Voluntarism versus Determinism – An Empirical Study of the Norwegian Fish Processing Industry

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This study focuses on why some firms achieve sustained competitive advantage in a setting characterised by environmental uncertainty. Theories from organisational ecology and the resource-based view of the firm are applied to study firm behaviour in the Norwegian fish processing industry, a setting characterised by high environmental uncertainty. The results indicate that in highly uncertain environments sustained competitive advantage is achieved through different types of flexibility.

The observation that some firms achieve sustained competitive advantage has received substantial attention in both economic and organisation theory. The theoretical approaches can be divided into two main streams of thought. In the first, the firm is considered a *static* element, where the firm's ability to adapt is considered limited due to internal barriers to change (Hannan & Freeman, 1977; Baum, 1996). The survival of the firm is totally dependent on its surroundings. If the surroundings change in a disadvantageous way with respect to the firm's adaptation, the firm will die. An advantageous change in the surroundings will lead to a strengthened position. A main idea in this approach is *selection* of organisations caused by fluctuations in the surroundings. The other approach takes a totally different view of the firm and its environment. Here, the firm's *ability to adapt* is considered of vital importance when explaining the competitive position of the firm in the population.

Accordingly, there is one view explaining sustained competitive advantage as a deterministic selection driven by changes in the surroundings of the firm, while the other view relates the phenomenon to the ability of the firm to adapt to its surroundings. A common feature of the two approaches is that the force behind the development of the firm structure, whether it is due to selection or adaptation of the firms, is environmental changes and competition for scarce resources.

The resource-based view of the firm

Understanding sources of sustained competitive advantage has become a major area in strategic management. The resource-based view of the firm has received much attention for its explanation of the existence of sustained competitive advantage (Barney, 1991; Penrose, 1959; Peteraf, 1993; Wernerfelt, 1984;).

Figure 1 summarises how the resource-based view of the firm explains the existence of sustained competitive advantage.

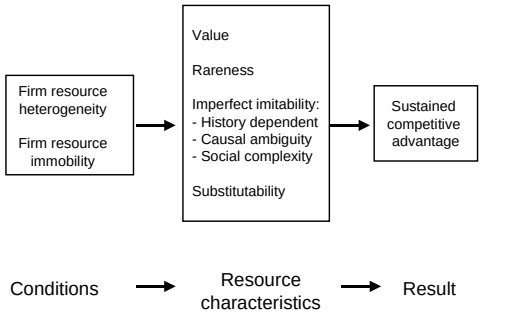

Figure 1 The relationship between resource heterogeneity and immobility, value, rareness, imperfect imitability and substitutability and sustained competitive advantage (Barney, 1991)

The model is based on the assumptions that some of the firm resources may be heterogeneous and immobile. To have the potential of sustained competitive advantage a firm resource must have four attributes (Barney, 1991):

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- It must be valuable
- It must be rare
- It must be imperfectly mobile
- It must be non-substitutable

The study is based upon this view, and in figure 2 we present an adjusted model we have applied. In this model we focus on the firm's capabilities rather than on its resources.

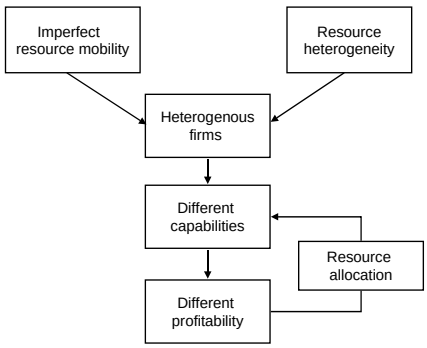

Figure 2 Theoretical model

We assume that due to heterogeneous firm resources and imperfect resource mobility we have heterogeneous firms in a population. The firms have developed different capabilities, which applied in a specific setting, will end up in different performances among firms within the same population. The model also has a dynamic view of the firm since profitability through management may be used to support and develop valuable capabilities.

In a population with strong competition between the firms, the survivors will be those who have developed the essential capabilities best. Our main thesis is that in a setting with large environmental fluctuations firms may achieve sustained competitive advantage due to high flexibility.

Design

To apply this model in an empirical setting we have made some adjustments. Two major adjustments have been to include uncertainty and flexibility. The analytical model is presented in figure 3.

The model focuses on one capability – *flexibility* – made valuable by uncertain environments. If the fluctuations continue for a long period of time, we will end up with a population of firms characterised by high flexibility.

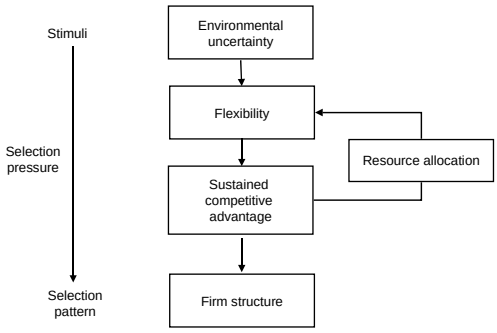

Figure 3 Model for analysing environmental uncertainty, flexibility and sustained competitive advantage

In this study we use flexibility as a measure of adaptation. Flexibility, however, is a construct that consists of many different types of flexibility (Sethi & Sethi, 1991). In order to focus on those types of flexibility that are essential in our setting, we have mapped different factors of uncertainty. Based on this mapping it is possible to derive essential flexibilities as illustrated in figure 4.

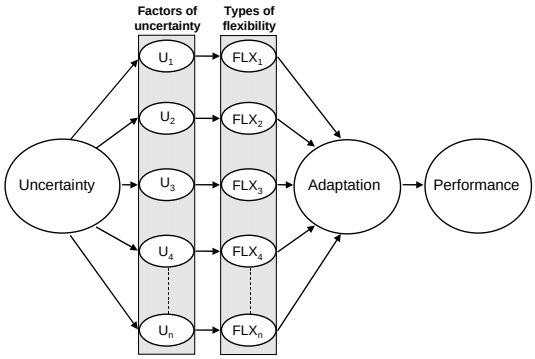

Figure 4 Model for analysing flexibility

An important part of our design is to compare flexibility among the survivors and the failures within a population with large envi-

ronmental uncertainty. In order to find a population that is suitable for testing the model two major demands must be met. Firstly, the population must be exposed to large environmental fluctuations. Secondly, detailed data from the firms must be available. A population that accommodates to these demands is the Norwegian fish processing industry.

Data

The data used in the study originates from "Driftsundersøkelsen i Fiskeindustrien", a yearly, ongoing survey of fish processing plants in Norway (Bendiksen *et al*, 1997). The part of the Norwegian industry we are analysing in this study are situated from mid Norway ("Nord-Møre") in the south, and continuing north to the Russian border. The processors are mainly producing white fish. The same companies are studied each year. Being the same cross-section of companies each year, the data is a so-called "panel data" set. From the panel data we have extracted a sub-set of data used particularly for this study. This sample consists of a group of companies that went bankrupt ("failures") in the period from 1977 to 1995, and a group consisting of the companies which had the highest profitability in the population in the same period ("survivors").

The following table shows the number of companies in the groups from year one until year five before bankruptcy in our study.

Table 1 Total number of firms in the study

	1	*2*	*3*	*4*	*5*
Survivors	36	36	36	31	31
Failures	34	34	28	24	20
Total	70	70	65	55	52

Each company, both "survivors" and "failures" have been mapped five consecutive years. Since we started to collect data in 1977, we have not been able to follow all the bankrupt companies up to five years before bankruptcy. As a consequence, only 20 of the 34 bankrupt companies have a full five years data set.

We have excluded from the study companies that have been refinanced with loss to the creditors or have undertaken other reorganisations with similar economic effects, like a composition or a private arrangement with the creditors. The "survivors" consist of the companies that in the period through their profitability are considered to have sustained competitive advantage in this population.

The data consists of detailed information about the annual production in each firm. The production statistics are integrated in an accounting model developed for "Driftsundersøkelsen i Fiskeindustrien". This model and the data are well suited for developing measures of different types of flexibility.

Results

The results of our mapping of factors of uncertainty are summarised in figure 5. The firms in this population have to adapt to large fluctuations in supply of raw materials. The volume of different products and the mix of products produced by the population fluctuate substantially. Additionally the profitability, both regarding product level and total production, fluctuates strongly. These factors change from month to month and from year to year.

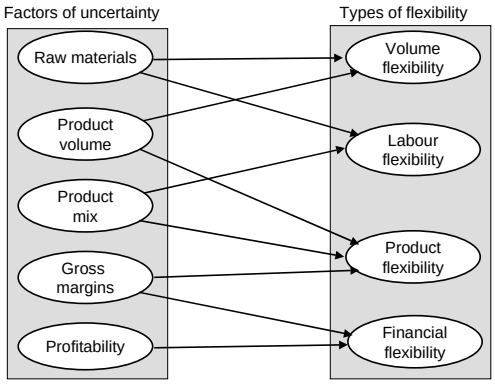

Figure 5 Factors of uncertainty and corresponding flexibilities

According to our model the firms in a population with a setting like this have to develop capabilities to handle these fluctuations.

After the results of the environmental mapping we chose to focus on volume flexibility, labour flexibility, product flexibility and financial flexibility. In table 2 we have presented the results of a test of differences between the compared groups of firms.

Table 2 Mean values of "failures" and "survivors" and t-values from the test of differences between the two group

	Failures (Mean)	*Survivors (Mean)*	*t-value*
Volume flexibility			
VOL1	0,209	0,354	3,42**
VOL2	0,421	0,845	4,32**
INV2	0,323	0,222	-1,47
Product flexibility			
PROD1	0,189	0,296	2,80*
PROD2	0,380	0,701	3,63**
ANVTOT1	0,641	0,722	1,52
ANVTOT2	1,319	1,682	2,85*
INV1	0,517	0,613	1,48
Labour flexibility			
ARB1	0,218	0,283	1,30
ARB2	0,467	0,674	1,75
Financial flexibility			
Net liquid balance	-0,243	0,125	5,47**
RISK	-0,160	0,004	5,18**
Productivity			
EFF	0,695	0,756	1,47

**** - sign.lev. < 0.01***

** - sign.lev. < 0.001

The results show that the "survivors" have high flexibility, and that they have developed different types of flexibility well. In addition the test indicates that they are significantly more flexible than the "failures". The results indicate that flexibility is a valuable capability among the Norwegian fish processors in the period studied.

A surprising result is that most of the flexibilities studied are more important than productivity in explaining performance in this population. A logistic regression model based on six different types of flexibility performed well in separating the population into the two groups – "survivors" and "failures". 90% of the firms in the analysis was correctly classified. Another surprising result is that among the "survivors" there are a weak but positive correlation between flexibility and productivity. This is a controversial result, because theoretical models often assume a negative correlation between flexibility and productivity (Suarez *et al*, 1995).

The results of a test that ranks the importance for surviving of the different types of flexibility are presented in figure 6.

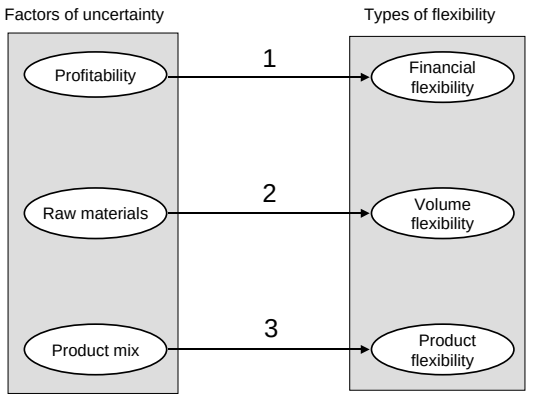

Figure 6 Ranking of uncertainty factors and importance of different types of flexibility

The most important type of flexibility in this population is financial flexibility, followed by volume flexibility and product flexibility. A ranking of the uncertainty factors indicates that profitability is most uncertain followed by raw materials supply and product mix. These results indicate a strong correlation between how uncertain a factor is and the importance of the corresponding type of flexibility for survival.

Concluding remarks

The results presented in this paper indicate that it is possible to achieve sustained competitive advantage in highly uncertain environments. The study shows that firms that achieve sustained competitive advantage in the fish processing industry have developed different types of flexibility in response to different factors of uncertainty. An important part of their economic success is that they do not suffer from productivity losses although they have high flexibility. This combination of capabilities is valuable, rare and difficult to imitate, and explain why

these firms achieve sustained competitive advantage in uncertain environments.

The study is a test of two different views of the firm with regard to its capability to change. The results confirm the dynamic view of the firm, and emphasise the role of management. On the other hand the destiny of the "failures" give support to the static view and the importance of barriers to change.

A major criticism against studies based on the resource-based view of the firm is the lack of empirical studies. This study is deeply empirically rooted, and contributes to a better understanding of why some firms perform better than other within the same setting does.

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