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**The Performance of Different Organisations
under Different Marked Conditions:
An Empirical Analysis of the Organisational
Structure and Performance of 1900 Danish Firms**

by
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Conditions: An Empirical Analysis of the Organisational Structure and
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Abstract

Among some scholars of management, organisation and also economists as well as policy makers it is argued that certain new forms of firm organisation such as flexible and learning organisations increasingly are becoming “best practice”, in an increasingly learning and global economy. On a policy level, in eg. Denmark and OECD, questions are already asked as to how policies should be set up to stimulate such organisational forms. A crucial aspect that is recognised by some scholars, is that it is in certain competitive structures where flexible and learning organisations are well suited, though tends to be overlooked within the debate. The analysis in this paper applies performance data from Statistics Denmark merged with survey data of organisational forms, management, work practices and employee skills collected through a questionnaire in 1900 Danish firms in manufacturing as well as services. Applying regression analyses we show that the flexible or learning organisational forms in some parts of the economy, characterised by innovation turbulence and cumulativeness, are best performers though not in general. We argue that a quantitative analysis as ours is vital to both avoid idiosyncratic generalisations among scholars as well as policy makers, and to give rigid and more detailed implications for policy regarding firm organisation, both at present and in a dynamic setting.

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Organisation of the firm, performance, learning, innovation.

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Contents

1. Introduction	1
2. Theories of Changes in the Economy and in Firms Organisational Response	3
3. Firm Organisation	5
4. Analysis of Firm Types	7
5. The Performance of Firms in Different Markets	14
6. Conclusion and Some Policy Implications	21
References	25

1. Introduction

Within economics it is generally agreed, that differences in e.g. factor endowments and especially technological capabilities matter for the trade- and growth performance of countries; a substantial amount of empirical analysis indicates the validity of these assumptions. Though factor endowments and technological capabilities as well as investments and labour costs do give some explanation to macroeconomic performance, in recent years a new “factor” has entered the discussion. In a broad sense, this new factor is related to differences in the organisation of production; a particular issue being the macro economic impact of differences in the firm’s organisation of its functions and production. The decisive importance of a firm’s organisation, the capabilities of its management and its strategy for its overall economic performance are well studied issues in the field of management and strategy studies; these issues are now regarded as important explanatory variables when discussing macroeconomic performance.

In academia as well as in policy circles the terms ‘the flexible organisation’ or ‘the flexible firm’ are often used to define an emerging form of firm organisation. It is argued that presently the flexible firm organisation is suited to perform better than the traditional organisation. The explanations of why flexibility at present, and perhaps even more so in the future, is a best practice in relation to firm organisation and strategy, often take their point of departure in the assumption that there have been changes in the competitive environments, the market in which the firm acts. It is argued that such changes occur due to severe *structural* changes in the economy, an increasing pace of technological development, changes in demand and an increasing globalisation. These changes cause turbulence and instability in the markets to which the firm must react in order to stay competitive. In prolongation, a flexible rather than a traditional organisation is believed to enable the firm to respond faster to such changes.

Possible differences between countries in terms of the performance of organisations, and more broadly in the organisation of production, might ultimately reflect themselves in differences in macroeconomic performance. Some studies indicate that there are differences and that these differences do matter (Lazonick & West 1995, Womack et al. 1990, Andreasen et al 1995). On a policy level such findings impose questions in terms of whether (and if so which) policy measures can be set up to support changes in firms’ organisations e.g. what institutional changes will be needed to support the diffusion of flexible organisations. In some policy circles

these questions are already being posed (Denmark), even if tampering with firms' organisation is tricky (Erhvervsministeriet, 1996).

While an increasing amount of studies argue that flexible organisations are the most productive and effective, these studies mainly rest on case material. The objective of this paper is to test if - and under which conditions - the proposition of the superiority of the flexible firm holds. We do not claim that non quantitative studies proposing that firm organisation matters for firm growth as well as macroeconomic growth are wrong. But we do propose that these propositions should also be supported by more quantitative analysis both in order to verify the proposition and to bring the proposition a step further.

The analysis in this paper is based on data collected in a survey of 1900 Danish firms in 1996; the firms belong to manufacturing as well as service and hence represent a full picture of the firms in Denmark. While some claim that there are fundamental differences between service and manufacturing firms (Lovelock & Wandemere 1994), such a comparison is not the objective of this paper. Rather, the aim is to analyse whether flexible firms are more successful than more traditionally organised firms. The measure of success applied relates both to the level of and the growth in labour productivity. The analysis is carried out in order to test the predominant claim that flexible firm organisation is becoming best practice in the light of market turbulence and the increasing pace of innovations brought not only to the product market but also to the process. Following these lines of argumentation, it must hence be assumed that the flexible firms are best suited in highly turbulent and innovative markets, while not necessarily in more stable markets. In order to test this assumption we apply a taxonomy of the economy developed by the Danish Ministry of Finance; the taxonomy which is based on a supply and a demand side perspective dividing the economy into four different competitive market types (Finansministeriet 1996).

The rest of the paper is structured as follows: As a starting point *section two* discusses the changes in the economy which are believed to favour a flexible organisation. *Section three* presents some of the firm responses to the changes and discusses the core characteristics of a flexible firm. In *section four* a taxonomy of firm types is developed and analysed according to relevant variables using a probit regression. The aim of the analysis is to test the behaviour of the four firm types both in order to verify our taxonomy for later analysis but also to reveal

differences which may lead to some policy implications. In *section five* the taxonomy of markets in relation to the competitive pattern is introduced and then applied in the analysis of performance of the four firm types which is tested in two regression analyses. Finally *section six* concludes on the analysis and turns to some implications for theory and policy.

2. Theories of Changes in the Economy and in Firms Organisational Response

As mentioned in the introduction, the argument that the flexible organisation is a superior organisational form as opposed to the traditional Taylorist firm often rests on the premise that ‘things have changed’. It is with regard to the adaptation to these changes in the economy that flexible firms or organisations are seen as becoming superior. Regarding this matter, some ideas and controversies will be presented below.

Globalisation is a concept increasingly used as an explanation or as a definition of the present state of the economy. For some the, globalisation of the economy is an effect of the free trade agreements and free movement of capital being cornerstones in different trade agreements like eg. EU, NAFTA and WTO; the outcome of globalisation being that to an increasing extent companies move parts of their sales force, production and development to other geographical locations than their home country. For many of these new affiliates opened by multinationals or large corporations the target countries are Asian or more recently countries in the Eastern European regions. The globalisation is said to increase competition and efficiency, mainly since the firms engaging in these globalisation processes situate the affiliates in order to benefit from e.g. low labour costs, hereby gaining cost reductions that can be used to lower prices or otherwise improve the competitiveness of the companies’ product. More recent studies indicate that it is not only large corporations that engage in globalisation and neither only low knowledge-intensive and low labour cost jobs that are affected by the process of globalisation. Hence, there are examples such as software being produced in India and engineering being improved and developed in Poland at a much lower cost than in the developed or more wealthy countries (Erhvervsministeriet 1996). However, there are controversies among academics as to how much is actually globalised. While some argue that to some extent today the economy is already global and at a fast pace is becoming more global, others argue that this scenario is an overshoot and that not all parts of the production (e.g. knowledge creation) is likely ever to become completely globalised.

Another explanation of turbulence and the need for restructuring is the *structural change* explanation, especially advocated by neo-Schumpeterians such as Perez (1983) and Freeman & Soete (1994). Within this line of thought the decline of the Fordist system and the emergence and expansion of the microelectronic system cause structural changes and these changes have widespread effects on the economy and even more so on the society as a whole. The basic argument is that the structural changes are a consequence of the recession in the late 1960s and in the 1970s caused by the exhaustion of the Fordist system which was challenged by the emerging and pervasive microelectronic and information intensive system. In the 1990s structural change occurs ever faster while the new technological system, offering new growth potentials, is being consolidated as the ruling paradigm. In each technological system there are distinct technological opportunities which affect production. The new opportunities cause rise for some and fall for others; new needs emerge and restructuring of production, but also of policies, institutions and society, takes place to support the growth of the new technological system (Tylecote 1992, Freeman & Soete 1994).

A third, and final perspective, to be touched upon relates to the structural change argument, emphasising, on the one hand the *opportunities arising from incorporating microelectronics and information control into production*, and on the other hand *changes in demand*. This perspective was put forward by Piore & Sabel (1984). The basic argument is that the existing Fordist mass production system will be replaced by a flexible production system. The changes in demand towards non mass goods can then be met by the opportunities given when applying microelectronics in the production. When demand changes towards individualism turbulence is rising on the markets. A key to survive in such markets is the ability to quickly fulfill new needs or arising niches.

From these (if not complementary then at least not opposing) lines of thought, it is obvious that the economy is in a flux where firms, as well as nations, must adjust to new needs and opportunities in what some have labelled 'The Learning Economy (Lundvall & Johnson, 1994). In this paper we will analyse if one of these adjustment measures at the firm level, flexibility, is a rational response to the new needs and opportunities.

3. Firm Organisation

In the organisational and managerial literature on strategic management, competing organisational approaches are advocated as a response to the increasingly turbulent markets where competition is argued to become ever more fierce. Some of the most significant new contributions are (i) the resource based view (Wernerfeldt, 1984), (ii) the dynamic capability approach (Teece et al., 1994), (iii) the core competence theories (Prahalad & Hammel, 1990) and (iv) theories about the learning organisation (Senge 1990). While the three first relate to the strategic level of the firm, leaving the actual processes of production within the firm untouched, the fourth (the learning organisation) relates directly to the internal organisation of production. Since the efficiency gains from internal organisation routines is the focal point not only of this paper but also a recurrent theme in the policy debate on flexible firm organisation, we will proceed by discussing some of the contributions concerning learning organisations and the field of organisational science, in which the concept learning organisations is nested. Hence, in what follows *rather than discussing flexible organisations and flexible firms we concentrate on the concept of learning organisations and related organisational concepts*. The main reason for this procedure being that in some sense the term 'flexible' has become a buzz word and used in many different respects bearing different meanings. There are a number of ways in which a firm can be flexible; e.g in its output, in relation to markets or in its capital. With regard to the intra organisational aspect of the firm, the firm can be numerically flexible or it can be functionally flexible. The flexibility which will be the turning point of this paper relates to functional flexibility (Gjerding ed., 1997).

The learning organisation represents an elaborated version of a functional flexible organisation. The purpose of the discussion on this matter is to highlight the essential characteristics of such an organisation, which later on serves the purpose of creating a taxonomy of the firms in the data set to be analysed.

A central idea underlying the concept of a learning organisation is that the organisation must focus on learning and the ability to learn (and un-learn) in order to remain competitive in a turbulent and innovative environment. The learning organisation seeks to utilize and develop the whole of its human resources in order to constantly improve and adapt all its functions as

a response to turbulence and competition. Since the first introduction of the concept (Senge 1990) an immense amount of books and articles have been written. Many of these contributions are written by and for practitioners (consultants and CEOs) and include checklists and methods for stimulating learning within the organisation or to measure the learning capacity of the organisation. Hence, while the learning organisation is regarded as a new concept, the basic ideas concerning the organisational set up have a lot in common with earlier contributions in the field of organisational science. The organic organisation presented in Burns and Stalker (1994) which was first introduced in the 1960s, the integrative organisation described by Kanter (1983) in the 1980s and the knowledge creating company (Nonaka & Takeuchi, 1994) are all quite similar to the learning organisation. They all stress the importance of full utilization of the employees skills, the transfer of tacit knowledge and a continuous development of the organisation and the routines within it (not governed solely by top management) as a response to innovative and turbulent markets.

The learning organisation can be regarded as a bottom-up organisation where the individual, or a group of individuals, close to the problem or task at hand, has responsibility and power to confront the problem. The organisation is perhaps most properly defined by *not* being based on an instrumentalist idea, i.e. of top management controlling the organisation. Opposed to instrumentalism, these new forms are rooted in cultural governance, trying to integrate functions based on a holistic view. The firm is not seen as an internal factor market, where departments are separate units, each with their own goal competing with units outside the company.

Another core element, seen in a Leavittian perspective, is that organisations are understood as organisms characterised by continuous development, where organisational change is not seen as a process of 'freeze-change-freeze', but rather as constant change (Leavitt, 1986; Leavitt, 1988).

In order to induce and structure the principles applied in the learning organisation some management techniques (such as work teams, integration of functions, learning by doing, employee competence plans etc.) are strongly associated with the learning organisation. In more popular contributions the emphasis is on establishing open office landscapes, knowledge

sharing schemes and advanced IT networks. All of these techniques and suggestions have as their principle aim to support the creation, distribution and use of knowledge and information within the organisation.

The main aim of undertaking these measures is a more efficient organisation with less control and an ongoing development of all routines in the firm, with all employees engaged in not only single, but also double loop learning (Argyris & Schoen, 1978). Further, the knowledge creation should be embodied in product innovations allowing the firm a premium price for its products. Last but not least the aim of the learning organisation is to ensure an ability to react fast to changes in technology, demand and competition and to be able to exploit new windows of opportunity as they emerge.

The following section takes its point of departure in the development of a taxonomy of four different types of organisations on the basis of the data mentioned in the introduction. It is important to stress that the questionnaire did not include a question on whether the firm was organised as a learning organisation or a traditional organisation. Hence, a synthetic measure of the organisational type is made by applying the firms' answers to questions; questions which are related to the above discussion of the characteristics of the learning organisation and the traditional organisation.

4. Analysis of Firm Types

This section develops a taxonomy of four firm types: The learning firm, the static firm, the innovative firm and the organic firm. These four firm types will represent the dummies which are used in the regression analysis later on. From the presentation above of the learning and the traditional (Taylorist) organisation, some key characteristics and differences in management techniques and in human resource management were outlined and it is these different characteristics which are applied for developing the taxonomy. The empirical part of the paper is based upon data collected in relation to the DISKO-survey; a detailed description of the data and the survey can be found in Gjerding ed. (1997). In the following the questions (or variables) chosen in order to differentiate the firms are presented and discussed.

The focus on *knowledge creation* in the learning organisation is central. This creation must be manifested in the products sold by the firm. Therefore learning firms must innovate and hence innovation is one variable in our taxonomy. In the questionnaire we ask whether or not the firms have introduced new products in the period 1993 -1995. If the firms have responded yes, we will label them as being innovative.

The variable characterising the internal organisational set up must include whether the workers are given competencies and responsibility; further there must be a willingness to change and finally co-operation and communication must be central. The actual questions are:

- whether the employee himself is in charge of daily planning;
- whether the employee or the floor manager is in charge of weekly planning;
- whether the firm has changed the demand for skills towards better ability to co- operate and communicate;
- and whether the firms emphasize the workers' ability to adjust to new circumstances.

If all four conditions are met with a positive reply we label the firm *organic*. With these two variables (innovative and organic), a taxonomy of four firm types/organisations is created (Table 1).

Table 1: Four Firm Types

<p><i>1. Static firms. 810 firms (42%)</i></p> <p>The organisational structure is expected to be hierarchical and stable with division of functions and labour. The reason for this expectation is the negative response to the variables in relation to the organisational mode. The static firms have not introduced any product innovations (neither incremental nor radical). Therefore, the static firms produce non novelty goods.</p>	<p><i>2. Innovative firms. 658 firms (35%)</i></p> <p>These firms innovate and the organisation is expected to be similar to that of the static firms. In the innovative firms learning processes are explicitly expressed in new products. However, this does not qualify the firm to be characterised as a learning firm, since the learning can be localized in one department leaving the rest of the organisation a 'static'.</p>
<p><i>3. Organic firms. 117 firms (7%)</i></p> <p>These firms do not product innovate, but are organic in the sense that they respond positively to the organisational variables. The organisation is expected to be less divided, both in accordance to function and labour, and we expect the firms to emphasise the development of the workers skills.</p>	<p><i>4. Learning firms. 302 firms (16%)</i></p> <p>The firms create knowledge which is manifested in innovations, (either incremental or radical). The firms are organic and are expected to have the characteristics mentioned in section two concerning the learning organisation.</p>

In the following we apply a probit regression to test the organisational types from our taxonomy against a set of variables related to the management literature on learning and traditional organizations. In the analysis we will mainly discuss the differences between the two pole types the traditional and the learning organisations, leaving the two other types the innovative and organic organisations as hybrids in the middle of the two poles. We perform this test in order to justify our taxonomy before we begin the analysis of performance. The analysis presented is an analysis of the connection between 12 variables which all are related to learning organisations and the four firm types from our taxonomy. In Table 2 below we have listed the dummy variables on the left and the questions underlying the dummy on the right.

Table 2: The Questions Underlying the Dummy Variables

Dummy name	The question underlying the dummy
WT	Does the firm use work teams as a way to organise the work?
DDP	Does the firm decentralise the decision process?
IOF	Does the firm integrate functions?
CDEQ	How important is the continuous development of the employees qualifications?
WA	Has the content of the job changed (1993 - 1995) in terms of more worker autonomy?
WS	Has the content of the job changed (1993 - 1995) in terms of more specialisation of the work?
ROU	Has the content of the job changed (1993 - 1995) in terms of more routinised work?
LTTP	Does the firm have long term training plans in order to develop employee qualifications?
AIET	How many of the employees have participated in training and courses (1995 or 1996)?
ITTEK	Has the firm invested in new technology based on IT in the period 1993 - 1995?
CCC	Has the firm developed a closer co-operative link with customers in the period 1993 - 1995?
CSC	Has the firm developed a closer co-operative link to suppliers in the period 1993 - 1995?

We put all 12 variables on the right hand side and the organisational types on the left hand side of a probit regression. A probit regression has been chosen since it is well suited for regressive analysis on dummy variables (Wonnacott & Wonnacott, 1979).

$$OT = \alpha + \beta_1 WT + \beta_2 DDP + \beta_3 IOF + \beta_4 CDEQ + \beta_5 WA + \beta_6 WS + \beta_7 ROU + \beta_8 LTTP + \beta_9 AIET + \beta_{10} ITTEK + \beta_{11} CCC + \beta_{12} CSC + \epsilon$$

For our taxonomy to hold we expect to find a significant relation between the variables and the organisational types which in turn implies that there are significant differences in the level of use of the learning oriented routines represented by the variables and the organisational types.

Table 3: The Probit Regression Results

Variable	Estimate
WT	0,3969*
DDP	0,1676***
IOF	0,1088 *
CDEQ	0,2428 ***
WA	0,3182 ***
WS	0,0049
ROU	0,3490 ***
LTP	0,1667 ***
AIET	0,2144**
ITTEK	0,4705 ***
CCC	0,3161 ***
CSC	0,1527**

*** significant at the 99% level, ** significant at the 95 % level, * significant at the 90 % level.

In recent management literature on the learning organisation and the knowledge creating company, some management techniques have been stressed as cornerstones in structuring organisational types. One of these techniques is to organise work teams which function as small self governed units which are given extensive autonomy in organising the tasks or functions they perform. This technique, along with delegation of responsibility to the employees, is believed to induce and encourage the decisions to be made by the people with the actual competence. Further, and very importantly, tacit knowledge can more easily be transmitted in small groups due to close contact. Finally, the small groups encourage knowledge creation, since the employees stimulate each other. As we see in the table both WT (organisation of work teams) and DDP (delegation of decision processes) are significantly correlated with our learning organisation, which bears witness to the fact that these firms to a much higher degree apply these techniques. The frequent use of work teams and delegation of responsibility in the learning firms must be interpreted as a means of creating and exploiting knowledge in the organisation in a decentralised manner. However, the knowledge which is being created at the decentralised level still needs to be both collected and controlled in order to be beneficial to the entire organisation and the focus herein. Hence, complementary a strong focus on coordination and integration is required. From our analysis this is verified by the evidence of the significant

correlation of IOF (integration of functions) with our learning organisation.

The significance of the three first variables (WT, DDP, IOF) indicates that the static firms are hierarchical and functionally segmented and that the learning firms are characterised by the opposite, i.e. that they are organic and integrative. In comparison to the static firms, the innovative and the organic firms are somewhat less hierarchical in their organisation.. The static firms fairly well correspond to what Burns & Stalker (1994) term a mechanic organisation where employees perform specific automated and routinised functions. In the group of learning firms there is an emphasis on integration, cooperation and the ability to create knowledge. The employee is regarded as a resource rather than as a function. The benefits stemming from a full (or fuller) utilisation of the employees capabilities are often subjected to analysis in the management literature. It is a research field of its own referred to as human resource management (HRM) and has gained widespread interest not only in academic circles but also amongst practitioners; increasingly HRM has become an integrated part of firm strategy (Beardwell & Heldan, 1997).

Since skills and capabilities of the employees are the essence in learning organisations, we now bring the attention of the analysis to the importance of human resources and how firms try to develop these. The variable CDEQ (continuous development of employee qualifications) is also significant which in turn implies that compared to the static firms the learning firms to a higher extent rely on the development of the employee skills as a major factor in determining the firm's performance. This result corresponds to the assumptions in the literature.

The three variables WA (worker autonomy), WS (work specialisation) and ROU (routinisation of work) relate to the actual content of the jobs within the organisation.

WA is significant and shows that the employees' ability to take responsibility and to work autonomously has become very important for the learning firms and also to some extent for the hybrid firm types. WS is not significant which indicates that the firms' demand for employee specialisation is less clear in its directions. ROU is significant which implies that jobs in the learning firms, but also in the organic firms, become less routinised whereas the jobs in the static firms tend to stay routinised.

The results of the three variables indicate that in the period from 1993-1995 the jobs in the learning firms have become less routinised, while the employees are given much more autonomy, responsibility and self management. The jobs in the static firms did not follow the same path and are fairly as they were. In relation to specialisation the picture was more blurred since the learning firms displayed the highest propensity both for specialisation and for de-specialisation.

The results of the variables CDEQ, WA, WS and ROU illustrate that especially for the learning firms a continuous development of employee skills is believed to be a crucial factor for the firm's performance. Within the group of learning firms there had been a change in the demand for employee skills; the particular demand being the employees' ability to work more autonomously and also to undertake more tasks than before. Hence, the jobs in the learning firms became less routinised. The variable LTTP (long term employment training plans) throws light on how the firms develop or acquire the employees with these particular skills. The long term development of the employees' skills is an essential factor in the HRM literature (Beardwell & Helden, 1997). The variable is significant which indicates that the learning firms not only merely regard employee skills as important but also to a much higher extent regard training and strategic development of the firm's internal employee skills as a part of the firm's overall strategy. This result of the variable AIET (actual investment in employee training) underpins the result of LTTP since it shows that the learning firms invest more in training of the employees than what is the case for the static firms. In other words, it is evident that the learning firms allocate more resources to the development of their human capital. The learning firms apply a systematised approach to the development of human resources and it is implicit that the employees must be able to learn. The static firms do not have the same strategic understanding and emphasis on employee skills and skill development.

The two last variables in our analysis of the firm types CCC (closer contact to customers) and CSC (closer contact to suppliers) are both positively correlated with the learning organisation. This implies that in our analysis, that the learning firms compared to the static firms, to a higher extent try to incorporate external knowledge. This in turn indicates that there is a relation between what in the marketing literature is known as a 'relationship marketing strategy' and

what we here refer to as the learning organisation (Achrol, 1991). This link has been elaborated more thoroughly on an empirical basis in Andersen & Kristensen (1998) and the results therein as well as the results found here imply that the pursuit of an avenue of cross- fertilisation between the two fields might be fruitful. The argumentation for the need and benefits of a relationship marketing strategy (Grönroos, 1994) opposed to a traditional marketing strategy (Mintzberg, 1983) is in a quite similar to the one we have discussed in relation to learning organisations in section two in this paper (Achrol 1991, Day 1997)

The analysis of the four firm types reveals very clear distinctions in the answers to the questions posed. These differences reflect that there are also quite clear differences among the four firm types with regard to their internal organisation which are reflected in i) the management style ii) the structuring of the organisation iii) the production iv) the employee empowerment and v) the employee skill requirement and development. On the basis of the results of the analysis a characterisation of the four firm types is possible. The static firms suit the description of the mechanic firm as found in Burns and Stalker (1994) , or the segmentalistic firms as described by Kanter (1983). In the static firms we find managerial hierarchy and a clear division of functions and labour. The workers are performing well defined functions and are controlled by layers of managers. The information and the decision process are confined to the top management that controls the entire organisation. Presumably, the control relies on highly standardised procedures.

The learning firms rely on knowledge creation and on human resource development. The workers are seen as resources and not as functions and are empowered to self management at least within their field. In the period 1993 - 1995 there have been changes in the firms both towards changing the organisation but also with regard to the requirement of worker skills. The results of the analysis concerning the learning firms correspond well to the understanding of learning, organic or integrative organisations as described in the literature (Senge, 1990; Burns & Stalker, 1994; Kanter, 1983) and discussed in section two.

5. The Performance of Firms in Different Markets

Whereas the first part of this paper was dedicated to divide the firms into groups according to

their organisational structure, the latter part of the paper proceeds by analysing whether there are differences between the firm types in terms of performance. As mentioned above, it has been argued that flexible firms or learning organisations perform better than traditionally organised firms in turbulent and increasingly competitive environments and it is the justification for this hypothesis which will be analysed subsequently. It is important to note that the proposed “superiority” of the learning organisations most often is associated with markets where learning, knowledge, quality and novelty are the competitive parameters rather than sheer price competition. In the analysis we follow this line of argumentation and do not expect the learning organisations to be “superior” in stable markets, a view which also was taken by Burns & Stalker (1994) in a discussion of the organic and the mechanic organisations. In order to analyse this we will apply a taxonomy or division of the economy developed by the Danish Ministry of Finance (Finansministeriet, 1996). The taxonomy is created by using two variables: The concentration of the sector and the nature of the good. The analysis was carried out for each of the 117 sectors in the Danish I/O tables and each of these sectors were classified as one of the four sector types in the taxonomy. A sector is classified as being highly concentrated if five firms supply 75% or more of the goods within the sector. If this is not the case, the sector is classified as a low concentration sector. In respect to the goods or the products in the sector, a distinction is made between standard goods and brand goods (Finansministeriet, 1996).

Table 4: The Industries in the Market Taxonomy

1. Low concentration / standard goods	2. High concentration / standard goods
Manufacturing of wood and wood production	Production of meat and meat products
Printing activities	Manufacturing of dairy products
Manufacturing of rubber and rubber production	Manufacturing of other food products
Manufacturing of construction material of metal etc.	Manufacturing of pulp and paper and paper products
Manufacturing of other general purpose machinery	Manufacturing of refined petroleum products
Manufacturing of glass and ceramic goods	Manufacturing of chemical raw products
Manufacturing of machinery for industry	Manufacturing of bricks, cement and concrete
Maintenance and repair of motor vehicles	Manufacturing of basic metals
Taxi operation and coach service	Manufacturing of machine engines and compressors etc.
Freight transport via road or pipelines	Manufacturing of machinery for industry
Water transport	Building and repair of ships and boats
Building cleaning activities	Transport via railways and busses
	Air transport

<p>3. Low concentration / customised or “Brand goods”</p> <p>Manufacturing of textiles Manufacturing of wearing apparel and dressings of fur Publishing activities excluding newspapers Manufacturing of hand tools and packaging of metal Manufacturing of agricultural machinery Manufacturing of radio communication equipment etc. Manufacturing of medical and optical instruments Manufacturing of furniture General contractors Brick laying Installation of electric wiring and fitting Plumbing Joinery installation Other construction works Sale of motor vehicles, motor cycles etc Retail of automotive fuel Wholesale of agricultural raw materials, live animals Wholesale of food, beverages and tobacco Wholesale of household goods Wholesale of wood and construction materials Wholesale of other raw materials and semi-manufactures Wholesale of machinery, equipment and supplies Commission trade and other wholesale trade. Resale of food in non specialised stores Resale of food in specialised stores. Department stores Resale of pharmaceuticals, cosmetics etc. Resale of clothing and footwear etc. Resale of furniture and household appliances Resale in other specialised stores etc. Hotels etc. Restaurants etc. Monetary intermediation Other financial intermediation Insurance and pension funding Activities auxiliary to financial intermediation Letting of own property Real state agents etc. Renting of machinery and equipment Computer and related activities Research and development Legal activities Accounting and book keeping</p>	<p>4. High concentration / customised or “Brand goods”</p> <p>Manufacturing of beverages Manufacturing of tobacco products Manufacturing of leather and leather products Publishing of newspapers Manufacturing of paint, soap and cosmetics Manufacturing of pharmaceuticals Manufacturing of domestic appliances Manufacturing of computers, electric motors Manufacturing of transport equipment excl. ships Manufacturing of toys, gold and silver articles</p>
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In Table 4 above the 'Dansk Branchekode 1993' Danish Industrial classification 1993 (henceforth db93) sectors are divided into the four competition types found by Finansministeriet (1996). As can be seen from the taxonomy, the largest group is the third group i.e. the low concentration and customised group, which includes most but not all of the service industries in the db93 classification.

Our choice of this taxonomy or division of the economy rests on several arguments. First, the taxonomy also includes service sectors which have become a large part of the modern economies. Second, the taxonomy is developed empirically meaning that it applies to data, which is not always the case if one turns to theoretically developed taxonomies. Third, it is directly related to Denmark and applicable to the Danish economy, which on the other hand poses the problem of generality and applicability to other economies. Fourth, and most important, the taxonomy divides sectors according to specific forms of competition, which for our purposes is ideal since we wish to analyse the different firm types within different competitive environments.

From the current debate on flexible firms and the claim of these firms becoming best practice, it is our intention to pose some hypotheses concerning in which markets the flexible firms are best performers. Since the flexible firms are assumed to be best practice in turbulent and highly innovative markets, it must be assumed that the flexible firms (which are referred to as learning firms in this paper) will manage best in markets with brand or customised goods. Apart from this hypothesis, following the ideas of Burns and Stalker's analysis (1994), it can also be assumed that the static firms perform well in market environments with standard goods. The firms in this analysis are referred to as static firms, but are quite similar to the firms which are labelled mechanic firms by Burns & Stalker (1994).

The subsequent analysis will provide some empirical evidence to whether or not these hypotheses are justifiable. The first part of the analysis serves the purpose of testing whether there are any significant differences in the level of labour productivity of the four firm types within the four competitive environments.

The model allows for the slopes of the different variables to vary according to the competition type to which they belong. LP denotes the level of labour productivity, alpha is the constant, C denotes the capital stock, S denotes the size of the firm and O denotes the four organisation types.

$$LP = \alpha + \beta_1 C + \beta_2 S + \beta_3 O + \epsilon$$

R square = 0,0702

Table 5: Level of Labour Productivity

Variable	Parameter estimate
Capital Comp_A	0,000841
Capital Comp_B	0,000389
Capital Comp_C	0,000739
Capital Comp_D	0,001844 ***
Size Comp_A	0.047100
Size Comp_B	-0,028571
Size Comp_C	-0,008416
Size Comp_D	-0195277 *
Organisation Comp_A	1.297091
Organisation Comp_B	-8.711979
Organisation Comp_C	-3.062476
Organisation Comp_D	55,641350 ***

*** significant at the 99 % level, * significant at the 90 % level.

(Our measure of the level of labour productivity is the total productivity of the firm; the sum of output minus the sum of raw inputs divided by the total number of employees. The capital is the firms' investments in machinery in 1992, 1993 and 1994. The size is the total number of employees in 1995. The organisational types are the four dummies from our division of the firms presented in section 3).

As we see from the results above, the size of the capital stock is positively significant in competition type D (high concentration and brand goods) which implies that the larger the capital apparatus the higher the level of labour productivity. We also witness that in competition type D, the size of the firm is negatively significant, meaning that there is a negative impact on the level of labour productivity of an increasing firm size . Finally, it is evident that competition

type D displays a positive significant relation between the organisational types and the level of labour productivity. Judging from the parameter estimate the learning firms have a much higher level of labour productivity than the static firms. With regard to the level of labour productivity at least in one of the sectors we find some support for the argument of the superiority of the learning organisation.

Before discussing the results further we turn to the analysis of productivity growth. Again, our model allows for the slopes of the different variables to vary according to the competition type to which they belong. P denotes the growth in labour productivity, α is a constant, \hat{I} denotes the growth in investments, S denotes the size of the firm and O denotes the organisation types.

$$\hat{P} = \alpha + \beta_1 \hat{I} + \beta_2 S + \beta_3 O + \epsilon$$

R square = 0,0403

Table 6: Labour Productivity Growth

Variable	Parameter estimate
Investments Comp_A	0,015658
Investments Comp_B	0,014091
Investments Comp_C	0,023415 **
Investments Comp_D	-0,002289
Size Comp_A	-0,034540 *
Size Comp_B	-0,024202
Size Comp_C	-0,038460 **
Size Comp_D	-0,009290
Organisation Comp_A	0,002589
Organisation Comp_B	-0,006333
Organisation Comp_C	0,004418
Organisation Comp_D	0,034675 **

** significant at the 95 % level, * significant at the 90 % level.

(Our measure of labour productivity growth is the logarithmic of the growth from of labour productivity from 1994 to 1995. Investments is the logarithmic growth in investments from 1994 to 1995. Both the growth period of productivity and

investments are relatively short and it would have been desirable to use a longer time span. At present state this is though not possible why the short time span have been chosen or given. The size is the total number of employees in 1995. The organisational types are the four dummies from our division of the firms presented in section 3).

As seen from the results of the analysis displayed in Table 6 in competition type C investments are positively correlated with growth (low concentration and brand goods); a negative correlation between firm size and growth is found in both competition type A (low concentration and standard goods) and competition type C (low concentration and brand goods). Finally, in relation to productivity growth in competition type D we also find that the learning organisation displays higher growth than the other types of firms.

Based upon the analysis we are able to support the argument of learning organisations being best or better practices in some markets, though not in all. As expected, the learning organisations display a significantly higher level of labour productivity and productivity growth in markets of high concentration and brand goods. Looking at this particular segment of the market, some light can be shed upon the structure found by using some insights from Malerba & Orsinigo (1993). A high degree of concentration of an industry is most likely connected with a high level of appropriability and a high level of cumulativeness in relation to knowledge used to produce the good at hand. Meanwhile, the fact that it is brand, quality and performance differentiated goods indicates that the competition relies on i) novel knowledge and ii) customised knowledge. We referred earlier to Kanter (1983) as one of the studies showing that the integrative organisation is better suited to innovate than the segmentalistic organisation, and we argued that the integrative organisation is quite similar to our learning organisation. Several other authors have also stressed that an integrative organisation which involves and empowers employees at all levels to participate in the knowledge generation process is more effective in innovative markets (Nonaka & Takeuchi 1995; Lazonic & West 1995; Womack et al. 1990). The demand for tailor made solutions and applications which meet niche needs (Piore & Sabel 1984) and the increasing turbulence in terms of markets and customers needs (Achrol, 1991) also provide some explanation for our findings. The firms facing such markets must be able to react faster to differentiated or new needs why an organisational setup which allows information gathering and diffusion is needed in order to bridge on the one hand rapidly moving and complex technologies and on the other hand rapidly

changing and segmented market needs. For the other markets, in our analysis we do not find the learning organisations to be “superior” in relation to performance in terms of labour productivity or in productivity growth. Hence, as one might have expected the static organisation did not turn out to be a better performer in stable markets. In our models we included measures for firm size and investments in capital and capital stock. Our results indicated a negative relation between firm size and performance.. Investments and capital did neither show a clear nor consistent pattern and a positive relation was only found in one sector. For some macro economists this may seem quite surprising since in general they represent a firm in a production function consisting of capital and labour. However, as argued by Geroski (1998) empirically explaining firm performance often leads to an explanation of a random walk; our study may point towards some potential paths to follow in the future. Indeed, all organisational variables seem to matter but especially the need to differentiate both firms and markets seems needed in empirical analysis; firms as well as markets differ and the notion of a representative firm or a best practice of firm organisation and a representative market does not hold.

6. Conclusion and Some Policy Implications

While the focus and the analysis’ of this paper is strongly micro oriented, we have chosen to place our discussion in a broader context. First and foremost because firm organisation recently is drawn into the macro economic debate as discussed in the beginning of the paper. But secondly because as we also hope to have demonstrated raising the question of why one form of organisation should be better than others does shed light on the micro discussion which helps avoid to idiosyncratic advocacy of a best practice. Our structural approach on the macro level gives us some indications of when and why a learning or flexible organisation is good practice. In a period of rapid change which may well be uneven in regards to markets as well as technologies, firms need to open up to the surroundings in order to react to new needs. When the firm opens up to the surroundings and wishes to react to consumer needs of customisation of products the firm must open up inside to coordinate the processes to ultimately deliver the products the consumers want.

One conclusion from our analysis is that the learning organisation as described in this analysis

has a higher level of labour productivity and labour productivity growth than the static and the hybrid firms in the competition characterised by concentration and brand goods. This conclusion supports the findings and assumptions, in the literature. In the markets for brand goods (in this paper used to represent innovative and turbulent markets) the analysis clearly showed that the learning firms were far more labour productive than were especially the static firms. However, we only found this relationship in this part of the economy and not in general which does suggest that caution is needed when talking of, “ a best practice of organisation or firm type”, in general terms. Still in light of the view that all markets will be increasingly affected by the ongoing globalization and an increasing competition, the results found here, may indicate that in the future the learning organisation may become the general organisational form.

We have used the level of labour productivity and the growth herein as measures of performance. At the firm level several other measures could have been used like profits or growth in turnover. Still we applied productivity level and growth because in a macro and policy context these measures seem to be best suited and of highest interest, since the labour productivity reflects the contribution to national income. Especially in a globalisation context it may well be assumed that low level labour productivity sectors will be difficult to sustain in a high income country like Denmark. It may be assumed that globalization will force high income countries to produce novel goods, and in doing this, the “learning organisation” is more efficient, such a process is likely to increase the pressure on the static firms to change towards learning organisations or the hybrid intermediaries.

On a policy level, the results of the analysis do give some support for those policy makers who argue, that the diffusion and support of flexible forms of organisation should be supported, in order to increase a country’s competitiveness, growth and welfare, when a longer time perspective is applied. However, the analysis does not support idiosyncratic beliefs stating that all firms should be flexible in the same way right away why suggesting a diffusion scheme of one particular best practice of firm organisation is not justified.

Abbreviations

EU: European Union

NAFTA:	North American Free Trade Agreement
WTO:	World Trade Organisation.
DISKO:	Danish Innovation System in a Comparative Analysis.
HRM:	Human Resource Management

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Danish **R**esearch **U**nit for **I**ndustrial **D**ynamics

The Research Programme

The DRUID-research programme is organised in 3 different research themes :

- *The firm as a learning organisation*
- *Competence building and inter-firm dynamics*
- *The learning economy and the competitiveness of systems of innovation*

In each of the three areas there is one strategic theoretical and one central empirical and policy oriented orientation.

Theme A: The firm as a learning organisation

The theoretical perspective confronts and combines the resource-based view (Penrose, 1959) with recent approaches where the focus is on learning and the dynamic capabilities of the firm (Dosi, Teece and Winter, 1992). The aim of this theoretical work is to develop an analytical understanding of the firm as a learning organisation.

The empirical and policy issues relate to the nexus technology, productivity, organisational change and human resources. More insight in the dynamic interplay between these factors at the level of the firm is crucial to understand international differences in performance at the macro level in terms of economic growth and employment.

Theme B: Competence building and inter-firm dynamics

The theoretical perspective relates to the dynamics of the inter-firm division of labour and the formation of network relationships between firms. An attempt will be made to develop evolutionary models with Schumpeterian innovations as the motor driving a Marshallian evolution of the division of labour.

The empirical and policy issues relate the formation of knowledge-intensive regional and sectoral networks of firms to competitiveness and structural change. Data on the structure of production will be combined with indicators of knowledge and learning. IO-matrixes which include flows of knowledge and new technologies will be developed and supplemented by data from case-studies and questionnaires.

Theme C: The learning economy and the competitiveness of systems of innovation.

The third theme aims at a stronger conceptual and theoretical base for new concepts such as 'systems of innovation' and 'the learning economy' and to link these concepts to the ecological dimension. The focus is on the interaction between institutional and technical change in a specified geographical space. An attempt will be made to synthesise theories of economic development emphasising the role of science based-sectors with those emphasising learning-by-producing and the growing knowledge-intensity of all economic activities.

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