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## Measuring corporate internationalisation: a review of measurement concepts and their use

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## **discussion paper**

FS I 00 - 101

### **Measuring Corporate Internationalisation**

A review of measurement concepts  
and their use

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### **Measuring Corporate Internationalisation**

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## **Abstract**

This paper discusses various ways of measuring corporate internationalisation. The concepts considered here became of crucial importance in the recent debate on globalisation, since many scholars link globalisation to a quantitative increase in the international activities of firms. However, this paper shows that opinions about the extent of this increase differ widely depending on what measurement concept is used. The paper further highlights that there is no unique and comprehensive measurement concept. Thus viable results depend on the difficult task of bringing research questions, measurement concepts and data availability into line.

## **Zusammenfassung**

Dieses Papier befasst sich mit den in der Literatur vorgefundenen Konzepten zur Erfassung der Internationalisierung von Unternehmen. Diese Konzepte haben im Zuge der Globalisierungsdebatte eine besondere Bedeutung erlangt, da vermeintliche und tatsächliche Globalisierungsfolgen vielfach auf eine quantitative Zunahme der Internationalisierung von Unternehmen zurückgeführt werden. Diese Zunahme kann jedoch je nach Meßmethode erheblich variieren. Gezeigt wird, daß es weder ein einheitliches noch ein umfassendes Meßkonzept gibt und daß valide Aussagen nur durch eine gelungene Integration von Fragestellung, Meßkonzept und Datenverfügbarkeit zu erzielen sind.



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# 1 Introduction<sup>1</sup>

The recent debate on globalisation has generated a wider interest in the transborder activities of corporations. While some authors are convinced that Multinational Corporations (MNCs) are best symbolised by an octopus whose tentacles try to grasp the whole world (Barnet/Cavanagh 1994, Korten 1995), other authors paint a completely different picture. Here the MNC is seen more or less as an lethargic animal, whose presence abroad is rather limited (Hirst/Thomson 1996). Both metaphors can be justified when considering individual companies, at least if one takes the following definition as a basis: according to Dunning (1992: 3) “A multinational or transnational enterprise is an enterprise that engages in foreign direct investment and owns and controls value adding activities in more than one country”.

It is probably not wrong to state that today most large corporations fulfill this definition, which is widely accepted in academia, business, national governments and international organisations. For instance, a recent compilation of data on the internationalisation of the 100 largest German companies has found that it is difficult to find a strictly national company. Even some of the utility companies are to a small degree active in foreign markets (FAST 1999 reprinted in Hassel et al. 2000a). Thus, thinking about larger corporations, the question is not which companies are internationalised, but rather how companies differ in regard to their internationalisation. This is especially true if we do not restrict internationalisation to the definition that value adding activities have to take place in more than one country, but also recognise that ownership structure or management composition can be internationalised too.

Given these differences in definition, this paper tries to give an overview of different approaches to measuring and comparing corporate internationalisation. Based on the assumption that there is more than one way to ‘correctly’ measure internationalisation, this paper concentrates on the meaningfulness of different criteria and indices. The first section deals with individual internationalisation indicators. This is followed by a discussion on how regional diversification in internationalisation can be measured and expressed. Next we look at different composite indicators (or indices) and discuss issues of reliability, exactness and validity of indicators and indices. The final section deals with the difficulties of bringing research questions, indicators and data availability into line.

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1 For useful comments I thank Douglas van den Berghe (University of Rotterdam), Dieter Plehwe and Stefano Vescovi (both Wissenschaftszentrum Berlin) as well as Michael Wortmann (Forschungsgemeinschaft für Außenwirtschaft, Struktur- und Technologiepolitik [FAST] e.V., Berlin).



## 2 Individual internationalisation indicators

As mentioned above, the term 'internationalisation' has different connotations - even if restricted to corporate internationalisation. Some might think of internationalisation as a process, others see it more as a certain level of international intertwining reached by a company. While this is only a question of different perspectives, there are strong differences of opinion as to what indicators are suitable for measuring corporate internationalisation. Following a well established framework in international business literature (Perlmutter/Heenan: 1979: 16; Sullivan 1994: 331; Bäurle 1996: 9), we can distinguish structural indicators, performance indicators and attitudinal indicators.

### 2.1 Structural indicators

Structural indicators try to give a picture of the international entanglement of a corporation at a certain time. Here we find several indicators that are related to the foreign *activities* of MNCs such as:

- the number of countries a company is active in
- the number/proportion of foreign affiliates
- the number/proportion of non-capital involvements abroad (e.g. strategic alliances, franchised operations etc.)
- the amount/proportion of foreign assets
- the amount/proportion of value added abroad<sup>2</sup>
- the amount/proportion of sourcing abroad
- the number/proportion of foreign employees

A second group of indicators describes the internationalisation of the *governance structures* of a corporation. Relevant indicators here are:

- the number of stock markets on which a company is listed
- the amount/proportion of shares owned by foreigners
- the number/proportion of non-nationals on the board of directors

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2 Following Schmidt (1991: 57) and Dunning (1992: 7) the value added abroad is the best measure to indicate the economic significance of the foreign activities of an MNC. The amount of value added abroad is calculated as the revenues made by foreign affiliates minus all inputs.

## 2.2 Performance indicators

Performance indicators measure the degree to which the success or failure of corporate activity during a certain period of time (usually one year) is connected to foreign countries. The two main indicators are turnover and operating income. Two issues have to be addressed when considering *turnover*:

- The first issue is demand. The main question here is, to what extent turnover is generated in foreign countries. The relevant indicator - amount of foreign sales by customer location - is calculated as exports from the home country plus revenues of the foreign affiliates (except those revenues that come from exports to the home country of the parent company).
- The second issue is supply. The main question here is, to what extent business activity is transacted by subsidiaries located in foreign countries. The relevant indicator - amount of sales of foreign subsidiaries - is calculated as the sum of turnover of foreign subsidiaries as a proportion of the sum of turnover of the parent company and its national subsidiaries.<sup>3</sup>

A second important performance indicator is the amount of *operating income* earned abroad. This indicator is usually calculated as the sum of operating income generated by all foreign affiliates.

## 2.3 Attitudinal indicators

Attitudinal indicators try to give a picture of how MNCs view foreign countries and treat their subsidiaries in foreign countries.<sup>4</sup> They usually imply an actor centred view, focusing on the management or parts thereof. Although there are doubts as to whether attitudinal characteristics can be measured with sufficient reliability (Sullivan 1994: 325), there is also strong support for the use of attitudinal indicators, as expressed in the following quotation: "...external and quantifiable measures such as the percentage of investment overseas or the distribution of equity, are useful but not enough ... The more one penetrates the living reality of how decisions are made in an MNC, the more weight must be given to how executives think about doing business around the world." (Perlmutter/Heenan 1979: 17)

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3 Since there is no consolidation of intrafirm transfers, this indicator does not necessarily express the home/foreign split of production!

4 Of course, in reverse this indicator also gives a picture of the role of the entities in the home country.

Table 1: Individual Internationalisation Indicators

Structural Indicators	Performance Indicators	Attitudinal Indicators
<p><b><u>1. Relating to foreign activities</u></b></p> <ul style="list-style-type: none"> <li>◆ Number of countries a company is active in</li> <li>◆ Number or proportion of foreign affiliates</li> <li>◆ Number or proportion of non-capital involvements abroad (e.g. strategic alliances, franchised operations)</li> <li>◆ Amount or proportion of foreign assets</li> <li>◆ Amount or proportion of value added abroad</li> <li>◆ Amount or proportion of sourcing abroad</li> <li>◆ Number or proportion of foreign employees</li> </ul> <p><b><u>2. Relating to governance structures</u></b></p> <p>Number of stock markets on which a company is listed</p> <ul style="list-style-type: none"> <li>◆ Amount or proportion of shares owned by foreigners</li> <li>◆ Number or proportion of non-nationals in the board of directors</li> </ul>	<p><b><u>1. Foreign sales</u></b></p> <ul style="list-style-type: none"> <li>◆ <i>Demand</i>: Amount of foreign sales by customer location <ul style="list-style-type: none"> <li>Exports from the home country</li> <li>+ Revenues of foreign affiliates</li> <li>– their revenues from exports to the home country</li> </ul> </li> <li>◆ <i>Supply</i>: Amount of sales of foreign affiliates <ul style="list-style-type: none"> <li>Sum of revenues of foreign affiliates</li> </ul> </li> </ul> <p><b><u>2. Operating income abroad</u></b></p> <ul style="list-style-type: none"> <li>Sum of operating income of foreign affiliates</li> </ul>	<p><b><u>1. 'Soft' indicators</u></b></p> <ul style="list-style-type: none"> <li>◆ Ethno-, poly-, regio- or geocentric management style according to: organisational complexity, authority, decision making, communication flows, recruiting, staffing, control</li> </ul> <p><b><u>2. 'Hard' indicators</u></b></p> <ul style="list-style-type: none"> <li>◆ International experience of top managers <ul style="list-style-type: none"> <li>cumulative duration of the years top managers spent working abroad</li> <li>weighted by the total years of their working experience</li> </ul> </li> </ul>

Quelle: Dörrenbächer 2000.

These different positions are reflected by the fact that several attitudinal indicators, differing in how statistically measurable they are, are in use. A rather 'soft' qualitative indicator was developed by Perlmutter. This indicator, which underlies or is explicitly applied in many studies (eg Hedlund 1986, Bartlett/Ghoshal 1989, Marginson/Sisson 1994, Dörrenbächer 1999) distinguishes four types of headquarter management's orientation towards their foreign subsidiaries (Perlmutter 1969, Perlmutter/Heenan 1974). To decide whether the central management of an MNC follows an ethnocentric (ie home-country oriented), a polycentric (ie host-country oriented), a regiocentric (ie regionally oriented) or a geocentric (ie globally oriented) approach, Perlmutter/Heenan (1979: 18f.) proposed a multi-item indicator, addressing *inter alia* the following aspects: complexity of organisation, authority/decision making, evaluation/control, rewards/punishment, communication/information, recruiting/staffing. However, due to their premise that recruiting/staffing is of central importance in the internationalisation of an MNC, Perlmutter/Heenan (1979: 183f.) concentrated their own empirical study on personnel function (manpower planning, manpower administration and manpower control). According to them, the degree of internationalisation of a company increases from ethno-, through poly- and regiocentrism to geocentrism.

An attitudinal indicator which can be better measured statistically was developed by Sullivan (1994: 332). According to him, the international mindset of a company increases with the international experience of top managers, measured as the cumulative duration of the years top managers spend working abroad weighted by the total years of their working experience.

### **3 Internationalisation as regional diversification**

In addition to the dichotomy of home vs. foreign, different geographical variation indices can be calculated for many of the indicators given above. For instance Schmidt (1981) uses the Herfindahl-index to place companies on a continuum between a completely homogeneous and a completely heterogeneous distribution of their foreign activities to different countries. Perriard (1995) uses the Gini-index to measure the extent to which the regional distribution of a certain indicator at a given company complies with the total distribution of this indicator in the world. Take the example of car production: following Perriard's methods, one could look how far the spatial distribution of the car production of a specific company tends to have the same spatial distribution as total world car production.

Table 2: The Measurement of Regional Diversification

Regional Concentration	Network Extension	Geographical and Cultural Distance
<ul style="list-style-type: none"> <li>◆ Homogeneous vs. heterogeneous distribution of foreign activities (Schmidt 1981)</li> <li>◆ Extent to which the regional distribution of a certain indicator at a given company complies with the total distribution of this indicator in the world (Perriard 1995)</li> </ul>	<ul style="list-style-type: none"> <li>◆ Network spread index: (Ietto-Gillies 1998)  Number of foreign countries in which a company owns affiliates as a proportion of total number of countries in which foreign direct investment has occurred – One country (=home country of the company)</li> </ul>	<ul style="list-style-type: none"> <li>◆ Countries are weighted according to their geographic and cultural distance to the home country (Kutschker 1993)</li> <li>◆ Psychic dispersion index: (Sullivan 1994) Number of zones with different cognitive maps relating to management principles in which a company is active (out of a total of 10 zones worldwide)</li> </ul>

Quelle: Dörrenbächer 2000.

A second way of tackling geographical variation of corporate internationalisation is to focus on the number of countries a company is active in. Developed by Letto-Gillies (1998), the so called “network spread index” is calculated, *ceteris paribus*, by taking the number of foreign countries in which a company has affiliates as a proportion of all countries where foreign direct investment has occurred, minus one country, ie the home country of the company.

Finally, based on the assumption that there are striking differences between countries, which influence the internationalisation behaviour of companies, (Johanson/Vahlne 1977), Kutschker (1993) proposed that foreign countries should be weighted according to their geographical and cultural distance to the home country of the company. Similarly, Sullivan (1994) introduced an indicator he calls “psychic dispersion”. According to this indicator, the world is divided into ten zones with different cognitive maps relating to management principles. The more zones a company is active in, the larger the psychic dispersion of its internationalisation.

## 4 Internationalisation Indices

Indices, or composite indicators, are formed by combining individual indicators. Despite the fact that numerous studies are based on individual indicators, there is a broad consensus that composite indicators are more suitable to measure corporate internationalisation. Firstly, given the multidimensionality of internationalisation,<sup>5</sup> restricting the measurement to one single item inevitably means that only a part of the whole phenomenon of corporate internationalisation is represented. Secondly, the multidimensionality of the phenomenon means that, depending on what indicator is used, single transactions could lead to contradictory results concerning the degree of internationalisation (German et al. 1999: 7). For instance, modernising a plant abroad might lead to an increase in the proportion of foreign assets, but due to the labour saving effects of modernisation, the proportion of foreign employees might at the same time decrease. Thirdly, using individual indicators does not allow systematic control of measurement errors, contingent influences and transfer pricing manipulations (see below).

Many scholars agree that the development of sophisticated indices to measure corporate internationalisation is still in its infancy (Sullivan 1994, Perriard 1995,

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5 This multidimensionality is also reflected in the wealth of different single indicators on corporate internationalisation as described above.

Ramaswamy et al. 1996). Only three different composite indicators can be identified in the literature on the subject:<sup>6</sup>

1. The “*transnationality index*” used by UNCTAD. This composite indicator first appeared in the World Investment Report 1995 (UNCTAD 1995). The aim of the indicator is “... to capture fully the extent of involvement of TNCs [Transnational Corporations, CD] in the world economy.” (UNCTAD 1995: 24). The index draws on three different ratios: Foreign sales to total sales, foreign assets to total assets, and foreign employment to total employment. In order not to favour companies from one specific type of industry<sup>7</sup> in the ranking of companies,<sup>8</sup> the “transnationality” index is calculated as the average of the three above mentioned ratios.
2. The “*transnational activity spread index*”. This index, proposed by Letto-Gillies (1998) is a combination of two indices. According to Letto-Gillies the index used by UNCTAD ignores the spread of foreign activities. But her own network spread index, which indicates regional diversification (see above), does not take into account the amount or the share of activities abroad. As a result she proposes to combine the two indices so that the UNCTAD index is weighted by the “network spread index”. In detail, the resulting new index called the “transnational activity spread index” is calculated as follows: The average of the following ratios: foreign sales to total sales, foreign assets to total assets, and foreign employment to total employment, is multiplied by the number of foreign countries a company is active in as a proportion of the total number of countries where foreign direct investment has occurred, minus one (the home country). In addition to this comprehensive index Letto-Gillies indicates that every individual indicator of the UNCTAD index might also be weighted by the network spread index, thus forming three sub-indices: the “sales spread index”, the “asset spread index” and the “employment spread index”.

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6 In addition to these indices, Perriard (1995) proposes a set of 13 quantitative and qualitative indicators to determine the degree of the internationalisation of a corporation. However since there is no integration of the indicators, the use of this instrument is very restricted.

7 Labour intensive, capital intensive or export intensive industry.

8 This index is annually calculated for the world's top 100 non-financial MNCs, which are selected on the basis of their foreign assets. The collection and the calculation of the data is undertaken by the Studies and Competence Centre for Organisational and Policy Research in European Business (SCOPE) at the Erasmus University of Rotterdam. For a recent interpretation of the data cf. van den Berghe (1999).

Table 3: Composite Indicators Used to Measure Corporate Internationalisation

<p><b>Transnationality Index (UNCTAD 1995)</b></p>	<p><b>Transnational Activities Spread Index (Ietto-Gillies 1998)</b></p>	<p><b>Degree of Internationalization Scale (Sullivan 1994)</b></p>
<p>Ratio of foreign sales to total sales + Ratio of foreign assets to total assets <u>+ Ratio of foreign employment to total employment</u> divided by 3</p>	<p>Ratio of foreign sales to total sales + Ratio of foreign assets to total assets <u>+ Ratio of foreign employment to total employment</u> divided by 3</p> <p>multiplied by</p> <p>Number of foreign countries in which a company owns affiliates as a proportion of total number of countries where foreign direct investment has occurred – One country (=home country of the company)</p>	<p>Ratio of foreign sales to total sales + Ratio of foreign assets to total assets + Ratio of foreign affiliates to total affiliates + „International experience of top management,, (see above) + „Psychic dispersion,, of international operations</p>

Quelle: Dörrenbächer 2000.



3. The “*degree of internationalization scale*”. This index proposed by Sullivan (1994, 1996) was developed in a bottom up-process, using publicly available data. Unlike UNCTAD, which selected its three individual indicators based on preliminary assumptions about their usefulness in expressing the phenomenon of internationalisation, Sullivan started with a total of nine indicators encompassing structural, performance and attitudinal items. Using item-total analysis<sup>9</sup> on a representative sample of 74 MNCs, five ‘good’ indicators have been identified. These indicators, all weighted by the factor one, form the degree of internationalization scale. In detail the index is composed of the following indicators: The ratio of foreign sales to total sales, foreign assets to total assets and foreign subsidiaries to total subsidiaries, the international experience of top managers (measured as the cumulative duration of the years top managers spend working abroad weighted by the total years of their working experience) and the psychic dispersion of international operations.

## 5 The reliability, exactness and validity of indicators and indices

If one recognises that scientific progress is not possible without adequate measurement (Korman 1974 and Schwab 1980 cited in Sullivan 1996: 338) then it is important to discuss the issues of reliability, exactness and validity of the indicators described so far.

As mentioned above the use of *individual indicators* to measure corporate internationalisation is in general not very reliable since it does not include a systematic control of measurement errors, contingent influences and transfer-pricing manipulations (beyond obvious implausibility).

- Measurement errors might occur with ‘soft’ attitudinal indicators, such as the Perlmutter typology. Here, biased views and cognitive dissonances, both of the interviewer and the interviewee, may lead to flawed results. Another source of measurement error is the fact that the definition of a certain indicator must be clear, detailed and viable. Take the example of the indicator of the ratio of foreign employment to total employment. In the first place, an exact definition of what an employee is is necessary: for example, should there be a headcount, or are part time employees converted into full time equivalents according to their working

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9 Item-total analysis correlates each potential indicator at a given sample with the indicator-corrected scale of the total score. The aim is to get a collection of indicators which has a high average correlation with the total score.

hours<sup>10</sup>; do employment figures represent the average of the year or is the figure taken at a common qualifying date etc. Secondly, is it viable to compare employment on a one to one basis, taking into account the large sectoral and national differences in the costs of creating a workplace?

- Contingent influences are influences that change indicators beyond real material changes. The most obvious contingent influence is exchange rate fluctuations. Exchange rate problems occur particularly when comparing the internationalisation of companies on a historical or on a national basis. Another contingent influence which occurs from time to time is the relocation of an MNC headquarter to another country.<sup>11</sup> Depending on the degree of internationalisation at the time of the headquarter relocation, there might be dramatic changes in some figures indicating the internationalisation of the company. Some further contingent influences are industry specific. They occur for instance in engineering, when large projects, covering many years, are invoiced in one year, resulting in a tremendous jump in performance indicators such as turnover or operating income.
- Transfer-pricing manipulations systematically distort the geographic distribution of performance indicators such as turnover and especially income. Transfer pricing manipulations occur when internalised transactions between related units of an MNC are not calculated on the “arm’s length principle”. Aims of transfer-pricing manipulations are manifold: for example, tax avoidance, lowering customs duties, repatriation of capital. However, very little is yet known about the significance of transfer-pricing manipulations. In a recent overview of different studies, Plasschaert (1996: 406f.) states that “... all in all, the only plausible, although trivial, conclusion .... is that transfer-price manoeuvres are probably practised much more frequently than TNCs [Transnational Corporations, CD] are willing to admit, but much less than is alleged in some circles.”

Although *composite indicators* are generally more reliable, their use is not without problems. We have discussed three different composite indicators, each of which claim to adequately measure corporate internationalisation. However, taking the multidimensionality of the phenomenon as a criteria, the three indices have different orientations. The UNCTAD index combines two structural and one performance indicator. The “transnational activity spread index”, proposed by Letto-Gillies is even more concentrated on structural aspects of internationalisation; she uses the UNCTAD index as a base but weights it with another structural indicator. The only index covering all three dimensions of internationalisation is the one developed by Sullivan. This index combines structural (two indicators), performance (one indicator) and attitudinal (two indicators) aspects. However, it is questionable whether even this comprehensive instrument adequately covers the internationalisation phenomenon:

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10 This point is crucial in industries which mainly use part time workers, such as the fast food industry or the transport industry.

11 One example is the relocation of the Ikea headquarter from Sweden to Denmark in 1975 (Dörrenbächer/ Meissner 1991: 23).

- Firstly, the viability of both attitudinal indicators used by Sullivan is heavily disputed. Ramaswamy et al. (1997: 173) maintain that length of international experience is not a good measuring stick for the international mindset of the management, since there are several other factors with a stronger influence, such as the geographic spread of the company, its policy and its administrative heritage. In addition, Ramaswamy et al. criticise the plausibility of the “psychic dispersion of internationalisation” concept. Using this concept would mean, for instance, that a company operating in France and the United Kingdom, has a higher psychic dispersion of its internationalisation than a company operating in Japan, India, Israel and Brazil.
- Secondly, there are strong concerns as to whether Sullivan’s indicator can really claim to be all-encompassing, because the way he chooses the indicators for the index (ie selecting indicators which have the highest average correlation with one another) systematically excludes indicators that might be important to express the phenomenon. Following Ramaswamy et al. (1997: 174) The index used by Sullivan “....seems to exclude several common strategic options for internationalisation such as indirect exporting, licensing, joint ventures...”

A second problem is the question of how much weight different individual indicators should have in an index. Up to now there is no information on how to determine the importance a specific indicator should have in the construction of an index. Because of this lack of information, two of the indices mentioned here treat all indicators equally. In contrast, the Letto-Gillies index allots more weight to the network spread component than to the three other single components.

To sum up the discussion, there is neither a single indicator nor an index that satisfactorily measures the overall degree of the internationalisation of a firm. Furthermore, there are differing views as to whether or not the construction of such a general index is feasible in the foreseeable future (Sullivan 1997: 190, (Ramaswamy et al. 1997: 176). Hassel et al recently considered this question; they have constructed a new index, which concentrates on the previously neglected financial dimension of internationalisation, and reflects the impracticality of the general approach (Hassel et al. 2000a, 2000b).<sup>12</sup>

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12 Hassel et al. (2000a, 2000b) combine an index that measures the real dimension of corporate internationalisation (using a somewhat reworked “transnational activity spread index”) with different indicators which measure the financial dimension of corporate internationalisation (i.e. foreign owners as percentage of total ownership, number of listings in foreign stock exchanges and the use of international accounting standards).

## **6 The magic triangle: research questions, indicators and data availability**

The lack of a general indicator encompassing the whole phenomenon of corporate internationalisation is a severe problem if the research purpose is to rank companies according to their overall degree of internationalisation. However, if corporate internationalisation is part of a more specific research question, then the aim of the research might give some guidance on how to construct a viable index (what indicators, how much weight). For instance, if one is interested in ranking companies according to their production abroad, the best indicator would probably be value added abroad. The proportion of foreign employees and foreign assets might be good measuring sticks. In contrast, the number of stock markets on which a company is listed does not seem to be a very plausible indicator.

It might also be easier to find indices for intra-industry comparisons than for cross-industry studies, since in this case indices can be optimised according to industry specifics. For instance the “transnational spread index” might be appropriate for industries in which the extent of the geographical reach is of special importance, such as in the transport industry.

But even if a viable index to rank companies from different countries and/or industries is found, two problems remain. The first problem is data availability. Apart from mail surveys, there are only a few sources from which data expressing the international entanglement of a company is available: these are specialised company listings, company handbooks, databases and annual reports. In general these sources are very fragmented and incomplete (for example they lack interesting information, such as the amount of shares owned by foreigners or the proportion of value added abroad etc). In addition, data availability has a high sectoral and national variance, and is the result of different accounting rules and publishing habits. For instance, in contrast to the US General accounting principles, the German accounting standard does not require a home/foreign split of the assets. Different practices exist in the publication of employment data, with many German companies publishing a home/foreign split, something that is very unfamiliar for Japanese companies. Finally, due to different modes of compilation, data is often incompatible especially for companies from different countries. While in the long run some of these problems will alleviate due to the ongoing standardisation of accounting principles, other problems will persist.

The second and more general problem is the use of indicators and indices in wider economic and socio-political research questions. The actual use of quantitative data on corporate internationalisation concentrates on three purposes.

1. In management science, many empirical studies look at the correlation between the internationalisation of a company and its financial performance.

2. In macroeconomics, the use of data on individual MNCs is not very widespread.<sup>13</sup> However there are some exceptions, where the use of company specific data is necessary, such as concentration issues. For instance the list of the top 100 MNCs of the world, annually published by the UNCTAD, is used to find out whether the share of those companies in world gross domestic product is increasing or not.
3. In political science (especially in the sub-fields of international political economy and industrial relations) the internationalisation of MNCs has served different purposes. In the past, the extent of foreign manoeuvres of MNCs was frequently used to explain underdevelopment in third world countries (e.g. Fröbel et al. 1977). More recently the internationalisation of MNCs has been used either to explain problems of state sovereignty and declining trade union power (Giddens 1996, Beck, 1996, Strange 1998) or to contest these developments by arguing that there is no, or only a modest growth, in the international entanglement of MNCs (Hirst/Thompson 1996).

Regardless of the field of study or the research purpose, there are some strong arguments against a positivistic interpretation of quantitative data on the internationalisation of MNCs. Take the case of management science and its attempt to explain the financial performance of an MNC by its internationalisation. It is a commonplace that in this kind of study the measurement concept strongly influences the result. However, even using the same indicator does not give a consistent picture (Sullivan: 1994: 330). Furthermore, macroeconomic data, for example on the (probably growing) contribution of large MNCs to the world's gross domestic product, has to be interpreted carefully. Collecting information on the quantitative share of a few large MNCs in a certain market is only a first step towards finding out something about the power of MNCs. In addition, there has to be at least a look at the development of competition and its influence on the level of prices and the structure of supply in this market (Dörrenbächer 1999: 56). Finally, the debate on the influence that corporate internationalisation has on state sovereignty and trade union power is a striking warning against a positivistic interpretation of quantitative data on corporate internationalisation. Many empirical studies have found that in the long run there is no big rupture in the quantitative (and qualitative) dimension of corporate internationalisation of MNCs (e.g. Hirst/Thompson 1996, Doremus et al. 1998, Wortmann 2000 forthcoming). However this does not mean that all problems concerning state sovereignty or declining trade union power are imagined. The answer is simply that other things like general economic conditions (Wortmann 1999) or the state's need for tax income (Scharpf 1996, 1997) have changed dramatically over time, bringing MNCs into better bargaining positions, whether their degree of internationalisation has significantly increased or not.

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13 Scholars usually use aggregate data, such as the flow or the stock of foreign direct investment. For a discussion of the problems associated with these indicators cf. Wortmann/Dörrenbächer (1997).

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