

Angenendt, Georg

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Identification and Discussion of parameters that can be used to analyze industries with Michael E. Porter's system of determinants that influence the competitive position of nations' industries

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# ETLA

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## **Keskusteluaiheita - Discussion papers**

No. 482

Georg Angenendt

**IDENTIFICATION AND DISCUSSION  
OF PARAMETERS THAT CAN BE USED  
TO ANALYZE INDUSTRIES WITH  
MICHAEL E. PORTER'S SYSTEM OF DETERMINANTS  
THAT INFLUENCE THE COMPETITIVE POSITION  
OF NATIONS' INDUSTRIES**

Kansallinen kilpailukyky ja teollinen tulevaisuus -projektissa tutkitaan, millaista teollista toimintaa voidaan harjoittaa Suomessa menestyksekkäimmin. Siinä tutkitaan menestyneitä vientiyhtiöitä ja pohditaan, miten niiden toimintaympäristöä tulisi kehittää, jotta ne pystyisivät saavuttamaan kilpailuetuja kansainvälisiin kilpailijoihin verrattuna.

Projektin päärahoittajina ovat Suomen itsenäisyyden juhlarahasto (SITRA), Elinkeinoelämän Tutkimuslaitos (ETLA), kauppa- ja teollisuusministeriö (KTM) sekä eri alojen tärkeimmät yritykset.

"The Competitive Advantage of Finland" research project evaluates the competitiveness of Finnish export industries and crucial elements behind their performance. The project focuses on what kind of industrial activities have the best possibilities for success in Finland.

The project is organised by Etlatieto Ltd and financed mainly by the Finnish national Fund for Research and Development (SITRA), The Research Institute of the Finnish Economy (ETLA), Ministry of Trade and Industry (KTM) as well as major companies in various fields.



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# Georg Angenendt

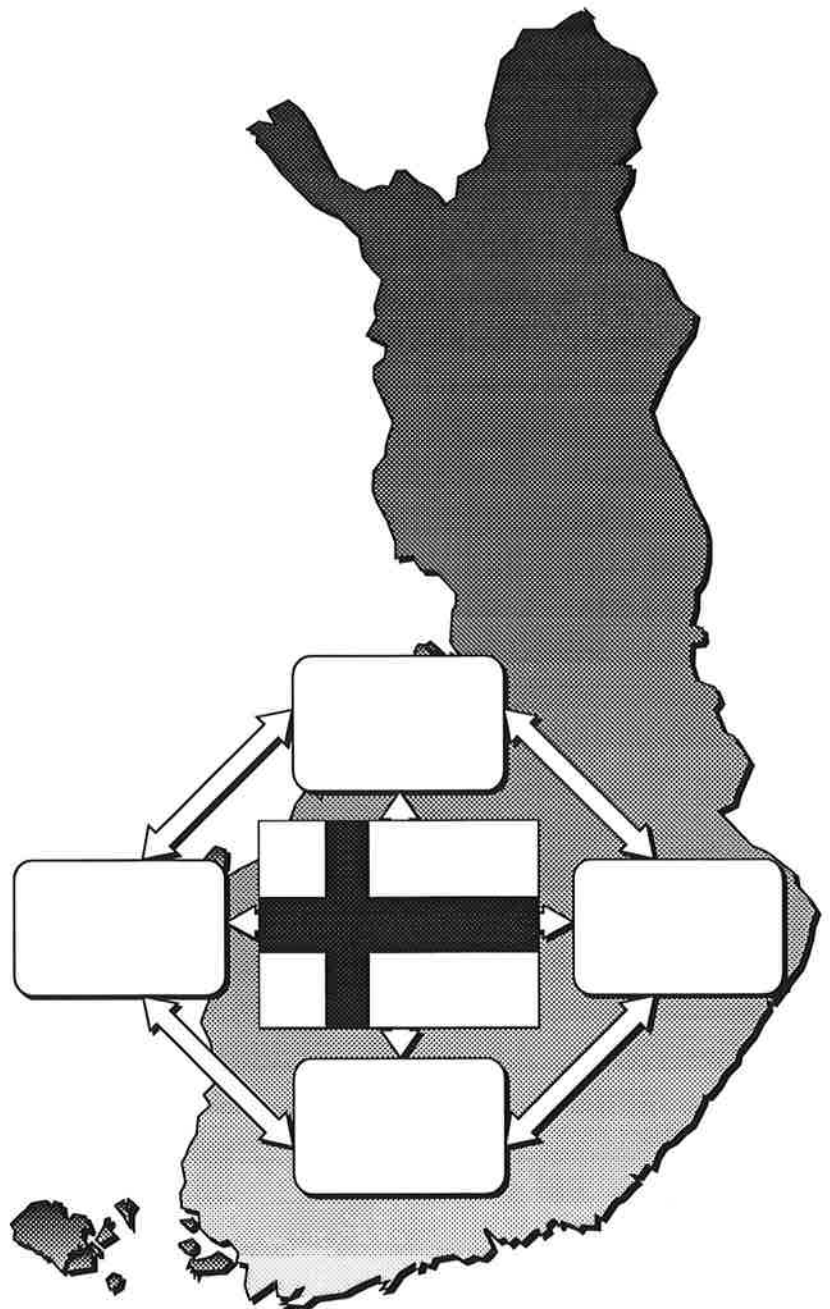
Kansallinen kilpailukyky ja teollinen tulevaisuus

The Competitive Advantage of Finland

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## **ABSTRACT**

This study identifies and discusses parameters that can be used to analyze industries with Michael E. Porter's system of determinants (the diamond as Michael E. Porter calls his model) that influence the competitive position of nations' industries. The parameters are grouped into two groups, result parameters and cause parameters. Result parameters are the ones which can be used to identify the current competitive position of an industry. The cause parameters broaden the view and the understanding of the competitive position through introducing more parameters, looking at their historical development, predicting their future development and understanding the influence of these parameters on the competitive position of an industry. Michael E. Porter's model describes the relationship between the cause parameters and the competitive position of an industry.

**KEY WORDS:** competitive advantage, diamond model, result parameters, cause parameters

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## **TIIVISTELMÄ**

Tämä tutkimus määrittelee parametreja, jotka kuvaavat toimialojen kilpailukykyä Michael E. Porterin mallin mukaisessa tarkastelussa. Parametrit on ryhmitelty kahteen ryhmään, tulosparametreihin ja aiheuttajaparametreihin. Tulosparametrit ovat niitä, joilla voidaan mitata toimialan nykyistä kilpailuasemaa. Aiheuttajaparametrit laajentavat kilpailutilanteen ymmärtämistä tuomalla esiin parametreja, jotka mittaavat toimialan historiallista kehitystä, ennustavat tulevaisuuden kehitystä ja selittävät näiden parametrien vaikutusta toimialan kilpailukykyyn. Michael E. Porterin malli selittää tulosparametrien ja aiheuttajaparametrien välistä keskinäistä suhdetta.

**AVAINSANAT:** kilpailuetu, timanttimalli, tulosparametrit, aiheuttajaparametrit

## YHTEENVETO

Tämä tutkimus on osa Etlätiedon koordinoimaa Kansallinen kilpailukyky ja teollinen tulevaisuus -projektia, jonka tavoitteena on identifioida Suomen elinkeinoelämän kilpailukykyisimmät toimialat ja toimialojen kilpailukykyä edistävät ja ylläpitävät tekijät. Tutkimusprojekti tuottaa aineistoa kansallisen teollisuusstrategian muodostamisen tarpeisiin.

Tämän osatutkimuksen tavoitteena on määritellä parametreja, jotka auttavat systematisoimaan toimialan kilpailukyvyn kuvausta Michael E. Porterin timanttimallin mukaisessa tarkastelussa. Tutkimus rajoittuu toimialan kilpailukykyä kuvaavien parametrien tunnistamiseen sekä niistä johdettuun teoreettiseen keskusteluun.

Tutkimus ryhmittelee Porterin timanttimallia systematisoivat parametrit kahteen luokkaan, tulosparametreihin ja aiheuttajaparametreihin. Tulospa-rametrit kuvaavat toimialan nykyistä kilpailuasemaa, joka määräytyy aiheuttajaparametrien toiminnan tuloksena. Siten aiheuttajaparametrit selittävät toimialan kilpailukyvyn syntyä, minkä lisäksi ne mittaavat toimialan historiallista kehitystä ja ennustavat myös tulevaa kehitystä. Michael E. Porterin timanttimalli selittää tulosparametrien ja aiheuttajaparametrien välistä keskinäistä suhdetta.

Toimialan kilpailuasemaa arvioitaessa on otettava huomioon tulosparametrien aikasidonnaisuus. Tulospa-rametrit voidaan luokitella edeltäviin, tosiaikaisiin ja jäljessä tuleviin parametreihin riippuen siitä, millainen aikaero on itse pa-rametreissa tapahtuvissa muutoksissa ja toimialan kilpailuaseman muutoksissa. Esimerkiksi edeltävät parametrit muuttuvat ennen kuin muutokset ehtivät näkyä toimialan kilpailuasemassa. Vastaava aikasidonnaisuus ei kuitenkaan sovellu aiheuttajaparametreihin, joita Porterin kilpailuetutimantin kärjet kuvaavat suoraan. Tutkimus osoitti myös, että jotkut parametrit voivat toimia sekä tulos- että aiheuttajaparametreina.

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## **1. Introduction**

### **1.1. Background**

This study is part of a research program carried out by TechNet in collaboration with the Research Institute of the Finnish Economy (ETLA). The objective of the Competitive Advantage of Finland -research program is to identify the competitive position of different Finnish industries. This study is concerned with the identification and discussion of parameters that can be used for this task. The idea is to provide researchers who identify the different industries with indicators that are helpful for them.

### **1.2. Objective of the Study**

The objective of the study is to identify and discuss parameters that can be used to analyze the competitive position of industries with M. E. Porter's system of determinants that influence the competitive position of nations' industries. These parameters will be used for analyses of industries.

### **1.3. Scope of the Study**

The study is confined to the identification and theoretical discussion of parameters that can be used as indicators for the analysis of industries of nations according to M. E. Porter's system of determinants of competitive advantage of nations. The study is based on his book 'The Competitive Advantage of Nations' in which he presents his model, the diamond.

### **1.4. Structure of the Study**

In chapter 2 I will describe M. E. Porter's model in which he presents a system of determinants on which the competitive position of industries in nations is based.

In chapter 3 I will first present a framework for the grouping of parameters that can be used as indicators for the analysis of the competitive position of an industry. Subsequently I will discuss the different parameters which I identified within the framework presented before.

In the end I will summarize the discussion of the parameters.

## 2. Porter's System of Determinants describing the Competitive Advantage of Nations

Michael. E. Porter describes a home nation as the country 'where strategy is set, core product and process development takes place, and the essential and proprietary skills reside. The home base is the platform for a global strategy in the industry in which advantages drawn from the home nation are supplemented by those from an integrated, worldwide position.<sup>1</sup>

The *diamond*, as Michael E. Porter calls his model, tries to explain why certain companies based in certain nations are more competitive than others. Michael E. Porter presents four attributes that determine a nation's competitive advantage.

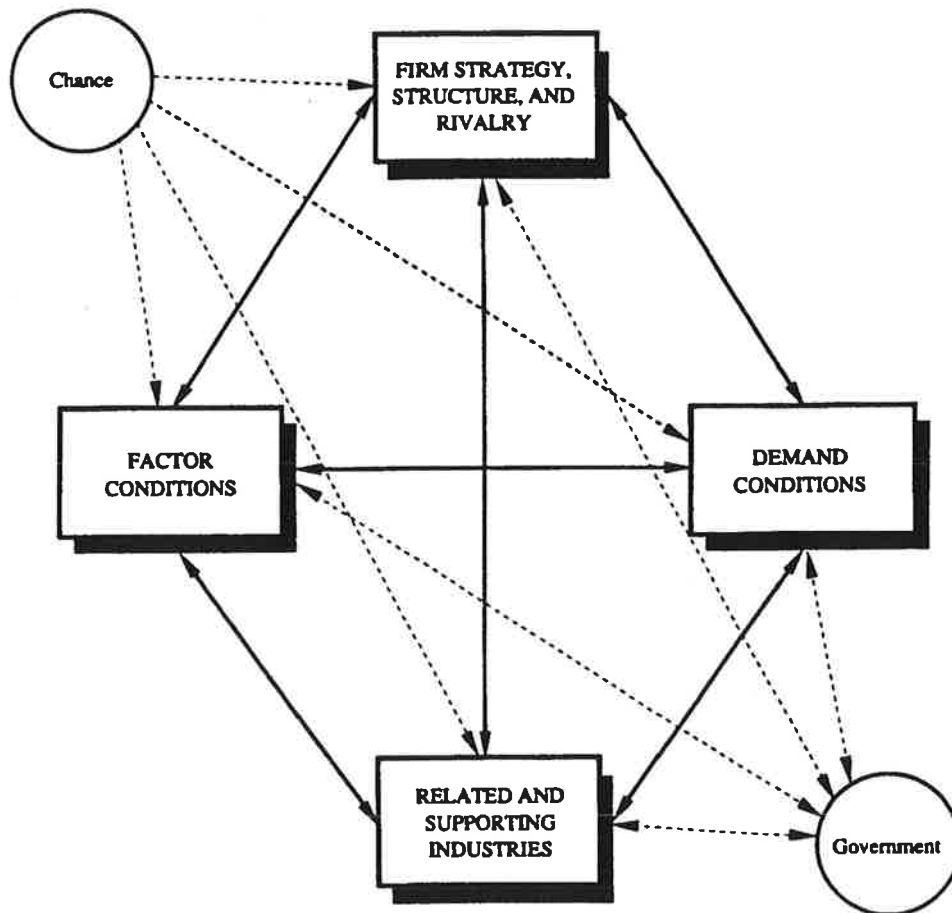


Figure 1: The Determinants of National Advantage<sup>2</sup>

<sup>1</sup>Porter, M. E. 1990. The Competitive Advantage of Nations. London, The Macmillan Press Ltd., p. 69

<sup>2</sup>Porter, M. E. 1990. The Competitive Advantage of Nations. London, The Macmillan Press Ltd., p. 127

It is important to possess advantages throughout the diamond to achieve and sustain competitive advantages although a selective disadvantage can result in a strength. A selective disadvantage can lead to increased efforts to circumvent or avoid this disadvantage and thus create a new basis for competitive advantage. A company can, for example, develop more efficient production methods if the cost of labor is high. Two further very important factors influencing the national advantage are chances and government. Chance events are beyond the control of companies and can reshape the competition in industries. Examples are inventions or war. Government can improve or reduce the competitiveness of an industry through various means, such as regulations or education. Michael E. Porter does not consider government and chance determinants. They are not determinants by themselves but they influence all four determinant of the diamond. Normally, nations do not succeed in isolated industries but in clusters of industries which are horizontally or vertically related.

## **2.1. Factor Conditions**

All inputs that are needed for an industry to produce and compete are called factors of production. There are five broad categories:

- human resources
- physical resources
- knowledge resources
- capital resources
- infrastructure

Every industry demands its own mix of factors. It is important for an industry to have available low-cost factors or uniquely qualified factors among this mix to be able to compete successfully. The availability alone is not enough to create a competitive advantage. They also have to be efficiently and effectively employed. It is not only important how the factors are employed but also where. Many factors can be employed in various industries.

One important distinction of factors is to group them into basic factors and advanced factors. Basic factors are such as natural resources, unskilled labor or location while advanced factors include factors such as highly trained

personnel or infrastructure. Another important classification divides the factors into generalized and specialized factors. Generalized factors are, for example, school education or general infrastructure. Narrowly skilled personnel or special infrastructure belong to the group of specialized factors. Factors can either be inherited or created. Examples of inherited factors are the geographical location of a nation or the availability of natural resources. Achieving high order competitive advantage and sustaining it is mostly based on created factors. In general, government is rather involved with the creation of general factors, for example through general education, while companies usually have to invest in creating specialized factors.

Disadvantages in some basic factors, called selective disadvantages, can pressure an industry to innovate around the disadvantage. The need for factors can be circumvented, eliminated or reduced through innovation. The disadvantage must be selective not to discourage but to motivate to tackle the difficulties. However, whether the selective disadvantage has a positive impact depends also on the other determinants

## **2.2. Demand Conditions**

Three attributes of the home demand condition are significant:

- the composition of the home demand
- the size and pattern of growth of the home demand
- the mechanisms by which a nation's domestic preferences are transmitted to foreign markets

Home demand does not create any advantage if the demand in foreign nations is different. However, the effect of the home demand on the competitiveness of a nation depends on the other elements of the diamond.

### 2.2.1. Composition of Home Demand

The composition of the home demand shapes the view of how a nation's firms perceive, interpret and respond to the buyers needs. Nations gain if the home demand yields an earlier insight into the buyers needs or if it pressures the firms to innovate. The composition of the home demand has an especially high influence on firms because of the following reasons:

1. Attention. Needs that are close are observed best and are least costly to identify.
2. Pride and ego. To be successful in the home market is a very personal and important motivation.
3. Pressures to improve are felt strongest in the home market.

There are three characteristics of the composition of the home demand that are especially important to success, namely the segment structure of demand, the sophistication of the buying behavior and the anticipation of buyer's needs.

**Segment structure of demand.** It is favorable to a nation's industry if its market segment is large or highly visible in the home nation but less significant in other nations. Large segments receive the greatest and earliest attention. The absolute share of demand is less important to receive attention than its relative size. Although the absolute demand of a product or a service can be higher in other nations, a smaller nation can gain a competitive advantage by concentrating on an industry that has a large share of the nation's home demand. Sometimes also the range of segments is important because the firms become more experienced in serving different market segments. This applies particularly to highly engineered or tailored services or products.

**Sophisticated buying behavior.** Sophisticated buyers yield insight into advanced buyer needs. This is supported by the proximity, physical as well as cultural. Industrial buyers can be especially demanding if they face a selective disadvantage that they try to overcome.

**Anticipatory buyer needs.** A stringent home demand is beneficial only if it anticipates the needs in foreign markets and it is important that the anticipation is a continuous process.

### 2.2.2. Demand Size and Growth Pattern

A large **size** of the home market can have a positive effect on competitiveness by encouraging firms to invest in large-scale facilities, technological development or productivity improvement, if there exist economies of scale or learning. The dark side of a large home market is that foreign markets receive less attention. Home demand is perceived as more certain and easier to forecast. A small home market does not have to be negative as firms can sell internationally. A large home market does not enhance the competitive position of a nation unless the same demand exists also in other nations. Sometimes small countries offer large markets due to particular circumstances. Finland, for example, provides a large market for Icebreakers.

The **number of independent buyers** affects the industry as a greater number stimulates competition. If just a few buyers dominate the market the risk to enter is perceived higher than it would be with more buyers. A few dominant buyers can bargain profit out of an industry. Potential competitors might not enter the market because of the higher perceived risk.

The **rate of growth** of the market has a stronger impact on the rate of investment than the actual size of the market. The companies' willingness to invest correlates rather with the growth rate than with the market size.

**Early saturation** forces firms to innovate and upgrade to maintain competitiveness. Early saturation has the strongest positive impact on a nation if it is combined with growth in foreign markets.

### 2.2.3. Internationalization of Domestic Demand

**Mobile or multinational local buyers** provide one way to distribute domestic demand. If the customers are mobile or multinational companies the firms of a nation gain because these domestic buyers are also foreign buyers. Mobile buyers highlight opportunities to expand into foreign markets. Multinational companies often prefer to do business with suppliers in their home nation, often for a long time after expanding into foreign markets.

There are also ways to exert **influence on foreign needs**. One way is to train foreigners. After returning to their home nation they usually prefer to

work with goods and services they were trained on. Domestic buyer needs can also be exported through **exports that disseminates culture**, such as movies or television programs. Two other ways of exerting influence are **emigration** and **tourism**.

### **2.3. Related and Supporting Industries**

Nations are seldom the base of just one competitive industry. In many nations internationally successful industries are usually linked through vertical (buyer-supplier) or horizontal relationships (eg. common customers or technology) to form a competitive industrial cluster.

#### **2.3.1. Competitive Advantage in Supplier Industries**

A competitive supplier industry can create competitive advantages in downstream industries in several ways. First, it can support other industries through an 'efficient, early, rapid and sometimes preferential access to the most cost-effective inputs'<sup>3</sup>. Second, the home based supplier industry can help to create advantages through continuous coordination with its customers. This is facilitated by the physical and cultural proximity. Finally, firms benefit from close working relationships with domestic world class suppliers resulting in a process of innovation and upgrading. 'Proximity of managerial and technical personnel, along with cultural similarity, tends to facilitate free and open information flow'<sup>4</sup>.

It is not necessary for a nation to have a competitive advantage in all supplier industries. Inputs without great importance to innovation or performance of products or processes can be obtained from suppliers outside the companies home nation.

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<sup>3</sup>Porter, M. E. 1990. *The Competitive Advantage of Nations*. London, The Macmillan Press Ltd., p. 101

<sup>4</sup>Porter, M. E. 1990. *The Competitive Advantage of Nations*. London, The Macmillan Press Ltd., p. 103

### **2.3.2. Competitive Advantage in Related Industries**

Competitive advantage in one industry often leads to advantages in related industries. An internationally successful related industry offers opportunities for flow of information and technical exchanges.

A pull effect to export products or services can exist if a firm recommends the use of a complementary product or service provided by a company of its own home nation. The reason for this kind of assistance is that the recommending company is familiar with the other company's product and has confidence that its own product or service performance will not be undermined by the recommended company's product performance.

## **2.4. Firm Strategy, Structure and Rivalry**

The fourth determinant is the 'context in which firms are created, organized and managed as well as the nature of rivalry'<sup>5</sup>.

### **2.4.1. Strategy and Structure of Domestic Firms**

The national context has an influence on the management style and on the type of competition. No management system is universally suitable. Nations tend to succeed in industries where the national environment supports the managerial practices and the modes of organization. The way companies are managed and organized is influenced by many aspects, such as attitude toward authorities, norms of interpersonal interaction or social norms of individualistic or group behavior. These aspects are the result of education, family structures and many other conditions, often intangible and unique to a nation.

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<sup>5</sup>Porter, M. E. 1990. *The Competitive Advantage of Nations*. London, The Macmillan Press Ltd., p. 107



### 2.4.2. Goals

The objectives that a firm pursues differ widely within and among nations. Significant differences exist also between employees and managers.

**Company goals** are determined by factors such as the ownership structure, the motivation of owners, the motivation of the holders of debt or the systems of incentives for the performance of senior managers. The objectives pursued by privately owned companies are often more complex as factors like pride, desire to provide continuity to employees or long time horizons come into play. Another important factor is to what extent debt holders also hold equity. If a debt holder holds equity to a large extent he is more concerned with the long-term profitability of the company.

A nation's ownership structure, capital market conditions and nature of corporate governance have a strong influence on the national advantage because of two reasons. First, different industries are favored in different nations because of their different risk profiles, different investment time horizons, different average sustained rates of return and different need for funds. The second reason for this influence is that the influence of the capital market varies between industries as the need for funds is not the same everywhere.

**Goals of individuals** have an important influence on the companies' ability to succeed. The reward systems play an important role in the behavior of an individual. Social, financial and other aspects of work form the reward systems. The importance of the different aspects varies across nations as attitudes toward skill development, self-realization, wealth, company activities, moving to other places, risk taking etc. exist to different extents in different nations.

The **influence of national prestige/priority on goals** is notable as nations tend to be more competitive in areas on which they depend or which are admired. Prestige and priority have an influence on the deployment of talents as more people dedicate themselves to fields that are important or have a high prestige.

Easily movable resources are not a benefit for international competition. This contradicts with the economists ideal of freely mobile resources.

Innovation can increase the productivity much more than redeployment of resources but innovation requires sustained investment in human and capital resources. The **importance of sustained commitment** does also include the commitment of an individual to his profession.

### 2.4.3. Domestic Rivalry

Domestic rivalry is a very important element for industries to be internationally competitive. Domestic competitors are more visible and create a higher pressure to innovate and upgrade. Competition with domestic competitors becomes often emotional while foreign competitors are viewed more analytically. Often the success of foreign competitors is attributed to "unfair advantages", an argument that does not hold for domestic competitors as they all have access to the same pool of factors. Domestic rivals try different strategies and create a wider variety of products and services to compete successfully and thus they increase innovation. The pressure in the home market forces firms not only to innovate but also to go international. Finally, domestic rivalry reduces destructive government intervention in form of 'assistance that undermines the dynamism, such as subsidies or guaranteed home demand or favoritism of a local firm'<sup>6</sup>. If there are more rivals it is more likely that the government invests in more constructive forms of support, such as the creation of specialized factors.

Co-operation has a negative influence unless it takes place in a restricted way. It decreases the level of competition and thus the drive of the industry to improve, innovate and upgrade. The often claimed positive aspect of eliminating redundancy in research does not live up to its expectations. The negative effects are stronger.

**New business formation** is important to domestic rivalry as new companies try different approaches and serve different market segments. New companies can be created as spin-offs which often have a positive impact on competition as it increases the rivalry. They allow innovations in products and processes that were hampered before and lead to serving of neglected market segments.

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<sup>6</sup>Porter, M. E. 1990. *The Competitive Advantage of Nations*. London, The Macmillan Press Ltd., p. 121

### **2.5. Chance**

Chance events are occurrences that have little to do with circumstances in a nation and are largely outside the power of firms (and often the national government) to influence.<sup>7</sup> Examples are inventions, technological discontinuities, discontinuities in input costs, shifts in world financial markets or exchange rates, changes in demand, political decisions or wars. Chances can break up the structure of industries and allow changes in the competitive position. The impact of chances differs between countries. A nation can take advantage of events and improve its competitive position if the other determinants of the diamond are favorable.

### **2.6. Government**

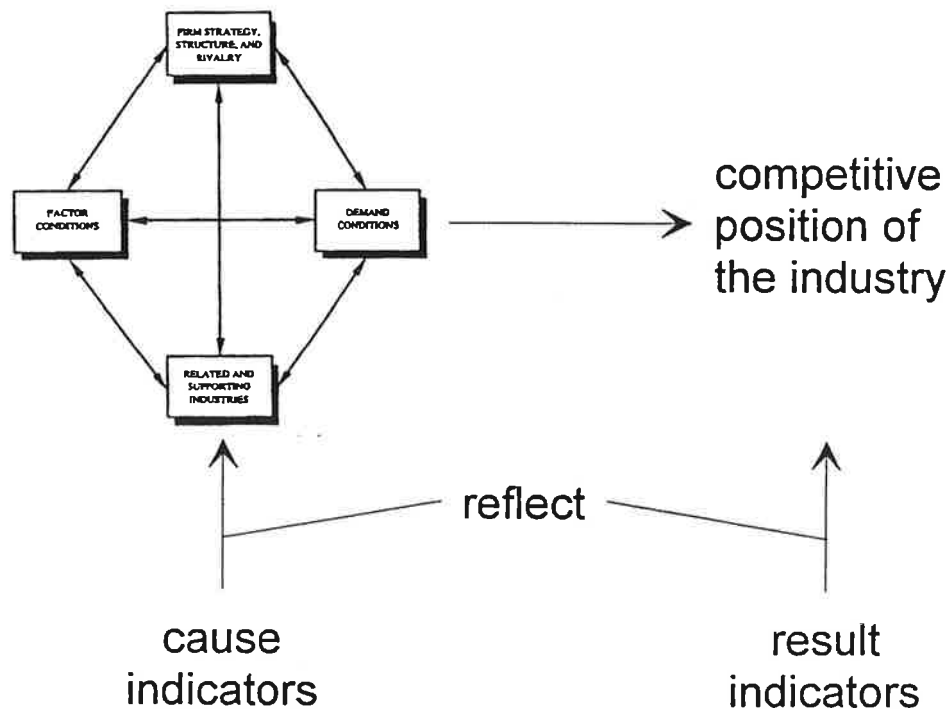
The government can influence the four determinants of the diamond positively or negatively. It can exert influence on the competitive position through influencing the determinants but it cannot create competitive advantage itself.

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<sup>7</sup>Porter, M. E. 1990. *The Competitive Advantage of Nations*. London, The Macmillan Press Ltd., p. 124

### 3. Indicators for the Competitiveness of an Industry

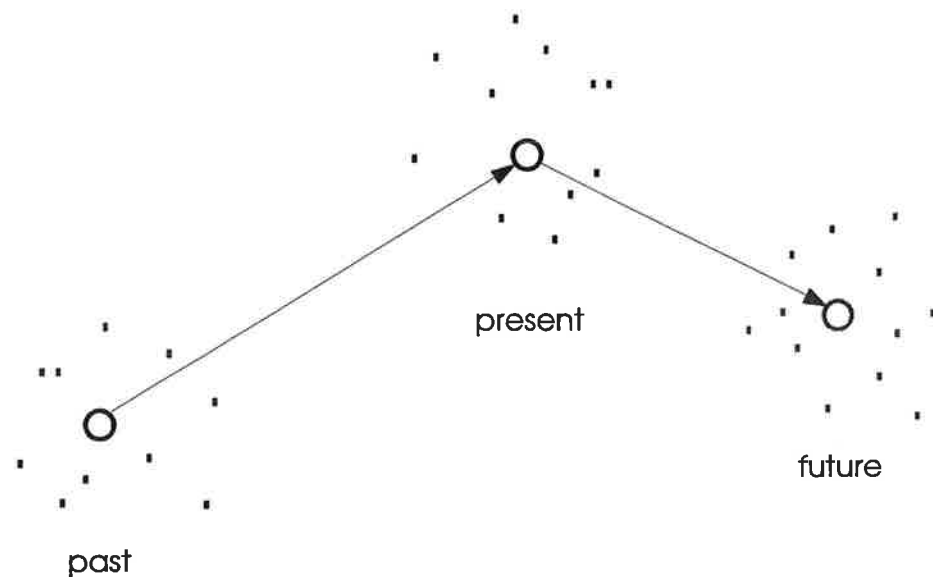
In the following I will discuss parameters that can be used as indicators for the competitiveness of a nation's industry. The indicators I will discuss can be grouped into two major groups, **result** indicators and **cause** indicators. Result indicators, such as profitability and growth, are relatively easy to measure. Although these factors seem to represent the current competitive situation of an industry one has to be careful. Profitability, for example, represents a good position in the past, caused by favorable conditions or good management. The position of today will be shown only by the profitability in the future. The result indicators are determined by the cause indicators. The cause indicators reflect the situation within the diamond of M. E. Porter's system of determinants of the competitiveness of nations' industries. The conditions within the diamond influence the competitive position of an industry heavily.



*Figure 2: The Relationship between Cause and Result Parameters*

Result indicators are, as mentioned before, relatively easy to measure. They provide a starting point for the analysis of an industry. However, they do not allow the evaluation of the competitive position of an industry itself. To evaluate a competitive position the result indicators have to be seen in a

broader context. M. E. Porter's diamond provides this context. The diamond explains the impact of conditions which are inside and outside the industry. The indicators describing the diamond are the cause indicators. The cause parameters are needed to explain and understand the pattern behind the current position (the result) of the industry. The number of patents applied for, for example, is a result of different cause parameters, such as the level of investment in R&D and the number of personnel allocated to R&D. As the world is a dynamic system, it is important not only to view the value of the cause parameters for the present but also look at their development. This means to take a look at their historic development and also try to predict their future development. With the help of the understanding of the pattern behind the competitive position, derived from the analysis of the past, and the predicted change of cause indicators one can make a reasonable assumption about the direction in which the industry will move (see Figure 3). It is not necessarily needed to identify the absolute value of the cause parameter. It can be enough to identify and predict changes compared to prior positions. To identify the direction in which the industry moves is essential for a sound analysis. In a dynamic world identifying the status quo alone is not sufficient for such a task.



- position of cause indicators
- position of the industry

*Figure 3: The Connection between Cause Parameters and the Position of the Industry*

As mentioned before, some indicators can show changes only some time after actual changes have taken place. These indicators can be called **lagging** indicators. Analogically, indicators that indicate changes before these actually take place can be called **leading** indicators. Finally, indicators that change at the same time as the changes take place are best called **real-time** indicators. This grouping is only applicable to result parameters but not to cause parameters. As described before, one should look at the development of the cause parameters in the past, predict them in the future and draw conclusions for the future position of the industry. For this approach the future pattern is important to get a clue about the future position of the industry. The fact whether the indicators are leading or lagging is not of importance. The approach to predict indicators for the future transforms all parameters in a way to leading indicators. If one predicts the future of a lagging indicator one can say that this indicator becomes a leading indicator since it hints in what direction the industry will move in the future. When evaluating result parameters, on the other hand, their 'time-behavior' has to be taken into account.

Some of the result indicators can also be seen as cause indicators as they have an impact on other cause indicators or act directly as a cause indicator themselves. The type of assets, which I will discuss more later, has an impact on other cause parameters and also on result indicators directly as it influences result parameters such as profitability.

In the following I will discuss first the result indicators as they provide a good starting point. Subsequently, I will discuss the cause parameters.

### 3.1. Result Parameters

One easily accessible indicator is the share of the world market economy exports of a nation's industry. The export share of an industry compared to the national share in world economy exports reveals an insight whether the industry possesses a favorable position in the world market. Another indicator that should be viewed in relation to the share of the industry in world exports is the balance of trade in the industry. A negative balance, for example, combined with a high share in world exports, suggests that the industry possesses a competitive advantage in certain market segments. *(Share of the world market economy exports of the industry compared to the nation's share of world market economic exports; Industry's balance of trade)*

The use of profitability as an indicator for an industry's position, although relatively easy to measure, can be misleading. Factors like protection and subsidies have to be taken into account. When comparing profitability internationally, one has also to be aware that reporting requirements, rules covering unreported reserves, etc. vary between nations. *(Profitability)*

The growth of an industry also provides some insight into the competitive position but it has to be seen in relation to the growth of the market. A high growth rate alone, for example, can be misleading if the market growth is even higher. One may think of General Electrics. General Electrics remained in the business of vacuum-tubes without taking advantage of the emerging transistor technology. Although it increased its sales by 20 percent it was losing market share since total market for devices to amplify weak electrical signals had grown by 30 percent<sup>8</sup>. *(Growth of the industry and the market)*

Another helpful indicator is the number of international links, as they yield an insight into the level of and commitment to international activities. The degree of commitment to participate in the international competition can also be seen by the level of foreign direct investment. The level of foreign direct investment based on skills and strength developed in the home nation provides a more direct insight in the competitiveness of the industry in the nation. Foreign direct investment has to be viewed critically as it can be high only by sourcing out parts of the industry. But to shift production to

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<sup>8</sup>Kotler, Philip 1991. Marketing Management, Englewood Cliffs, Prentice Hall, Inc, p. 57

low cost countries, for example, does not indicate a strength. It shows rather a weakness of the industry as it does not, or only partly, rely on more sustainable competitive advantages, called higher level advantages. Of course, it is reasonable for some industries to shift parts of production abroad to take advantage of lower level advantages if there is no way of achieving higher level advantages in this operation. (*Number of international links; Level of foreign direct investment*)

Other indicators useful to evaluate the competitive position of an industry are the efficiency of the distribution network, the efficiency of the purchasing network and the efficiency of the in-house logistic<sup>9</sup>. These indicators are difficult to measure although it is possible to do at least a qualitative evaluation. (*Efficiency of purchasing network; Efficiency of in-house logistics; Efficiency of distribution network*)

A high number of licences sold also suggests a favorable position of the industry. To get a better view it is useful also to look at the value of licences sold, or purchased. A favorable position of the industry is also indicated by a high number of patents applied for and a low level of liabilities. (*Number of licences sold/purchased; Value of licences sold/purchased; Number of patents applied for within a specific time period; Level of liabilities*)

Further indicators of interest are the value, type and age of assets. The level of assets reveals the level of investment and thus indicates the degree commitment to the industry. But the level should not be viewed without looking at the type of investment. The commitment to an industry varies with the extent to which the assets can be transferred to another industry. The second element to look at is the age of the assets. The age has to be seen in the context of the life-cycle stage of the assets. Ten-year-old buildings are still valuable assets while ten-year-old computers are obsolete. Depreciation takes the nature of assets into account and thus removes some of the distortion, but to look only at the level of assets can still be misleading. The book value of the assets after depreciation often does not represent their real value. It is very important to take into account the type of assets. The presence of sophisticated machinery can indicate a favorable competitive position as it might give an advantage over competitors with less advanced

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<sup>9</sup>see also p. 24



equipment. To evaluate if this is a real advantage one has to take a broader look and see the assets in the context with the industry. Advanced machinery gives only little advantage if it is not used efficiently or effectively. (*Value, age and types of assets*)

Reputation can also reveal information about the industry's competitive position. It does not refer directly to commercial success but to the public opinion. A good reputation is generally favorable and a valuable asset. (*Reputation*)

The customer base is another valuable asset. People tend to buy from vendors from which they bought before as it reduces their perceived risk. To have a comprehensive customer base at disposition provides advantages for the industry. One should not look only at the length of the list but also at the repurchase rate of customers as it indicates the customer's satisfaction. (*Customer base/repurchase rate*)

The quality of the output can also be used as an indicator for the industry's competitive position. But it has to be viewed carefully. Some products might be of lower quality on purpose. Product strategy can lead to the marketing of products that are not as advanced as the industry is capable of producing. But if the industry produces products with lower quality it might harm itself in the long run. The same applies to the service industry. (*Quality of the output*)

**3.1.1. List of Result Parameters**

LEADING INDICATORS	REAL TIME INDICATORS	LAGGING INDICATORS
Growth of the industry and the market	Quality of Output	Share of the world market economy exports of the industry compared to the nation's share of world market economic exports
Level of foreign direct investment		Industry's balance of trade
Number of patents applied for within a specific time period		Profitability
Efficiency of purchasing network		Number of licenses sold/purchased
Efficiency of in-house logistics		Value of licenses sold/purchased
Efficiency of distribution network		Level of liabilities
Value, age and types of assets		Reputation
Number of international links		Customer base/repurchase rate

*Table 1: The Result Parameters*

### 3.2. Cause Parameters

A wide variety of cause parameters exist and require a structure to group them. This can be done easiest and best following the classification given by M. E. Porter's diamond.

#### 3.2.1. Factor parameters

##### Human resources

The human resources are the most important resources. A sound basis in human resources provides a good starting point for creating knowledge resources, overcome shortages in physical resources and also creating an efficient infrastructure. Changes in human resources take place slowly and thus they are slow to adjust to newly emergent needs.

Changes in the human resources can have a tremendous impact on the competitiveness of an industry of a nation. If the level of education decreases it can cause difficulties in finding qualified personnel, which can lead to a lower quality of the industry's output. Difficulties can arise not only when the absolute level of education sinks but also when it does not rise enough as it is demanded by the industry. Decreasing quality of the output weakens the industry's competitive position. (*Level of education*)

Industries in industrialized nations have to build their competitiveness primarily on higher level advantages. This requires skills. As the world is dynamic, the industry has to move on to stay ahead of competitors or to catch up with them. A need exists to improve vocational qualification continuously. A nation, or industry, failing to educate the needed labor is digging its own grave. Germany, for example, achieved its strong position in the international market not to a small extent through its high level of education and vocational training. Another indicator of interest are the fields of vocational specialization. Due to national circumstances, such as giving a high priority to an industry, and social situations, prestige of certain professions, people differ between nations in terms of seeking professions and employment in certain industries. The higher the attractiveness of a profession, the greater number of people choose it. This increases the pool of highly capable individuals in the profession and thus increases the quality of

labor. (*Level of vocational training; Fields of vocational specialization; Programs for creating vocational qualification*)

Not only the quality of labor but also the motivation is important. The level of motivation as well as the type of motivation. People can be motivated by prestige, wealth, self-realization and other things. The type of motivation influences the choice of the profession and working area. Socially oriented professions, such as teachers, provide self-realization for many people but do not offer a high income. People aiming at a high standard of living are more likely to enter technical or managerial professions. While a wealth oriented engineer probably chooses to work in the industry, a prestige oriented engineer might decide to pursue an academic career. The choice of profession and field of working has an impact on the availability of qualified labor and thus on the quality of the output of the industry which in turn influences the industry's competitive position, as discussed in the previous paragraphs. Besides the type of motivation the level of motivation is of importance. It is obvious that workers with a low level of motivation work with lower productivity and produce output of lower quality than worker with a high level of motivation. Pride in the work can influence the competitive position of a nation's industry significantly. (*Level of motivation; Type of motivation*)

The level of wages in an industry is another parameter that has some impact. It has an impact on the attractiveness of an industry, or profession, and thus influences the size and constellation of the pool of labor seeking employment in this industry, or profession. An increase in the wages increases the pool of labor available. But the level of wages does not have only a positive impact on the industry. The higher level must be compensated with higher productivity or through differentiation of the output. Without an adjustment through productivity or differentiation the industry weakens its competitive position. (*Level of wages*)

Changes in individual goals can alter the situation on the labor market as well. The changes can lead to changes in types and level of motivations, fields of vocational specialization, level of education and so on. One should look out if changes are taking place or are predictable. In Japan a change of

values takes place<sup>10</sup>. The young generation does not have the same values as older generations. This will change many things in Japan and will also cause changes in the industry. As self-realization becomes more important the level of motivation for work will change. (*Changes in individual goals*)

### **Physical resources**

Physical resources comprise a wide variety of resources. They range from machinery over buildings to the natural environment. Since I discussed such resources as machinery and buildings (see value, age and types of assets<sup>11</sup>) already in the chapter about result indicators I will not discuss them here in detail. I located them into the group of result indicators since they are the outcome of, or shaped by, past processes (management and production processes) and can be used as indicators to identify the current competitive position of an industry. But they are also cause indicators as they have an influence on other cause indicators. Obsolete equipment, for example, hinders R&D even though high amounts of money may be spent and a high number of personnel may be employed. It also has a direct impact on result parameters such as profitability. The indicators have to be viewed again under the aspect of being a cause parameter. (*Value, age and type of assets*)

The natural environment is important to be mentioned as an indicator as it has a strong impact on the industry. Infrastructure, fields of industrial activities etc. are influenced strongly by the natural environment. Different geographic conditions favor different means of transport and communication. The availability of inland waterways will lead to a different infrastructure for transportation of goods than it would be without them. Also the location of the industry and its suppliers is influenced by the natural environment. If this leads to a concentration of the industry and suppliers on a small geographical area it facilitates more direct contacts between participants of the industry as the barrier of long distances diminishes. But the impact of the natural environment goes beyond these aspects. It also has a strong influence on which industries develop and in what segments. In the field of construction Swiss companies have long held a leading position in equipment and services for tunnelling because of their need to build in the

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<sup>10</sup>NN: Japan - Die Eskapaden der Jugend, in: Der Spiegel, Vol. 47, 1993, Nr. 13, p. 181-185

<sup>11</sup>see p. 16

Alps<sup>12</sup>. Changes in the natural environment can have severe results as the shrinking of the Aral lake, for example, causes problems for the fishing industry. In the long run a change in the climate can also alter much of the natural environment and thus influence nations and their industries. Changes can also occur more locally if one thinks of pollution. Of course, pollution diffuses but the degree of pollution shows different levels between different geographical areas. When analyzing a nation one should also look at the natural environment affecting the industry and their probable changes in the future. *(Condition of and changes in the natural environment)*

Changes in physical input costs can influence the competitive position of an industry. The changes in costs do not have to be the same everywhere. One may think of increased costs of energy due to higher oil prices. Countries that depend to a smaller amount on this energy source gain a better competitive position. Within an industry the composition of natural resources needed to produce a product or to provide a service can be different. Parts of the industry are then affected differently when changes in these natural resources occur. *(Changes in physical input costs)*

### **Knowledge resources**

Knowledge resources depend heavily on human resources and their deployment.

The number of research institutes related to an industry can serve as an indicator of the industry's effort to innovate. As continuous innovation is essential to maintain a competitive situation the creation of knowledge resources is of central importance. Besides the number of research institutes, the amount of personnel employed can be used as an indicator, as research institutes vary in size. *(Number of research institutes related to the industry; Number of personnel employed in R&D)*

Two further indicators of interest are the number of R&D projects and the level of investment in R&D related to the industry. These two parameters do not have to correlate as they depend heavily on the nature of the industry and the nature of the projects. There are significant differences between industries in terms of level of investment per project. The automobile

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<sup>12</sup>Porter, M. E. 1990. *The Competitive Advantage of Nations*. London, The Macmillan Press Ltd., p. 88

industry, for example, requires enormous investment just to design and launch one new car model. The need for investment is lower for companies that produce machinery. The differences in requirements for investment in R&D have an impact on the structure of industries. In some industries there are only a few major players that dominate the market while in other industries a great number of medium sized companies exist. When looking at the level of investment in R&D one has to take into account the nature of the industry. Like the level of investment, the number of projects in R&D also varies a lot between different industries. Some industries have a larger number of smaller projects. (*Level of investment in R&D; Number of R&D projects*)

But the assessment of the number of R&D projects and the level of investment does not go deep enough. As it is essential to innovate continuously one can derive useful information by looking at the type of R&D projects itself. Industries have to invest in pure research and new product development as well as in upgrading current products. But if an industry relies only on upgrading it is only a matter of time until it becomes uncompetitive. (*Type of R&D projects*)

The quality and efficiency of R&D depends heavily on the qualification of the personnel. As the quality of the available personnel varies between industries and nations one should look beyond the boundaries of the industry in question. Competitors in other countries might have a more favorable pool of personnel available for R&D. (*Quality of personnel in R&D*)

### **Capital resources**

A high level of debt capital requires high sums to service the debt and exposes the industry to the risk of increasing interest rates. If the interest rate increases the financial resources available to the industry to invest decrease and thus might endanger the industries' future position. The industry is then also ill prepared for unexpected expenses or losses. This problem is faced by many companies that expanded during the economic boom and now have problems to service their debts as the economy weakened and the profit did not meet the expectations. (*Level of debt capital*)

Besides the level of debt capital the kind of capital is of interest. Different ways to finance companies favor different industries. Capital is available in different forms such as secured debt, unsecured debt "junk" bonds, equity and venture capital. The availability and attractiveness of the different forms of capital differ between countries as they are influenced by national circumstances. (*Types of capital available*)

### **Infrastructure**

The infrastructure of an industry is a cause indicator as well as a result parameter. The term infrastructure comprises a broad field. The current infrastructure is the result of processes in the past concerning the organisation and the building, or purchasing, of the facilities needed (*Efficiency of purchasing network; Efficiency of in-house logistics; Efficiency of distribution network*<sup>13</sup>). These parameters are not only the result of processes but also have an impact on other parameters and should be analysed from this point of view as well. Infrastructure has an impact on parameters such as profitability of an industry, size of market share and reputation.

The purchasing network provides the production with the inputs needed. Reduced costs due to reduced stock and flexible sourcing that allows flexibility in production are only two results of an efficient purchasing network. The in-house logistic has an influence on the productivity due to the arrangement of sequences in production and storage. The distribution network, on the other end of the chain, influences the speed and quality of delivery. It provides opportunities to create good will on the customers' side and, may be, to reduce distribution costs. The superior parts and service delivery system of Caterpillar is one example. Due to this service and other strength of the company Caterpillar is able to charge a 10-to-20 percent price premium<sup>14</sup>. (*Efficiency of purchasing network; Efficiency of in-house logistic; Efficiency of distribution network*)

The communication network serves three different purposes, namely the communication with suppliers, communication within the company and communication with customers. Although it is element of the distribution

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<sup>13</sup>see p. 16

<sup>14</sup>Kotler, Philip 1991. Marketing Management, Englewood Cliffs, Prentice Hall, Inc, p. 386



network, the purchasing network and the in-house logistic it is worth looking at it separately. Effective communication can save costs and increase productivity and quality of the product as well as the quality of the service provided. Some aspects are the better co-ordination between functions within the organization, speedier delivery, better co-ordination with suppliers and satisfied customers. (*Efficiency of communication network (internal and external)*)

### **Intangible assets**

Reputation and customer base, already listed as result indicators, are also cause parameters as they influence other parameters such as market share and profitability. They should be reviewed under this aspect. Changes in these parameters can lead to significant changes in the future. If, for example, a company loses its reputation on which it built its strategy it might have to change the basis of competition and enter a price competition. One may think of Caterpillar<sup>15</sup> losing its excellent reputation based on reliability of its machinery and its excellent spare part distribution. It would lose the basis on which it currently bases its price premium. (*Reputation; Customer base/repurchase rate*)

#### **3.2.2. Demand parameters**

##### **Composition of the home demand**

An industry has to respond to changes in demand. It has to offer new or modified products to satisfy the new demand. A change in the demand can be the result of changes in the buyers' attitudes towards quality, price or prestige, changes of the buyer's sophistication or the emergence of a new technology.

It is important for an industry to have sophisticated buyers as they put pressure on the industry to innovate continuously. If the sophistication decreases it can cause difficulties for the industry in the future as they might lose their 'drive' to continue innovating<sup>16</sup>. One should look out for indicators

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<sup>15</sup>Kotler, Philip 1991. Marketing Management, Englewood Cliffs, Prentice Hall, Inc, p. 386

<sup>16</sup>see p. 5

that might indicate a change in the buyer's sophistication. (*Change in buyer's sophistication*)

The buyer's attitude towards quality, price and prestige can change over time. If price becomes the major criteria for purchase the industry might lose ground if it does not base its competition on price. Price as the major buying criteria can lead to lower quality of the output and can hamper the development of new, advanced but also more expensive products. It is especially harmful to an industry if this development takes place in the home market while in other markets price is not the major buying criteria. In this case it is likely that the industry will try to succeed in the home market with competing on price and that it will weaken its position abroad. Changes in the attitudes towards quality, price and prestige can be beneficial for an industry if these changes in the home market anticipate changes abroad. In this case the industry has an advantage compared to other nations' industries where these changes occur later since it is better prepared. But one has to be careful. Although the buyer needs might have been anticipatory in the past they might not be in the future. One should search for changes in the buyer's attitudes and try to evaluate their degree of anticipation in relation to foreign markets. (*Attitudes toward quality, price and prestige; Change in the degree of anticipation of buyer needs*)

Shifts in the segment structure of demand can change the focus of the industry. If a market segment increases its attractiveness the industry will pay more attention to it. The industry will increase its competence in this segment and obtain a more favorable position in this segment abroad. It is valuable for an industry to have a large market segment in the home market if this segment is of interest internationally. The relative size in the home market is of greater importance than its absolute size of the international market in terms of achieving high attention<sup>17</sup>. (*Segment structure of demand*)

### **Demand size and growth pattern**

If the demand in the home market changes it alters the attitudes of the industry concerning foreign markets. If the home market is large the

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<sup>17</sup>see p. 5

industry usually is less interested in going international since it faces a large potential at home. The lacking pressure of going international is the major negative point of a large demand in the home market. A shrinking home demand increases an industry's focus on business opportunities abroad and increases efforts to improve its international competitive position. On the other hand a large home demand supports efforts to invest in large scale facilities, technological development or productivity improvement. Unless the same demand exists in other nations a large home demand does not enhance a nation's competitive position. *(Size and growth of home demand)*

The number of independent buyers is relevant to an industry since a few dominant buyers can reduce an industry's profit and attractiveness if they possess much bargaining power. The impact of a strong bargaining power can be positive or negative to the efforts of innovation. On one hand the industry might be pushed ahead to further innovation to improve its profitability and thus competitive position. On the other hand the industry might run out of the financial resources needed for investment in R&D in order to innovate. In this case the industry will lose ground in the international competition. *(Number of independent buyers)*

Since the rate of growth has a strong influence on the industries' attitude towards investment it is an important parameter to look at. Companies' investment is rather a function of the growth rate than of the actual market size itself. High growth stimulates companies to invest and to improve their competitive position. The level of saturation of a market also influences the industries' attitude towards going international. If the home market is large companies hesitate to go international since the risk of such operations is perceived higher than to operate in the home market which is more familiar. A saturated home market forces companies to look for new business opportunities and go abroad. These companies have to face new competitors and have to find ways to obtain a better or to maintain a favorable competitive position. This increases the pressure to innovate. *(Rate of market growth/level of saturation of the home market)*

### **Internationalization of domestic demand**

Mobile or multinational local buyers can highlight business opportunities in foreign markets. Individuals or organizations abroad often remain loyal to

companies of the home country. The sales to these customers show an industry business opportunities abroad and lower the perceived risk. (*Mobile and multinational local buyers*)

Another parameter to look at is the way and extent how industries influence on foreign needs. One way is to train people from abroad. They usually prefer to work with the equipment they were trained with. Another way to influence foreign needs is to export products or services that need supplementary products or services. Still another way of influencing are exports that disseminate culture such as movies or television programs. One should look at mechanisms of internationalizing domestic demand that are relevant to the industry. Different industries are affected differently. Also the product itself has an influence. Coca Cola for example benefitted much more from these mechanisms than it was possible for other industries because Coca Cola was more than just a drink for many people. (*Ways and extend of influence on foreign needs*)

### **3.2.3. Parameters describing the Firm's Strategy, Structure and Rivalry**

If companies want to be successful in the long run they have to commit themselves to the industry. One important indicator for sustained commitment is the level of investment. Companies with a low degree of commitment will hesitate to invest large amounts in the industry. One has to take into account that the required level of investment can differ significantly between industries. (*Level of (new) investment*)

How serious companies try to remain in business might also be seen by looking at their overall marketing effort. Although a high degree of marketing effort indicates a willingness to remain in the industry it does not mean that the company's competitive position is favorable. A high marketing effort can be the result of an unsatisfactory performance and the company's attempt to alter the unfavorable situation. (*Marketing effort*)

The commitment of a company to an industry depends not only on the performance of the company but also on the goals of the companies. One objective can be to achieve a certain degree of market penetration or withdraw from the market when falling short. In this case the goal is directly

related to the performance. But other goals exist as well, such as providing work to employees. (*Company goals*)

The structure of an organization is very important. There is no unique structure that suits all industries. The evaluation of the structure has to be done in the context of the industry's nature. The structure refers to the organizational structure as well as to the ownership structure.

The ownership structure has a notable influence on the company. In Germany where banks are not often only creditors but also share holders the time horizon for investments is much longer than in the U.S. where the stock market has a strong influence and the incentives for managers are tied to short-term performance. The ownership structure, and the system for incentives for managers, in Germany favors industries that require a high level of sustained investment to maintain its competitiveness. (*Ownership structure; System for incentives for managers*)

Besides other parameters which are mentioned before the managerial system has an influence on the competitive position of an industry. There is no optimum managerial system that suits all industries. One should evaluate how the existing structure of the industry of interest suits the industry. Sometimes a centralized structure has advantages compared to a decentralized structure. But it can also be the other way around. (*Managerial system*)

Another interesting parameter is the extent to which different organizational levels are involved in R&D. An industry can benefit a lot if it taps the right sources. Within the organization are departments that often can provide valuable information if they are asked. If an industry, for example, does not listen to its sales force it might develop products that do not meet the demand of the market. To find the right sources to listen to is not always easy. One source might be appropriate at one time and not another. If Hewlett Packard had listened to the results of the market research they would have dropped the development of pocket calculators since there seemed to be no market for it<sup>18</sup>. But the answer cannot be not to listen to anybody and research and develop what the R&D department likes to do.

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<sup>18</sup>Ed McCracken, CEO of Silicon Grapics, quoted by Richard Norman on 03/19/1993 during a presentation in 'Entrepreneurship and Business Strategy'

Interaction between departments reduces the risk of missing the needs of the market but can also slow down the development process. (*Interaction between R&D department and other departments*)

The number of new companies is of interest as it can alter the competition within an industry. New companies present a threat to existing companies as they can become a challenging competitor. New entrants stimulate the competition and force existing companies to innovate and upgrade. Not only the emergence of new companies but also the potential danger of emergence of new competitors can stimulate existing companies to improve. The threat of new entrants is closely related to the level of barriers to entry presented by M. E. Porter in his model for the structural analysis of industries<sup>19</sup>. If the barriers to entry are low the companies can be forced to innovate and improve their position, and higher the barriers to entry, without new companies actually entering the market. Already the perceived risk can stimulate the industry. (*Number of competitors; Level of barriers to entry*)

Merges and co-operations between companies can change an industry. Especially if the industry is dominated by a few major players a merge of them or a co-operation between them can have a big influence on the industry. It undermines the competitive advantage as it reduces the need for improvement, incentives to upgrade and diversity. (*Number of merges/co-operations*)

If the distribution of the market share changes, companies are likely to take measures to regain their former share. This increases competition and pressures companies to move on with innovation. The fight for market share can lead to destructive competition as it takes place in the air carrier industry. Destructive competition reduces the strategic options of companies as it deprives it of financial resources needed to innovate. (*Distribution of market share*)

#### **3.2.4. Parameters describing Related and Supporting Industries**

Suppliers are very important to an industry. An internationally competitive industry often has internationally competitive suppliers in the home nation.

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<sup>19</sup>Porter, M. E. 1980. *Competitive Strategy*. The Free Press, A Division of Macmillan Publishing Co., p. 1-29

Co-operation with competitive suppliers can provide advantages. An industry can gain from competitive suppliers through 'efficient, early, rapid and sometimes preferential access to the most cost effective inputs'<sup>20</sup>. The Italian world leadership in gold and silver Jewelry may serve as an example<sup>21</sup>. Part of its success is based on the fact that Italy is also world leader in jewel-making machinery and in equipment for recycling precious metals. The intense rivalry in the home market among the equipment suppliers leads to a responsive service and attractive prices. Due to these circumstances Italian jewelry manufacturers obtain new equipment early which sustains their competitive position on the world market. (*Co-operation with suppliers; Competitiveness of suppliers*)

Co-operation with related industries can benefit an industry. It might coordinate activities of the value chains with its related industry or even share parts of the value chain. One example is the use of the same distribution channel. It is also possible that an industry benefits as a supplier of complimentary products for the other industry. For example, the Swedish suppliers of products for construction of projects such as harbors, water towers and underground oil storage facilities benefitted from the internationally successful Swedish engineering consultants. Another possible positive effect is the flow of information between related industries. If one of the industry loses competitiveness it can affect the other industries as well, for example in reduced sales of complementary products. (*Co-operation with related industries; Competitiveness of related industries*)

### 3.2.5. Government

The government has a big influence on the industry through legislation, education, taxation, subsidies etc. It is important for the analysis to look at where and how the government influences the industry. It is impossible to identify all the influences but one can take a look at the most important one. For shipyards in Germany, for example, subsidies are of central importance. For other industries, like the chemical industry, legislation concerning environmental protection can be crucial. It is important to identify the most important influences of the government and relate them to the industries' competitive position. (*Governmental influences on the industry*)

<sup>20</sup>Porter, M. E. 1990. *The Competitive Advantage of Nations*. London, The Macmillian Press Ltd., p. 101

<sup>21</sup>Porter, M. E. 1990. *The Competitive Advantage of Nations*. London, The Macmillian Press Ltd., p. 101

## 3.2.6. List of Cause Parameters

FACTOR PARAMETERS (p. 19)	
<i>Human resources (p. 19)</i>	Level of education
	Level of vocational training
	Fields of vocational specialization
	Programs for creating vocational qualification
	Level of motivation
	Type of motivation
	Level of wages
	Changes in individual goals
<i>Physical resources (p. 21)</i>	Value, age and type of assets
	Condition of and changes in the natural environment
	Changes in physical input costs
<i>Knowledge resources (p. 22)</i>	Number of research institutes related to the industry
	Number of personnel employed in R&D
	Level of investment in R&D
	Type of R&D projects
	Number of R&D projects
<i>Capital resources (p. 23)</i>	Quality of personnel in R&D
	Level of Debt capital
<i>Infrastructure (p. 24)</i>	Types of capital available
	Efficiency of purchasing network
	Efficiency of in-house logistic
	Efficiency of distribution network
<i>Intangible assets (p. 25)</i>	Efficiency of communication network (internal and external)
	Reputation
	Customer base/repurchase rate



<b>DEMAND PARAMETERS (P. 25)</b>	
<i>Composition of the home demand (p. 25)</i>	Change in buyers sophistication
	Attitudes toward quality, price and prestige
	Change in the degree of anticipation of buyer needs
	Segment structure of demand
<i>Demand size and growth pattern (p. 26)</i>	Size and growth of home demand
	Number of independent buyers
	Rate of market growth/level of saturation of the home market
<i>Internationalization of domestic demand (p. 27)</i>	Mobile and multinational local buyers
	Ways and extent of influence on foreign needs
<b>PARAMETERS DESCRIBING THE FIRM'S STRATEGY, STRUCTURE AND RIVALRY (p. 28)</b>	
	Level of (new) investment
	Marketing effort
	Company goals
	Ownership structure
	System for incentives for managers
	Managerial system
	Interaction between departments and R&D department
	Number of competitors
	Level of barriers to entry
	Number of merges/co-operations
	Distribution of market share

<b>PARAMETERS DESCRIBING RELATED AND SUPPORTING INDUSTRIES (p. 30)</b>	
	Co-operation with suppliers
	Competitiveness of suppliers
	Co-operation with related industries
	Competitiveness of related industries
<b>GOVERNMENT (p. 31)</b>	
	Governmental influences on the industry

*Table 2: The Cause Parameters*

#### **4. Summary**

To evaluate the competitive position of an industry it is not enough to look at the present situation only. It is important to understand how parameters contributed to the industries' position in the past and analyze how changes can affect the competitiveness of the industry.

Result indicators are relatively easy to measure and provide a good starting point for the analysis of the competitive position of an industry but they do not allow the evaluation itself. To evaluate the competitive position the result indicators have to be seen in a broader context which is provided by M. E. Porter's system of determinants that influence the competitive position of nations' industries. The diamond, as M. E. Porter calls his model, explains the impact of conditions which are inside and outside the industry. The indicators describing the diamond are the cause indicators. The cause indicators are needed to explain and understand the pattern behind the current position (the result) of an industry. Since the world is dynamic and subject to changes it is important not only to view the value of the cause parameters for the present but also look at their historical development and try to predict the future development. It is not necessarily needed to identify the absolute value of the cause parameters. It can be enough to identify and predict changes compared to prior positions. With the help of the understanding of the pattern behind the competitive position, derived from the past, and the predicted change of cause indicators it is possible to make a reasonable assumption about the direction in which the industry will move.

The discussion of the parameters showed, that some parameters are result indicators as well as cause indicators although the point of view when looking at them is different.

The result indicators can be grouped in leading, real-time or lagging indicators, depending on the time difference between changes of the indicators and changes of the competitive position of the industry. Leading indicators, for example, change before changes actually take place in the competitive position of an industry. This 'time-behavior' has to be taken into account when using these indicators to identify the competitive position of an industry.

LEADING INDICATORS	REAL TIME INDICATORS	LAGGING INDICATORS
Growth of the industry and the market	Quality of Output	Share of the world market economy exports of the industry compared to the nation's share of world market economic exports
Level of foreign direct investment		Industry's balance of trade
Number of patents applied for within a specific time period		Profitability
Efficiency of purchasing network		Number of licenses sold/purchased
Efficiency of in-house logistics		Value of licenses sold/purchased
Efficiency of distribution network		Level of liabilities
Value, age and types of assets		Reputation
Number of international links		Customer base/repurchase rate

Table 3: Result Parameters

FACTOR PARAMETERS (p. 19)	
<i>Human resources (p. 19)</i>	Level of education
	Level of vocational training
	Fields of vocational specialization
	Programs for creating vocational qualification
	Level of motivation
	Type of motivation
	Level of wages
<i>Physical resources (p. 21)</i>	Changes in individual goals
	Value, age and type of assets
	Condition of and changes in the natural environment
<i>Knowledge resources (p. 22)</i>	Changes in physical input costs
	Number of research institutes related to the industry
	Number of personnel employed in R&D
	Level of investment in R&D
	Type of R&D projects
	Number of R&D projects
	Quality of personnel in R&D
<i>Capital resources (p. 23)</i>	Level of Debt capital
	Types of capital available
<i>Infrastructure (p. 24)</i>	Efficiency of purchasing network
	Efficiency of in-house logistic
	Efficiency of distribution network
	Efficiency of communication network (internal and external)
<i>Intangible assets (p. 25)</i>	Reputation
	Customer base/repurchase rate
DEMAND PARAMETERS (p. 25)	
<i>Composition of the home demand (p. 25)</i>	Change in buyers sophistication
	Attitudes toward quality, price and prestige
	Change in the degree of anticipation of buyer needs
	Segment structure of demand

<i>Demand size and growth pattern (p. 26)</i>	Size and growth of home demand
	Number of independent buyers
	Rate of market growth/level of saturation of the home market
<i>Internationalization of domestic demand (p. 27)</i>	Mobile and multinational local buyers
	Ways and extent of influence on foreign needs
PARAMETERS DESCRIBING THE FIRM'S STRATEGY, STRUCTURE AND RIVALRY (p. 28)	
	Level of (new) investment
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	Competitiveness of suppliers
	Co-operation with related industries
	Competitiveness of related industries
GOVERNMENT (p. 31)	
	Governmental influences on the industry

Table 4: The Cause Parameters

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