daily inventory status instead of an order and then on the basis of a previously agreed min-max size of the inventory themselves decide when and which sizes have to be delivered. The system is also called VMI.

The bursting energy hit the central digitalisation departments as a wave. For a long time the departments have been working with digitalisation, mainly in an internal context and otherwise 'preached e-business', as they say, to the rest of the organisation. Now there are more inquiries than there have been for a long time, which naturally increase the activity level in the organisation. The many suggestions for changes, minor errors and adaptations which are localised in the IT system and they are used for a variety of purposes create a heavy workload for the central employees in the organisation<sup>19</sup>. The fact the individual divisions do not have an adequate contingency to handle these many inquiries naturally increases the workload among the other e-business employees, irrespective of which division has the problems, because the problem has to be solved anyhow. When the practical, operational tasks are put together with the significant travelling activity the employees also experience due to activities created locally in many countries creates a heavy burden on the employees who work with customer-related digitalisation issues in the centralised organisation at Danfoss. In periods the burden is so massive that the operation alone requires over 100% of the capacity available, and therefore, due to capacity limitations, projects of an experimental nature with interesting innovative elements are shelved. This also means that the individual projects are postponed for long periods of time that they eventually must be discarded because the basic conditions for the experiments have changed.

It is not only the employees in the central divisional organisations who feel the new winds of digitalisation at Danfoss. Some employees in Danfoss IT also experience changes as it is now mandatory that they pay visits to the customers to find and specify the correct technological solutions for the individual customers, etc. When the projects move from specification to implementation it requires that the employee communicates directly with the customers, which is often unproblematic. There are examples, however, of few employees having been so inexperienced in contact with the customers that, at various points, communication with the customer has caused problems. All in all, the proactive approach to digitalisation means that several different parts of the Danfoss organisation have to cooperate across organisational borderlines, which actually is done without any major problems, to the great delight of everyone. The relatively new organisational measures such as eTeam, the Core Team, and Branding Team have turned out to be good organisational platforms and network to facilitate the coordination and exchange of experience across the divisions and business units.

As mentioned already the proactive approach in the Danfoss organisation means that new needs for digital applications are identified that the existing digital tool box at Danfoss is unable to handle. The new needs are of very different types. A few are suggestions of new small applications to be added to the DeCom platform. Other needs consist of outright innovations seen in a Danfoss

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<sup>19</sup> The workload is so big that it has been established that there is a need for moving the daily service of DeCom from the Core Team to the Global Business Services Organisation (GBS). GBS already handles the daily servicing of the SAP infrastructure and several other related tasks. It is estimated that DeCom is now mature enough to become fully operational, which means that GBS now have to take over the daily servicing and training of the super users. This means that local GBS employees in the individual sales companies are now being identified as local super users in relation to DeCom (Source: meeting at the GBS Business Board, May 2006)

context because it involves new technology that is to be applied in a new and untested way in relation to customer-related processes that have not been digitalised formerly. Although there is a significant workload on the departments that are to support this proactive policy, in this period, individual experiments are launched and implemented.

#### **4.4.3 Digital experiments are launched**

The energy that is gradually and quietly built up at different levels of Danfoss in relation to digitalisation of customer relations is being manifested through various measures, or experiments, that are launched to individual customers. In these digital experiments the process is unknown to the Danfoss employees at the beginning of the project. That is both the technical platform, the procedure that guides the project, and the cooperation between Danfoss IT and the rest of the organisation, and ultimately the results. The big difference between now and then is that from the beginning these projects involve customers with articulated needs. The different experiments cover both automation of document handling between Danfoss and the customer, as well as the delivery of tailored information to the single customer.

The most challenging experiment is being launched with a relatively big Italian manufacturer<sup>20</sup>. The experiment focuses on automation of various documents and the derived flows of information between Danfoss and the customer. In short, the application of a new technological platform is to create a controlled flow of information between the two parties so that the customer can place orders directly in Danfoss' IT system. Then the order is to be submitted electronically and to be stored automatically in the customer's IT system. If, for various reasons, Danfoss should choose to change the delivery dates for the ordered goods, the customer is automatically notified, and will immediately be able to see this on his own IT system. When the component is dispatched from Denmark the customer is again automatically notified, and a bar code is placed on the package so it can be scanned on reception. This furthermore facilitates the customer's handling of the delivered articles. The experiment is not only an experiment for Danfoss, it is also the first time the customer is involved in a solution of this nature<sup>21</sup>; therefore the project is groundbreaking, both for Danfoss and the customer. Danfoss and the customers may have an idea of the actual advantages and savings, but the issue has not been examined or described in detail. As the customer says, these solutions are the way ahead, and therefore one has to participate. The project was discussed for a somewhat long period of time but the implementation was begun in October 2005. In the next section we are going to see how the experiment is coming along.

The other experiment that is launched covers other phases of the relations between the customer and supplier than merely automating the document. The experiment came into being in early 2005 and representatives from the customer's organisation were invited to a meeting at Danfoss where the needs were discussed. The meeting had a span of 1½ days. At the meeting there were participants from Danfoss: people from the local sales company and centrally placed employees. In this case the customer is one of the biggest and most important customers of Danfoss, and therefore the project received a good deal of attention. At the time when the experiment was in the early

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<sup>20</sup> This integration project is an actual example of the above-mentioned dedicated e-business employee who was hired in the business unit of Food Retail. The customer has thus been contacted by this e-business consultant from Danfoss, and from then on the integration project has taken its form.

<sup>21</sup> In this connection it should be mentioned that for many years the technology to automate the flow of various documents has been available. The new is that net-based technology is used. This makes the above solution significantly faster to implement and significantly cheaper. The possibility that customer-specific bar codes are placed on the packages and delivered to the customer is, however, a relatively new and innovative solution.

stage the customer was involved in implementing a new IT system, and therefore was not immediately interested in a solution that required that the IT systems were to be integrated and merged. The customer was more interested in getting customised information delivered on an exclusive homepage that was only available to the customer's employees. The project was named Partnetnet because it was an Internet site for one partner. The customer asked for a number of tailor-made information which seen from Danfoss' point of view ranged from pre-sales to sales and after-sales processes. That is, it was a digital application which could handle configurations and choice of products, ordering, information about delivery times, complaints, technical questions via chat rooms, direct contact to Danfoss people and a platform for common projects, etc. The whole idea of Partnetnet is that the customer gets exclusive access to all the interesting information Danfoss delivers.

The Partner experiment lived on for several months, during which time both Danfoss and the customer worked on the project, but due to technical and organisational problems, and the fact that the customer is bought up by a third party the actual project was discontinued in October 2005. However, the experiment has documented that there is a need for a digital application that can handle these highly versatile tasks. The experiment is carried on in a common project rooted in the eTeam where all three divisions participate in the project and the Partnetnet concept is being uncovered and defined. Similarly, the customer types that are to benefit the most from a Partnetnet need to be identified, and representatives of these customer types then need to be invited to participate in developing an actual prototype.

The above initiatives, both the different teams and the actual digitalisation projects, represent a real change in attitude at Danfoss. Now Danfoss seeks out the digital possibilities. The fact that the customers involved in the experiments are responding in a very positive way (both in relation to being selected to participate in the experiment and in relation to the possibilities they are introduced to when the digital application have been developed and implemented) contribute to giving more positive energy to the experiments. But the experiments also run into problems, which we will look at in a later section.

#### **4.4.4 The first success is achieved**

October 2005 marks the point in time when the digital customer-related experiment focusing on automation of the flows of information between Danfoss and the Italian customer moves from specification to implementation. At this point in time all the initial problems have been solved and the IT organisations of the customer and Danfoss, can set to business and start implementing the solution. The implementation is made without any major problems, and by January 2006 the solution is ready to become air-borne. Thus it has taken three months for the two organisations to specify the solution, which is deemed acceptable bearing in mind that it is the first time the respective organisations have implemented a solution of this type. The period to be used to implement similar solutions is expected to be significantly shorter in the future and accordingly the costs are expected to be lower.

The implementation and the actual experiment are assessed to be a success, both by Danfoss and the customer. Documents and information are flowing directly between the two IT systems which amounts to fewer sources of errors, a reduced time consumption, and more up-to-date information. At an evaluation meeting in Italy in May 2006 the customer's IT executive said:

[IT Director] *“We know that integration is the way forward, and the fact that the information now flows faster between Danfoss and us, we have improved the entire process from ordering components until the finished products, arrives at the customer’s doorstep. Paper takes time and every hour you can save throughout the process is good.”*

Here the IT executive both refers to the fact that information flows more easily between the customer and the supplier, and that resources are saved as processes involving paper and fax can be eliminated. Although resource-consuming processes can be eliminated it is obvious at the meeting that the customer assessed the advantages found in the improved flow of information and the fewer potential sources of errors to surpass the saved resources in terms of time.

Danfoss can be pleased that the customer is more satisfied now than before the experiment was implemented. The internal resource consumption relating to handling the customer has been reduced as many processes have been automated, and the customer follows Danfoss more closely now that vital information is delivered promptly, also in case formerly agreed delivery times are changed. This means that the customer is able to supply more precise information to his customer, which is explained by the IT executive:

[IT executive] *“It makes our production planning easier, as we can immediately get an overview of the product availability at Danfoss. This is good because we can provide our customers with delivery information of their cabinets with better precision.”*

The experiment turns out to be a success, and both the supplier and the customer are satisfied. The Danfoss organisation has learned a lot, also that extra technological solutions need to be accumulated before Danfoss will have a digital range of products that can cover the customers’ needs. Through the experiment it appears that there may be other more efficient ways of handling these integrations which is presented to the eTeam, which in turn initiates a process where the new technology is analysed and the utility is localised. (Meeting minutes eTeam meeting 16.06.06). Especially the changes that are to be made in the customer’s IT systems may possibly be handled in another and more efficient way whereby the investment at the customer’s end becomes radically lower. This requires a new experiment and a new customer, who wants to participate in the development and testing of such a solution.

#### **4.4.5 But the trees do not grow into the sky – who is paying?**

The projects that have been launched are often very educational, both technologically and organisationally. And the process of uncovering, specifying and implementing the project later on provide new aspects and tasks that the employees have not worked with in this context before. Naturally, this means that different ingrown routines and procedures have to be re-evaluated; a few employees’ job description will change and other employees will now have contact with the customers, which was not the case previously. All in all, many new elements that in combination help increase the learning which the employees who are working on the project will reap.

Just as the costs of the launched projects often will be highest in case of experiments and will gradually fall as the projects move from being experimental to becoming operational, the costs the rest of the organisation incurs are also biggest in the cases where new concepts are tested. As has

been noted earlier, it is the business unit, or the sales office that has the customer that, in practice, pays the development costs on behalf of the whole Danfoss federation.

An aspect that naturally needs to be included in the contemplations within the business units and the local sales company is the fact that the experiment in relation to the total Danfoss federation potentially covers an innovation that may be of vital importance for the company future. But if the prioritisation is to be made in relation to the local customer the costs are often excessive. This fact seriously threatens to kill off a few of the above-mentioned experiments. There are however extraordinary solutions which reduce the costs in relation to the actual experiment whereby they can be accepted and justified by the business unit and the sales company.

In relation to other digital projects and potential experiments this local perspective is a direct way to kill the initiative. One can still hear statements at Danfoss and in the eTeam that go like this:

[Marketing Director] *“I am hired to optimise my business unit and create results in the context of this business unit. I can see that in a Danfoss context and in the perspective of the whole business of Danfoss this application and possibility are important, but if I have to prioritise in relation to our agenda and the fact that recently we have bought companies that have to be incorporated into our organisation then there are many projects and efforts we need to spend our scarce resources on before we can help finance a function like this.”*

That is, the local focus and agenda of the individual business unit are therefore more important in the perspective of the actors than the well-being of the federation. This behaviour can in a way be explained by the widespread routines that have existed at Danfoss for many years. The narrow focus on the business units and divisions' ability to deliver RONA and EBIT and the many restructurings the company has undergone with the objective to decentralise the responsibility in the company. But in terms of digitalisation of the relations to the customers it is definitely not a behaviour that enhances the development.

Generally these structures influence the digitalisation situation in the Danfoss federation and the local decision makers in the sense that existing investments in technology are fully exploited, and new investments in technology are only made when they are absolutely necessary. On the other hand, it has meant that, almost as a rule, new and untested technology has been avoided and instead worn-out cheap technologies have been preferred. The big problem is that the above priority exclusively is made on grounds of economic considerations that totally disregard the potential significance of the new projects in relation to their innovative possibilities seen in a Danfoss perspective. Furthermore, it means that essential learning is lost and potential innovations are not discovered since new projects are not started or receive lesser resources so that existing technological platforms can be used.

As described the above, although the experiments ran into problems, these were not bigger than the experiments could be solved. The implementation of the solutions was therefore commenced in October 2005. Due to the behaviour described above, and the focus on local priorities rather than the general well-being of the federation, other experiments appear to face an uncertain future, and the cooperation in the eTeam is not altogether frictionless all the time. Naturally, with the present structure and organisation of the company, the question is whether the actors will ever be able to

put the federation's perspectives before the local agendas and thus give higher priority to common projects rather than local projects.

#### **4.5 But where is the digitalisation strategy?**

At this point in time (late 2006) lots of activities and actual customer-related measures are being carried out across the three divisions that make up Danfoss (Meeting minutes eTeam meetings 30.03.06 and 16.06.06). The interplay between Danfoss IT and the three divisions has improved significantly although there are still problems. Through many people's concerted efforts spanning three years great parts of the organisations have now changed their attitude and are acting in a more proactive way and are more explorative in terms of digitalisation and customer-oriented processes. A more proactive attitude can therefore be identified but still there are many doubters, and eTeam and the other teams have not yet firm ground under their feet. The collaboration process is far from established. The divisions' cooperation and coordination have improved, although there is room for improvement. Therefore one may ask oneself: where is the digitalisation strategy, and does it still exist?

The Danfoss narrative was started with a wish to get a greater overview, and not least a strategy for the digital customer-related measures the company wanted to take. If we understand 'strategy' here to mean a document where the analysed and planned process has been described on the basis of data collection for implementation, everyone can see that there is no strategy. On the other hand, many things have happened in the past three years. An employee reflects on her experience of the period from 2003 until today in the following words:

[Strategic Planner] *"The most crucial thing that has happened in this period is that our original assumptions of the customers have been buried. It is another world picture we work with today – the myths have been buried. (...) We have also become aware of how big an asset we have in the other divisions in Danfoss. Originally we had the attitude that we knew best ourselves, and that our markets and customers were so unique that collaborating with the others was out of the question. We have now become aware of the other divisions and that we are strong together. It is a real competitive advantage that together we have muscle because of our ability to carry through several experiments in the digital area than we could handle on our own. Today experiments that are launched in one division is followed by the others, and therefore we can learn from each other's experience and avoid spending resources on developing the same applications in several parts of the organisation as was the case before. "*

[Question:] *"Do you then have a digitalisation strategy?"*

[Strategic Planner] *"We have the start of a strategy because we have become proactive and have acquired a flair for experiments. We have become more action oriented and thus we have to find out which focus we want in the future. What our procedure is to be like, and how we are going to solve the tasks (...) easily and quietly the strategy will grow from these actions – it is still a bit unclear as to which route we are to follow. But we need success stories and good experience to get on."*

[Question:] *"But you haven't analysed and described it in a strategic document which is usually customary at Danfoss"*

[Strategic Planner] *“A document does not define whether there is a strategy – the recognition is the strategy. In that way the strategy will never be completed. But we will increasingly become better at spotting the possibilities digitalisation offers. Here it is important to keep in mind that we will never reach a point where we can say that now we have the strategy. The strategy is not a goal that has to be reached, it is more like a process or a journey by which the direction becomes visible through actual actions with actual customers. (...) It is a process which involves all parts of our company. The digitalisation responsibility is not restricted to a digitalisation department. It is something that will impact on the whole company. This is also what makes it so unmanageable and fluffy.”*

That is the situation at the point of time (late-2006) where we leave the Danfoss narrative. Many exciting activities are going on across the three divisions that make up Danfoss. There is no *grand finale* to the narrative of customer related digitalisation in Danfoss. There is only a realisation that, in collaboration with the customers and through actual actions, one must travel and visit places unknown to one today. Only through action can meaning be created, and with meaning the next steps in the digital fog will emerge. The game is influenced, new actors may appear, existing actors may disappear, power bases may erode and structures may change.

This is what the future is made of!