SUBCONTRACTING RELATIONSHIPS IN THE MANUFACTURING INDUSTRY: THE DUTCH CASE

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Abstract

The major changes that have taken place in the Western hemisphere in the last couple of decades have not only resulted in a rapid expansion in the number of SMEs but also in an improvement of their position in the production chain. The oil crisis of 1973 and the subsequent years of recession marked a turning point for SMEs because although large enterprises were particularly hard-hit, SMEs fared much better and in fact acted as an important stabilizing influence. SMEs were given another spur as a result of the development in technology and logistics in the early 1980s. The latest development that affects SMEs is the opening up of the Internal Market ('1992') of the European Union which is particularly significant for the Dutch economy because of its highly open character.

This thesis will focus on subcontracting relationships in the Dutch manufacturing industry, which is characterized by a predominance of SMEs. The research stresses the small and medium-sized suppliers' position but large contractors are also a critical component of the research. The objectives of the thesis are to develop an insight into the background of subcontracting, to identify the various types of subcontracting relationships and to analyze the shifts in subcontracting relationships and their causes.

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INTRODUCTION

As the next millennium approaches, the position of small and medium-sized enterprises (SMEs) in the manufacturing industry in the Western hemisphere is changing yet again. Since the 1920s large enterprises have been the pre-eminent form of industrialization, though other types of enterprises have continued to exist alongside it. The oil crisis of 1973 and the subsequent years of recession marked a turning point for SMEs because although large enterprises were hit particularly hard, SMEs fared much better and in fact acted as a stabilizing influence. The stagnation of the world economy resulted in a general crisis in mass production which led to de-glomeration and specialization of large enterprises. This in turn resulted in a trend towards the dis-investment of non-core activities, otherwise known as vertical disintegration.

SMEs were given another spur as a result of the developments in technology and logistics in the early 1980s. The emergence of computer-based, highly flexible manufacturing technologies have reduced the historic disadvantage of smaller enterprises. Efficient, flexible smaller batch production with scope economies has come within the reach of SMEs. Developments in logistics have resulted in the internationalization of markets and in competition becoming more global. As a result, the product life cycle has become shorter. Therefore, in order to survive, let alone thrive, in this economically volatile environment, manufacturers are expected to respond to the market quickly and flexibly. In this context, deconcentrated and diversified SMEs increasingly fulfil a necessary complementary function to the large enterprises, something which is reflected in the increased importance

of subcontracting.

Large enterprises focus their attention on their core competencies and rely on suppliers to supply them with the remaining components, with the effect that subcontracting is moving away from cyclical to structural supply. Also, contractors increasingly expect their suppliers to contribute more to the production process. The contractors only want to have direct transactions with so-called 'main-suppliers' which are referred to as the 'vital few'. The latter supply strategic, higher value added components, their subcontracting relationship tends to be long-term and they contribute to product design through early supplier involvement. The main-supplier in turn subcontracts simpler components to its suppliers and so on down the line. This results in a hierarchical structure of suppliers and a myriad of subcontracting relationships which tend to develop into networks. The main-suppliers, on the top of the subcontracting pyramid, maintain longer-term subcontracting relationships than the so-called jobbers at the base; naturally the former can also command a higher profit margin. All this clearly indicates a move from capacity subcontracting to specialty subcontracting. Simultaneously, the more intense relationship with their main-suppliers encourages large enterprises or contractors to reduce the number of suppliers they are dealing with directly.

As a consequence, contractors have adapted to the changing circumstances by adjusting their strategies (back to the basics), re-inventing what constitutes a good subcontracting relationship (fewer and more intense relationships) and subsequently changing their attitudes towards suppliers (co-makership, early supplier involvement and so on). Likewise, the position of suppliers has changed from flexible firms that were subservient to their contractors to ones that, out of mutual interest, stand on a more equal footing with their contractors. Subcontracting has evolved from cyclical capacity subcontracting to

structural specialty subcontracting, which explains why large firms are increasingly viewed as playing a major role in economic development in conjunction with SMEs.

Recently, additional challenges for small and medium-sized suppliers and the continuously changing subcontracting relationships with their contractors were generated by the official implementation of the Internal Market of the European Union (1992). First of all, this means that there will be increased competition because of the expanded sales potential both within the European Union and between the European Union and other trading blocs. Secondly, it will affect exporting and non-exporting firms alike, and inter-firm linkages will change since internal borders and cost savings no longer limit firms to the domestic market. Thirdly, increased competition will lead to more efficient organizational structures through mergers and take-overs, and there will be a shift from a functional to a divisional form of enterprises. Lastly, the spatial behaviour of firms is changing. In order to make use of the polarisation in comparitive costs within countries, which are even greater within the European Union, firms will reorganize by way of a spatial division of labour.

The likely outcome of the implementation of the Internal Market is that firms will seize the opportunities arising within the European Union and use them for restructuring. This is likely to result in the sharpening of the spatial division of labour at the level of the European Union.

This thesis will focus on subcontracting relationships in the Dutch manufacturing industry and will mainly stress the supplier's position. The latest developments in subcontracting are important for Dutch manufacturing because of the predominance of small and medium-sized enterprises which will also be affected by the opening up of the Internal Market. The particularly open character of the Dutch economy ensures that all smaller enterprises are not

only affected by the Internal Market through their own direct exports but also indirectly via their contractor. The disappearance of the internal borders of the European Union will also result in increased competition for small and medium-sized suppliers. It is only by moving up the subcontracting pyramid that small and medium-sized suppliers will improve their position as this enhances their competitive edge regionally, nationally and globally.

The aim, objectives and structure of the thesis

The aim of this thesis is to analyze subcontracting relationships in the Dutch manufacturing industry. More specifically, it will concentrate on subcontracting relationships from the suppliers' point of view which, in this research, also encapsulates the category of small and medium-sized enterprises. The research concentrates mainly on the position of the suppliers in the subcontracting relationship. However, it also extends to analyzing the contractor's point of view. The objectives of the thesis are thus fourfold:

- to develop an insight into the background of subcontracting;
- to identify and interpret the various types of subcontracting (inter-firm) relationships in the manufacturing industry in the Netherlands;
- to analyze the shifts in subcontracting relationships in the past decade and whether the Internal Market has been of any influence; and
- to explain the reasons for the shifts in the nature of the subcontracting relationships.

The above are the main themes which run throughout the discussion and the thesis is organized in three sections. Part I reviews the relevant literature and theory for this research (Chapters 1 to 4). In Part II the research methodology is discussed and the main empirical evidence is analyzed (Chapter 5 to 8). A synthesis of the main empirical and theoretical

conclusions, together with the implications for policy are presented in Part III (Chapter 9).

In order to comprehend the setting of this subject, the historical dimension and general background of Dutch manufacturing are analyzed from the relatively late start of the industrialization process to the present date; and a comparison is made of the competitive position of Dutch manufacturing vis-à-vis its neighbouring countries (Chapter 1). The evolution of SMEs throughout the past century will also pass in review. This links up with Chapter 2 where the variety, complexity and pervasiveness of SMEs will be analyzed in more detail. Even though there is no unique definition for SMEs, their positive and negative characteristics relative to their larger counterparts will be discussed in detail. The analysis then moves on to the presence of SMEs in the Netherlands and its increasing importance as a result of the diminishing economies of scale. The causes and results of the diminishing economies of scale are analyzed in Chapter 3. The contemporary technological and market developments are discussed, which have resulted in an increase of subcontracting by large firms to mostly smaller suppliers in the past decade are discussed. The changed character of subcontracting has improved the position of suppliers, but at the same time demands more of them. Despite the latest developments in technology and logistics, smaller suppliers often still cannot attain scale economies, lack access to information about markets and technologies and most are in a subservient position with respect to customers. This is where the Dutch government and the European Union may step in (Chapter 4) by helping small and medium-sized suppliers overcome the initial barriers in order to enter markets and acquire technologies. The last part of this chapter therefore, analyzes the policies implemented in other major industrialized countries with respect to SMEs and subcontracting.

Having established a broad context for the research, the second part of the thesis concentrates on the methodological and empirical elements of the research. Chapter 5 sets out the methodology used. The fieldwork for this research was carried out by means of in-depth (semi) structured interviews and case-studies with both suppliers and contractors. Chapters 6-8 link up with the themes of the previous chapter in its discussion of the thesis' methodological approach to empirical analysis. Chapter 6 explores the production process of both suppliers and contractors by concentrating on the firm's origins, background as well as its production system, production design and quality. The second empirical Chapter (Chapter 7) seeks to establish the type of suppliers and contractors by investigating the products that are manufactured, the intensity of the subcontracting relationship, contractors' support and so on. The last part of the empirical research (Chapter 8) analyzes the support both suppliers and contractors receive from the Dutch government and the European Union. It also evaluates the respondents' perception of their competitive position vis-à-vis neighbouring countries and their intentions and expectations with regard to future business strategies.

Part III (Chapter 9) draws together the results of the previous chapters and discusses the implications of the key findings. It also presents recommendations for future policy.

PART 1

SMEs AND SUBCONTRACTING

CHAPTER 1

DUTCH MANUFACTURING: THE CONTEXT

1.1 Introduction

This chapter will first of all analyze the nature of Dutch manufacturing at the national level: its relatively late industrial breakthrough in the second part of the 19th century; the interbellum period (1918-1940); and the post-WWII years which were characterized respectively by recovery (1945-1959), growth (1959-1973) and stagnation (1973-1990s). This chapter will concentrate on analyzing the position, distribution and structure of Dutch manufacturing over the last few decades.

It is, however, equally important to reflect on the position of the Netherlands vis-à-vis other major industrialized countries, considering its open economy which is greatly dependent on exports. This is especially so in the case of manufacturing industry. The international context has become even more pertinent since discussions were initiated about the Single European Market of the European Community in the White Paper of 1985. The Single European Market, or the Internal Market as it is commonly termed, has given extra impetus to European integration. The Internal Market was formally operationalized in 1993, yet functionally questions still remain to be resolved. The introduction concludes with an outline of the aims, objectives and structure of the thesis.

1.2 The late industrialization of the Netherlands

Between 1850 and 1914, the first phase of the industrialization process took place in the Netherlands in the form of a transformation from a pre-dominantly agricultural to an industrial economic system (Table 1.1), an evolution which was further developed in both breadth and depth in the following decades (Messing, 1981).

Table 1.1 Employment by sectors in the Netherlands (1849-1920) (%)

Year	Agriculture	Manufacturing	Services
1849	44.1	24.1	31.8
1899	29.6	33.8	36.6
1909	27.3	35.2	37.5
1920	22.9	37.8	38.4

Source: Naval Intelligence Division (1944); and Lambooy (1992).

There are various reasons for the late final industrial breakthrough of the Netherlands. As De Smidt and Wever (1990a) point out, this can be explained in three different contexts: the institutional-psychological, the macro–economic and the economic–geographical.

The institutional–psychological explanation stresses the fact that the Dutch in the 19th century, with the exception of the textile industry, were "mainly oriented towards cultivation in the tropics and towards international trade" (De Smidt and Wever, 1990a, p. 15; Jansen & De Smidt, 1974). This was due to the limited home market and its favourable transport location (the Netherlands is considered the 'Gateway to Europe') surrounded by countries -Belgium, Germany and the United Kingdom- which had industrialized early because of their access to local raw materials. This resulted in the open character of the Dutch economy. It directed the Netherlands in the obvious direction of generating economic

growth through exports, and made international developments of vital importance to its economy. The industrial development of the Netherlands can thus partly be explained by North's export base theory (1955) which assumes that growth and development depend on the export sector and its multiplier effects, and partly on the entrepôt function of the Netherlands (North, 1955; Hamilton, 1974). The gateway function of the Netherlands has always been associated with its centrality in terms of transportation within Western Europe and also with the historically central position of Western Europe in the flow of commodities in world trade. Dutch infrastructure in the late 19th century was made up of the seaport of Rotterdam, a national system of navigable waterways and a dense railway network. It served both domestic and international markets and turned out to be the ideal catalyst for an industrial breakthrough. The central role of the Netherlands in the exchange of industrial products among neighbouring countries also gave the tertiary sector a strong impulse. In addition, there was an "absence of the spirit of enterprise and innovation" (De Smidt & Wever, 1990a, p. 15) in the first half of the 19th century which showed in the lack of venture capital in the domestic market.

The macro–economic explanation of late industrialization is based on factor cost differentials. Besides the fact that it was hard to accumulate capital in the Netherlands, Dutch labour was relatively costly, a condition "originating partly in the long-established and prosperous commercial activities of the coast and the river ports" and also because labour productivity was low (Naval Intelligence Division, 1944, p. 359; De Smidt & Wever, 1990a). The fact that it was hard to accumulate capital implies that capital accumulation from trade and from colonial activities was not and could not be ploughed back into industrial development in the Netherlands as these were in fact used to finance balance of payment deficits (De Vries, 1978)

Finally, the economic-geographical context explains why there was not only a lack of skilled labour, but also an absence of other critical conditions for the development of production processes in Dutch manufacturing. An example was the availability of low labour costs in the textile industry in one region (Noord-Brabant) but an absence of coal supplies for its steam engines. The lack of raw materials was a problem anyway, especially in an era which was characterized by both coal and steel. Surely it was possible to import either German or British coal, given the open Dutch economy but transport costs were high and not compensated by the lower labour costs. It resulted in Weber's critical isodapane being exceeded in such a region. The result was that the forward and backward linkages of enterprises were more internationally than nationally oriented.

The breakthrough of industrialization in the Netherlands only happened from the 1890s, unlike some other West-European countries such as the United Kingdom and Germany. The late arrival of the Netherlands on the industrial scene (France and Italy were also 'late' in this respect) happened to coincide with the upswing of the third Kondratieff cycle (1898-1949) which was characterized by applications of the internal combustion engine and the electric motor (Butzin in: De Smidt and Wever, 1989; De Smidt and Wever, 1990a). The delay had consequences for the path industrial development has taken. Rostow's stages model characterizes various stages of growth (from the traditional society, the preconditions for take-off, the take-off, the drive to maturity, and the age of high mass-consumption (Meier, 1989)) which each identify certain 'leading sectors' in the economy, the growth of which is thought instrumental in propelling the economy forward. The take–off phase is especially important because it is a period in which the leading sector manifests itself and kick-starts the push to economic growth and thus affects the other

branches of industry (De Smidt and Wever, 1990). Yet the initial phase of industrialization in the Netherlands lacked a true leading sector which, according to Rostow, is characterized by the take–off stage being immediately followed by a subsequent stage of self–sustained growth.

The delayed industrialization did have one clear advantage, namely that activities which were based on new technology could be initiated without having to restructure the economy. Dutch industrialization was characterized by structural expansion of the economy: the new orientation or qualitative change in the industrialization process towards the capital goods industry such as electrical works (Philips in 1895), machinery, aircraft, shipbuilding, transport equipment, construction industry and chemical engineering which were introduced alongside the 'old' sectors of food and kindred products, textiles and wood which were already well endowed in mechanical-powered factory production. While the size of enterprises increased (Table 1.2), a new legal form of enterprise (N.V. or Naamloze Vennootschap, a legal construction that allows firms to take financial risks without entailing personal liability) was created which improved the position of small enterprises. The increase in the size of enterprises could partly be attributed to the already existing enterprises that were doing well, such as in the textile industry, and partly to completely new enterprises in the paper, rubber, metals and chemical industries.
The 20th century witnessed the rise of industries that required little raw material, but which depended to a high degree on the application of capital and scientific research. Broadly speaking, the development of heavy industry followed, rather than preceded, the expansion of light industry (Naval Intelligence Division, 1944). And shortages of materials resulting from WWI (1914-1918) encouraged the expansion of these industries.

In short, there was a shift towards manufacturing and services at the same time as a relative decline in agriculture and fisheries after 1899 (see Table 1.1). Geographically, the period of port development and industrial breakthrough (1870–1913) manifested itself in an increasing spatial concentration of manufacturing, and thus of the population in the western

Table 1.2 Employment structure according to firm sizes (%)

Size class (no. employees)	1889	1909
1-10	76.5	55.5
11-49	8.3	15.3
> 50	15.2	29.2

Source: De Vries, 1974, p. 26.

part of the country which became known as the Randstad. The spatial pattern of industry outside the west from 1870 to 1910 can be characterized as one of functional and spatial concentration: manufacturing was mainly clustered in the west (with a monopoly of business services), while agricultural activities were mainly to be found in Noord-Brabant, Gelderland, Twente and the southern coalmining region of Limburg. The core-periphery dichotomy, however, was less explicit at the national scale than in other Western European countries such as France and Italy (Giaoutzi, 1988).

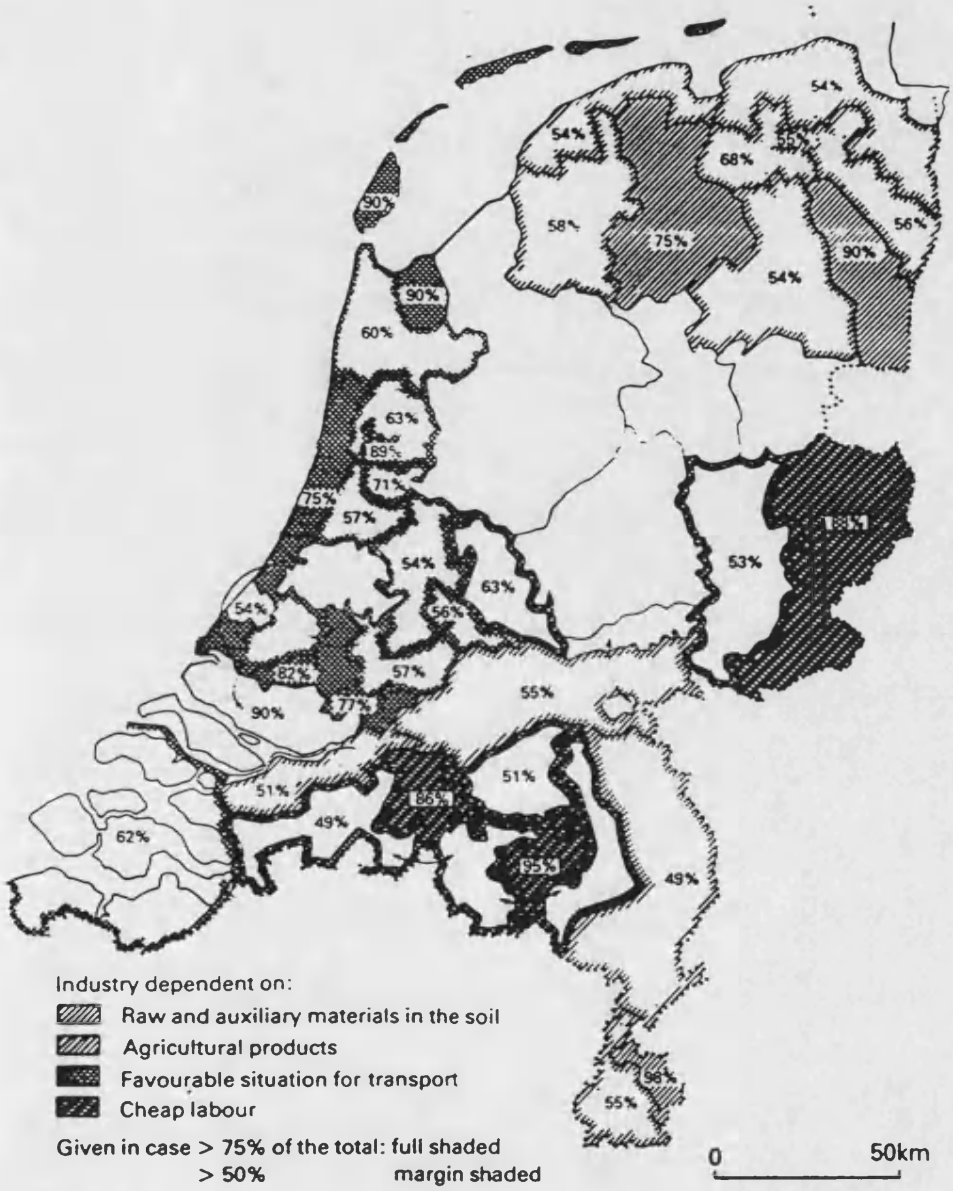
The development of employment in the 'new' sectors such as chemicals, paper and printing remained modest after 1889 and only increased in the second and third decade of the 20th century. The 'new' industries at the turn of the century were functionally and geographically less concentrated and less strongly intertwined.

After 1910 a deconcentration of industry occurred, largely as a result of the presence of large labour reservoirs in the east and south and of a by now dense railway network. It

generated a labour-oriented industrialization drive in the eastern and southern areas, a process which was partly supported by the developing large industrial firm which made many craft enterprises disappear (De Smidt & Wever, 1990). The growing population in the agricultural areas (such as Noord-Brabant and Twente) with their abundant supply of labour which kept wages low, gradually attracted the traditional sectors. The textile industry of the west moved to the north-east to Twente and the south-east to Noord-Brabant which also housed the leather and footwear industry (the Langstraat). Other examples of industries that settled in these areas include the electrotechnical industry (Philips in Eindhoven) and the rayon fibre industry (Enka, now Akzo in Eindhoven and Arnhem) which 'sought to tap the labour pool found in the eastern and southern regions' (De Smidt & Wever, 1990a, p.20).

Between 1914 and the time of the world depression in 1929, the old dominating sectors (food, textiles and wood) decreased in terms of employment, while the metals sector (shipbuilding, machinery) and the newcomers (the electrotechnical industry, light metal industry (such as Fokker), chemical, graphical and paper, rubber, construction, hydraulics and construction material industry) increased in this respect. It was only around 1930 that the foundation was laid for a spatial pattern of specialization which perpetuated until 1963: the west with its industrial port activities, the footwear industry in Noord Brabant's Langstraat and the textile industry in Twente, Tilburg and Helmond (see Map 1.1). The pattern of regional specialization around 1930 could be explained by Weber's (1909)

Map 1.1 Locational tendencies in manufacturing, 1930



Source: Winsemius, in: De Smidt & Wever, 1990, p. 68.

classical theory which reduced locational choice to the weighing of transport costs or the critical isodapane (Hamilton in: Bennett and Estall, 1981).

From 1930 to 1947 the industrial structure changed little with the exception of the period during WWII and the subsequent phase of reconstruction. A short revival in the latter part of the 1930s resulted in a minor increase in economic growth, especially in the metals industry. It was in the period 1930-1947 that employment and production volume diverged for the first time which was the result of technological development.

To summarize, the period 1850-1914 was characterized by a slow and balanced industrialization which thereafter greatly slowed down, even more as a result of the longlasting depression of the 1930s and WWII.

1.3 The post-war period: recovery, growth and recession

1.3.1 Recovery

WWII left its imprint in the Netherlands and this was reflected in sharply reduced output, seriously depleted or damaged capital and infrastructure, exhausted stocks of raw material, combined with declining living standards, in some cases to subsistence level. Another impediment was the disruption of the German economy, the Netherlands' most important trading partner. In addition, there was the loss of the Netherlands' colony, the Dutch East Indies, which used to be both its supplier of raw materials and its protected export market. This loss brought on the economic collapse of Amsterdam as a centre of the colonial trade. Furthermore, a rapidly growing Dutch population and the migration of labour from the agricultural sector did not aid the process of recovery after WWII.

1.3.2 Growth

The basis of economic growth after WWII was laid down by a policy of re-industrialization and of export which ignored the opportunities in the tertiary sector. After years of unemployment in the 1930s, the aim of the government after 1945 was to achieve full employment by creating jobs. Priority was given to investment at the expense of consumption. Because of the increase in population and the deficit in the balance of payments, the most opportune way to achieve this was by expanding manufacturing to contribute substantially to the process of economic growth. Because of the weak Dutch export position, a combination of fiscal and physical controls was used to restrain wages and demand in order to suppress inflation, accelerate industrialization, improve the international competitive position and distribute income as fairly as possible (Aldcroft, 1993). It was also at this moment in time that the welfare state was introduced. But as physical controls were gradually dismantled, the emphasis shifted towards the control of aggregate demand by fiscal measures. Other instruments of the industrialization policy included harmonization of the manufacturing structure; stimulation of the development of basic industries by raising the level of investment which was to ensure rapid growth in outputs and exports and improve productivity performance; and emphasis on industries which required a high level of education and skills (Jansen & De Smidt, 1974). Industries which initially dominated the industrial structure of the Netherlands (textiles, footwear and clothing) and which were characterized by unskilled and semi-skilled labour achieved a slow growth in employment. By contrast, the basic industries such as metallurgy and petroleum refining, and industries requiring skilled labour such as printing, chemical and metals industries (especially the electrotechnical industry) managed to grow rapidly. Examples of expanding industries in post-war industrialization that were partly induced by

the government were the aircraft industry (Fokker) and the automobile industry (Daf), while others grew as independent entities. Philips represents an example of extreme independence (although it did receive state support for decades) so much so that 'Philips created jobs, not a growth pole accompanied by multiplier effects and industrial diversification' (Fischer in: De Smidt & Wever, 1990, p. 68)

The post-war period generated a process which raised the level of industrialization and is reflected in three different trends. First of all, there was rationalization (1950-1970) which manifested itself in the form of a change from labour-intensive to capital-intensive production and in the fact that work was increasingly carried out by skilled and highly skilled labour. This resulted from a high level of expenditure on R & D in the Netherlands (2.3% in 1967) which was higher than in any of the five other EC-countries (Jansen & De Smidt, 1974). New investments gained momentum in comparison with replacement investments. Higher labour productivity was achieved on the one hand by increased capital intensity which is also an indication of the trend towards an international division of labour - a geographical pattern of specialization of the production process at the global scale (Dicken, 1992). On the other hand, higher labour productivity also resulted from the increasing scale of enterprises (economies of scale). Other factors which improved labour productivity in this period were technological progress, a better educated labour force and the establishment of foreign enterprises in the Netherlands. The result was a displacement process of mainly labour-intensive industries (using unskilled and semi-skilled labour) from the core region towards the peripheral regions.

The change from labour-intensive to capital-intensive industries was, as mentioned above, closely related to the increase in the scale of production (see Figure 1.3), which brings the discussion to the second trend that raised the level of industrialization: the propensity to

strive for an optimum scale of enterprise. As a general rule, larger enterprises should facilitate the achievement of economies of scale which in turn should ultimately provide growth and enhance competitiveness. At the same time, the increase in firm size also led to employment growth (Jansen & De Smidt, 1974; Jansen, De Smidt & Wever, 1979).

Table 1.3 Employment structure in the manufacturing industry according to firm size class (%)

Size class (no. Employees)	1950	1964	1966	1968	1970
10 - 49	17	14	14	14	13
50 - 99	41	10	10	10	10
100 - 499	25	24	25	24	
500 - 999	42	11	11	11	10
1000+		40	41	40	43

Source: Centraal Bureau voor de Statistiek, in: Jansen & De Smidt, 1974, p. 49.

The establishment of the European Economic Community in 1958 stimulated the trend towards concentration, which took the form of mergers and take-overs. Large enterprises in the 1950s and 1960s made up a vital part of the Dutch industrial structure with respect to employment (see Figure 1.3), export and R & D. Large enterprises which flourished in the 1960s displayed a tendency toward diversification which could lead to the inclusion of adjacent product lines (such as Shell), whereas other enterprises became conglomerates as they broadened their product activities far beyond their original scope (such as Philips) (De Smidt & Wever, 1990). Others expanded their activities by take-overs (Unilever). Because of the emphasis on growth and on large enterprises during the 1960s, the creation of new enterprises was at a low ebb.

The number of basic industries in the total industrial sector increased in this period, mainly as a result of new investment. The strengthening of the basic industries was important because they filled fundamental gaps in the industrial structure and radiated multiplier effects on other industries (De Smidt & Wever, 1990). The rise of a true basic industry such as the metals and the chemical industry was a sign of the growth to maturity of the Dutch industrial structure. While industrial complexes were clearly missing in the pre-war period, they developed thereafter as new industrial activities emerged around the basic industries whose output they used. Germany's temporary absence from the markets created the rare opportunity for the metals and chemical industry to take root (De Smidt & Wever, 1990). The increase in basic industries mainly concerned the petroleum, heavy chemical industry, construction industry and also the ferro-metallurgy and aluminium production. The latter is an important indicator of the development of capital- intensive industries. Employment increased in the basic industries and so did production.

The successful beginning of the post-war industrialization process came as firms were able to profit from the upswing of the fourth Kondratieff cycle: from 1949, the key industries of electronics, petrochemicals and aeronautics proved to be forerunners of a broad-based economic revival. During the 1950s and 1960s, the foundation was laid for the development into a modern industrial country, but this was not without problems: "The die was cast, but the prospects were bleak" (De Smidt & Wever, 1990, p. 11). A nascent division between modern and traditional sectors manifested itself in the early 1950s (1948-1952) as the post-war policy of re-industrialization and export changed the employment structure by sector dramatically (see Table 1.4). While agriculture and forestry had declined

Table 1.4 Economically active population of the Netherlands

Year	Agriculture and fishery		Manufacturing		Public utilities		Services	
	x 1,000	as %	x 1,000	as %	x 1,000	as %	x 1,000	as %
1899	592.3	30.8	598.0	31.1	9.2	0.5	687.4	35.8
1909	640.8	28.4	723.6	32.0	16.2	0.7	855.3	37.9
1920	640.9	23.5	937.2	34.5	31.4	1.2	1079.9	39.7
1930	655.4	20.6	1125.6	35.5	32.9	1.0	1332.1	41.8
1947	747.1	19.3	1385.7	35.9	39.0	1.0	1638.1	42.4
1960	446.8	10.7	1717.6	41.2	50.1	1.2	1857.9	44.6
1970	329	7.0	1729	36.9	43.0	0.9	2595.0	55.2

Source: CBS in: De Vries, 1978, p. 1.

since 1899, they only commenced to do so in absolute terms together with mining after 1947 (De Vries, 1978). Economic growth accelerated from the early 1950s well into the 1960s (the so-called era of the 'economic eldorado') with manufacturing, characterized by expansion and diversification, and the service industry becoming increasingly important (see Table 1.4). But it still took the Netherlands until 1963 to adjust to the European industrial pattern. It was also during the 1950s and 1960s that structural problems emerged as a result of the stagnation in employment growth in manufacturing industry. This defined a break-point in post-war manufacturing employment. While employment growth, albeit at a slower rate, occurred in the printing, chemical, metals and petroleum refinery industry, the traditional industries (textiles in Twente and Noord-Brabant; footwear in Noord-Brabant) lost a substantial amount of employment as did food and kindred products, coalmining (Limburg), shipbuilding (Amsterdam and Rotterdam) and metalworking (Utrecht) lost a substantial amount of employment due to structural problems. The contraction of the shipbuilding industry, for example, was the result of the competitive expansion of this sector in Japan and Korea.

One cannot really pinpoint one particular reason for the weakness of these industrial sectors but factors such as the low inelasticity of demand for products, the rise of new substitute products, increasing international competition from cheap-labour countries and also the lethargic policy of many enterprises certainly contributed to it. It is relevant to note, that the most important instrument of the industrialization policy from the post-war period, namely the restrained wage policy, became trivial after 1963 as government abstained from its former wage policy. This resulted in a wage explosion which made the Netherlands lose its advantage as a low labour country (Knoester, 1989). The industrial structure of the Netherlands, however, had improved by this time in such a way that the increase in wages was compensated by increases in labour productivity amounting to 4.5% between 1953-1963; and 8.0% between 1963-1968 (Jansen & De Smidt, 1974)). Another facilitating factor for the Dutch industrial structure was the formation and progress of the Common Market. All in all, the economic growth of the sales market in the 1960s was strong even though the level of industrialization in the period 1950-1970 remained rather low in comparison with other Western European countries such as Belgium, Germany and the United Kingdom. The Netherlands, therefore, became characterized as a semi-industrialized country as a result of the increased importance of the service sector in the share of employment (over 50% in 1970). However, it should be noted that although the level of industrialization was very low in the Netherlands during this period, it was even lower in France and Italy (see Table 1.5) (Jansen & De Smidt, 1974).

The embryonic character of the Dutch industrial structure was reflected in the export figures and the employment structure of manufacturing which was dominated by the processing of agricultural products and manufacturing activities which required unskilled and semi-skilled labour such as food and related products, textiles, clothing and the footwear industry. In

Figure 1.5 Distribution of employment in six European countries by sector (%)

Countries	Agriculture			Manufacturing			Mining/ Construction			Services		
	'50	'60	'70	'50	'60	'70	'50	'60	'70	'50	'60	'70
Netherlands	16.0	11.6	7.6	30.9	30.9	29.2	10.1	10.9	11.4	43.0	46.7	51.8
Belgium	12.6	8.7	5.2	34.2	34.9	34.0	12.4	11.2	10.2	40.8	45.2	50.6
West-Germ.	22.7	14.0	9.6	32.4	37.4	39.1	10.7	10.6	9.9	34.2	38.1	41.4
France•	26.9	22.4	15.1	26.9	28.0	28.4	9.7	10.1	11.3	36.5	39.5	45.3
Italy••	44.6	32.6	19.5	23.3	26.9	31.8	6.6	10.3	11.2	25.6	30.9	37.5
U.K.	5.4	4.2	2.9	36.2	37.6	36.5	10.3	9.7	8.3	48.1	48.5	52.3

• 1951 not 1950; ••1955 not 1950

Source: US Department of Labour in: Jansen & De Smidt, 1974, p. 179.

contrast with other Western European countries the Netherlands remained wedded to its trading function. The increasing importance of manufacturing and services was an indication of the continuance of the industrialization process since the 1890s. The continuation of the industrialization process took place despite some cyclical turning points such as the Korean crisis (1950-51); the policy of retrenchment (1957-58); the rather mild cyclical change of 1965-66 and; finally, the slow-down in economic growth since the economic recession in 1972 which was deepened by the oil crises of 1973 and 1979 (Messing, 1981; De Smidt & Wever, 1990). Employment in Dutch manufacturing peaked in 1958.

The relative shift in the industrial composition of the national economy created room in the western core region (Noord-Holland, Zuid-Holland and Utrecht) for more capital–intensive industries with highly-skilled labour with specialized skills. While manufacturing decreased in relative terms in the west during the 1960s, it increased in both absolute and relative terms in the north (see Table 1.6).

Table 1.6 Employment in industrial sectors by region, 1950-1970 (in absolute terms (x 1,000 man years) and in %)

	1950		1960		1970	
	abs.	%	abs.	%	abs.	%
North						
- agriculture	118	27.4	93	21.3	59	12.5
- manufacturing	101	23.6	116	26.6	135	28.5
- construction	33	7.6	40	9.2	51	10.8
- services	163	37.7	171	39.3	217	45.9
Total employment	431	100	436	100	473	100
East						
- agriculture	156	22.8	121	16.6	92	11.1
- manufacturing	237	34.6	265	36.3	284	34.3
- construction	57	8.3	70	9.6	89	10.7
- services	225	32.8	266	36.4	354	42.8
Total employment	686	100	730	100	829	100
West						
- agriculture	179	9.7	151	7.5	110	4.7
- manufacturing	555	30.0	591	29.2	596	25.6
- construction	160	8.7	192	9.5	250	10.7
- services	915	49.6	1075	53.0	1357	58.2
Total employment	1846	100	2026	100	2334	100
South						
- agriculture	129	17.6	100	12.0	69	7.3
- manufacturing	292	39.9	364	43.8	366	39.1
- construction	60	8.2	77	9.3	102	10.9
- services	235	32.1	281	33.9	385	41.2
Total employment	732	100	830	100	936	100
Netherlands						
- agriculture	582	15.8	465	11.6	330	7.2
- manufacturing	1185	32.1	1336	33.2	1381	30.2
- construction	310	8.4	379	9.4	492	10.8
- services	1538	41.6	1793	44.6	2313	50.6
Total employment	3695	100	4022	100	4572	100

Source: Centraal Plan Bureau, in: Jansen & De Smidt, 1974, p. 182.

There was an absolute increase in manufacturing employment in the south and east over the period 1950-1970, though the relative increase was limited to the 1960s and then returned to the 1950s level (see Table 1.6).

The suburbanization of a wide range of activities which took place in the Netherlands at the local and regional level was a development universal to Western Europe. The suburbanization of economic activities and thus of employment, occurred in a number of stages and with differing susceptibility to distance to the central city: commercial and distributive activities were least susceptible to distance followed by large scale office industries, while non–commercial activities such as education and health care proved to be most susceptible.

1.3.3 Recession

Economic recession swept through the Western world in the 1970s and early 1980s following the economic downturn of 1972 which was deepened by the oil crises of 1973 and 1979. It had a devastating impact on large enterprises. Smaller enterprises in the Netherlands coped better as they showed a specific resilience in this time of recession. Observations of this kind were made in other countries, such as the ones by Birch (1979) who stated that 88 per cent of all new jobs created in the United States between 1981 and 1985 were by small firms employing less than twenty employees. Storey and Johnson (1987) maintain that Birch's estimates were exaggerated and argued that the total national impact of jobs created in small firms was rather more modest. It should also be noted that the largest part of these new jobs were created in the service sector rather than the manufacturing sector (Rothwell & Zegveld, 1982).

When de-industrialization emerged in the 1970s, attention shifted from large enterprises to

the smaller ones and in addition, the structure of many a firm's production process changed dramatically: they cut back their labour force (and so did the biggest three companies: Shell, Unilever and Philips), abstained from diversification and reorganized their business drastically (disintegration). Further jobs were lost in the sectors that were branded the big losers of the 1950s and 1960s such as textiles, clothing and footwear, but the modern sectors showed a positive growth such as the petroleum refinery, the rubber, chemical and metals industry (see Table 1.7).

Table 1.7 Distribution of employment in the manufacturing industry in worked hours (as a % of the total industry)

Year	Food and kindred products	Textiles, clothing and footwear	Paper and graphical ind.	Petroleum chem + rubber	Metal
1960	19.8	18.5	7.5	7.6	35.4
1965	18.0	16.9	8.4	8.8	37.2
1970	17.6	13.9	9.4	9.5	39.0
1975	18.1	9.3	9.4	12.0	42.4
1980	18.5	6.8	10.2	12.0	43.3
1985	18.9	5.4	10.2	14.0	43.1
Contribution SMEs (less than 100 employees), in %					
1960	52.4	38.8	66.8	22.1	32.6
1985	41.4	50.5	65.5	17.0	33.6

Source: Wetenschappelijke Raad voor het Regeringsbeleid (WRR) (1987), in: Lambooy, 1992, p. 14.

There are four measures for assessing the process of de-industrialization (Gaudemar & Prud'homme, in: Rodwin & Sazanami, 1991): absolute industrial production (value added at constant prices), absolute industrial employment, relative production (the share of industrial value added in GDP) and relative employment (the share of industrial employment in total employment). The process of de-industrialization in the Netherlands is

assessed here by using the measure relative employment.

While manufacturing shed 25 per cent of its jobs between 1973 and 1985, the construction industry lost 30 per cent (De Smidt & Wever, 1990) while at the same time, there was an increase in jobs in the service sector such as wholesale trade, transport and communication (Atzema & Lensink, 1986) (see Table 1.8).

Table 1.8 Employment by sector

	1973	1979	1985•
	100 man years		
agriculture	309	280	271
manufacturing	1144	994	860
energy	66	62	66
construction	465	459	327
services	2097	2275	2286
total firms	4081	4070	3810
government	612	703	732
Total	4693	4773	4542

•Estimate

Source: Centraal Plan Bureau (CPB) (CEP 1986), in: De Smidt & Wever, 1990a, p. 47.

From 1974 to the early 1980s, the overall unemployment dropped -2.0 per cent in the Netherlands (and by contrast, only -0.1 per cent in Japan). The mid-1970s saw a qualitative change in the composition of unemployment: unskilled labour suffered particularly badly while, by contrast, there was a relatively strong growth of employment of the mid-level and higher skilled employees (see Table 1.9). The long-lasting economic recession led to structural overcapacity in manufacturing, and when the second oil crisis hit in 1979, the service sector could no longer compensate for the decline in employment in the

Table 1.9 Employment and labour supply by level of education

		Employment (%)			Supply (%)		
		1975	1985	2000	1975	1985	2000
Level							
	elementary	23.8	14.1	7.7	24.9	16.2	10.6
	extended elementary	30.8	28.2	23.6	31.0	29.3	24.3
	secondary	32.9	39.9	45.5	32.2	37.9	42.5
	semi-higher	9.0	13.2	17.3	8.7	12.3	15.8
	higher	3.4	4.7	5.9	3.2	4.3	6.9
	Total	100	100	100	100	100	100

Source: Kuhry & Van Opstal, in: De Smidt & Wever, 1990a, p. 48.

manufacturing sectors which resulted in a net fall in employment which lasted until 1983. Even though the employment share of manufacturing declined, the GDP accounted for by the manufacturing sector grew in real terms between 1978 and 1986. The declining share of manufacturing is an illustration of the considerable output growth of services as a result of both the subcontracting of production and services and because of the demand for new consumer services. The 3.6 per cent increase in Dutch manufacturing productivity was the result of technological progress, zero or low wage growth, and because of the subcontracting of service parts in the production process.

One effect, however, of the process of de-industrialization was that after 1973 the industrial map of the Netherlands became less pronounced: there was a shift of the centre of economic activities from the core region, the West, towards the intermediate zone and some argue that the core region in the Netherlands has merely extended over a larger area (De Smidt & Wever, 1990).

Table 1.10 Employment by sector in the Netherlands (%)

Year	Agriculture	Manufacturing	Services
1973	7.6	40.6	51.8
1979	6.9	37.2	55.9
1983	7.2	33.3	59.5
1990	6.3	32.9	60.8

Source: WRR (1987) in: Lambooy, 1992, p. 15.

Since 1983, the steady erosion of the manufacturing sector has declined in the west and there were indications of a strengthening of the Randstad again. The south of the Netherlands and the province Drente where growth incentives had been applied showed some positive change but the traditional manufacturing sectors such as shipbuilding and food and kindred products in the North Sea Canal Area continued to face an adverse climate.

The year 1984 marked the beginning of the structural recovery of all Western European economies and manufacturing in the Netherlands experienced employment growth once more again. Unit labour costs have decreased since the early 1980s and has partly contributed to the increase in manufacturing productivity and has strengthened the Dutch competitive position in the international context (Webbink & Van der Tuin, 1985). The dominant business strategies in the 1980s and 1990s are functional decentralization of management ('companies within the corporation') and the sale of 'exotic' elements ('back to the basics') (De Smidt & Wever, 1990). These development will be explained in detail in Chapter 3.

Like other countries in the 1990s, the Netherlands again suffers from an economic slump. Generally speaking, the Netherlands, the European Union and Japan all suffer from the

following symptoms. First of all, consumer markets have reached saturated point and over-production has become a reality. Secondly, environmental issues are becoming more of a problem in the production process in the sense that they add to the costs of production and thus have an effect on profits. Thirdly, there is increasing competition from both the Pacific region and Central European countries. The globalization of trade has caused a profound change in the relative strengths of developed and developing countries and no market can be considered a 'protected' market or a market safe from foreign competition any longer. The Netherlands increasingly imports products such as textiles and micro-electronics from the Pacific region and Eastern Europe because of lower labour costs and thus of production costs in those areas which results in overcapacity and unemployment in the Netherlands. Fourthly, there is economic stagnation. Companies are looking for new product/market combinations but both technology and marketing do not seem to be able to provide the required opportunities. Finally, the economic-political outlook is uncertain. In the 1980s, the world economy as a whole had to come to terms with the diversion of income flows which is the result of the combination of global reorganization of manufacturing trade (Dicken, 1992), the world-wide reduction of purchasing power and the need to restructure production in line with the changed price ratios. Beside that, the turbulence being experienced in the former Soviet Union and former Yugoslavia has a negative effect not only on investments but on consumers as well; and at the same time, nationalism and protectionism appear to be on the increase.

1.4 Dutch manufacturing: an international comparison

In addition to the internal state of affairs in the Netherlands, it is also important to examine its competitive position vis-à-vis its neighbouring countries. First of all, there are the labour

costs and related issues. In the Netherlands, labour costs are high because of the disparity between the gross and net labour costs which, in turn, are the result of the higher social costs associated with social security, early retirement and so on (Webbink & Van der Tuin, 1985). This particular gap is much bigger than in other economies such as France, Belgium, Germany and the United Kingdom and often results in increasing pressures on productivity and workload for Dutch employees. Moreover, even though labour productivity in the Netherlands may be higher (RMK, 1992), as a result of lower levels of sick leave and days-off, productivity per employee tends to be lower (Ministry of Economic Affairs, 1992). With regard to labour flexibility, neighbouring countries such as Belgium, Germany and the United Kingdom score better while for labour costs, countries such as Portugal and also Eastern Europe have become increasingly attractive. The low labour costs in Portugal in combination with its stable political climate and special subsidies for setting up firms provide an appealing production environment. Eastern Europe is also attractive because of its potentially large market with a relatively well qualified labour force potential.

Secondly, taxes are on an upward trend in the Netherlands and in the long term this may well prove to be a major disadvantage. The recent changes in tax legislation, the so-called Oort legislation, has not resulted in the expected simplification of tax regulations: they are highly complex and can differ from one case to the other. Other Western European countries are more attractive in this respect. Both Belgium and the Republic of Ireland have introduced special tax regulations to attract foreign investments and there is no such thing as property tax in Belgium.

Thirdly, the technical infrastructure (education and training). The Netherlands enjoys a major potential advantage in that its workforce is highly educated. Next to Germany, it

offers the best educated people in the European Union. The only disadvantage is their relative lack of practical experience and qualifications but this can be made up by on the job training within firms. The lack of practical experience can be mainly attributed to the shortening of the duration of university and polytechnic degrees which gears education towards theory and with no time left for practical experience. Ideally, universities should be more flexible, more specialized and on-line computer links and marketing should be better linked, however, the recent initiative towards the creation of centres of excellence at universities is a step in the right direction. There is a shortage of vocational training which is a problem common throughout the European Union with the exception of the United Kingdom and Germany. The latter does not experience this problem because it can attract people from former Eastern Germany. In general, firms in the Netherlands maintain good relationships with institutions of expertise and information such as universities, polytechnics and research centres (TNO), Chambers of Commerce, Institutes for SMEs (IMK), Quality Circles and so on (RMK, 1992), however, it is argued that French research centres are more efficient at generating spin-off (and they are also more approachable) (Ministry of Economic Affairs, 1992).

Fourthly, the physical infrastructure of the Netherlands is reasonably good. Its location by the sea is very favourable as it is highly accessible via the rivers. The availability of industrial sites and their prices are also a positive asset. International road links have been improved dramatically in the past five to ten years, however, the accessibility of the major cities in the Randstad (Rotterdam, Amsterdam, The Hague and Utrecht) via roads is increasingly becoming a problem because of congestion. Railroads, especially international ones, are not very well connected.

Fifthly, the Netherlands is fairly advanced with respect to the European Union's

environmental legislation which often turns out to be unfavourable for enterprises. Unlike Germany and France, there are no strict requirements in the Netherlands however, it is much stricter than for example in Belgium where there seems to be hardly any legislation. Dutch environmental legislation has a negotiable character and thus differs from region to region. This lack of consistency results in Dutch environmental legislation being rather vague and legal procedures taking a long time, nevertheless, the global trend is that in the last decade legislation has become progressively stricter which affects firms adversely.
Finally, the Netherlands is lagging behind in comparison with its neighbouring countries when it comes to standardization and certification of products. Germany already has several DIN-standards; the United Kingdom has developed some ISO-standards; France is also well advanced and has some 200 'Laboratoires Désignes' which provide firms with support with regard to hallmarks and certificates. As a result of the opening up of the Internal Market, the Netherlands is bound to suffer the consequences (reduced competitiveness) if it continues to lag behind in this respect.

Lastly, a brief look is taken at the importance of the Netherlands as the 'Gateway to Europe' which further increased during the latter part of the 20th century. Recent developments such as the implementation of the European Union, the opening up of Eastern Europe and the agreed enlargement of the European Union in the northern direction are all factors which contribute or may contribute in the future to this process. The Netherlands now ranks amongst the top ten countries in manufacturing trade (see Table 1.11) and 70% of Dutch exports are destined for the European Market with its most important trading partners being Germany, Belgium, Luxembourg, France, the United Kingdom and Italy. The Netherlands' most important export partners outside the European

Table 1.11 The world 'league table' of manufacturing trade

Exports			Imports		
Rank		Share	Rank		Share
1978	1989	(%)	1978	1989	(%)
1	1 United States	11.8	1	1 United States	15.4
2	2 West Germany	11.0	2	2 West Germany	8.4
3	3 Japan	8.9	4	3 Japan	6.5
4	4 France	5.8	5	4 United Kingdom	6.2
5	5 United Kingdom	4.9	3	5 France	6.0
6	6 Italy	4.6	6	6 Italy	4.8
9	7 Canada	3.9	10	7 Canada	3.7
7	8 USSR	3.5	8	8 USSR	3.6
8	9 Netherlands	3.5	7	9 Netherlands	3.2
10	10 Belgium-Luxembourg	3.2	9	10 Belgium-Luxembourg	3.1
27	11 Hong Kong	2.4	23	11 Hong Kong	2.2
21	12 Taiwan	2.1	12	12 Spain	2.2
20	13 Korea, Rep.	2.0	19	13 Korea, Rep.	1.9
33	14 China	1.7	29	14 China	1.8
14	15 Sweden	1.7	11	15 Switzerland	1.8
12	16 Switzerland	1.7	30	16 Taiwan	1.7
31	17 Singapore	1.4	24	17 Singapore	1.6
18	18 Spain	1.4	12	18 Sweden	1.5
15	19 Australia	1.2	16	19 Australia	1.4
40	20 Mexico	1.2	15	20 Austria	1.2
22	21 Brazil	1.1	34	21 Mexico	1.1
23	22 Austria	1.0	17	22 East Germany	0.8
16	23 East Germany	0.9	20	23 Denmark	0.8
-	24 Saudi Arabia	0.9	-	24 Thailand	0.8
24	25 Denmark	0.9	26	25 Czechoslovakia	0.7
	Total	82.7		Total	82.4
	World	100.0		World	100.0

SOURCE: GATT (1990), in: Dicken, 1992, p. 30.

Union are the United States and Japan.

The fact that Dutch seaports, airports, roads and rivers are being increasingly utilized is the result of both national and international economic growth. The key to the Dutch gateway function is made up of Amsterdam's Schiphol Airport and the seaport of Rotterdam which are both of international standing whereas Schiphol Airport has become increasingly important in the last few decades due to the development of air cargo, the seaport of

Rotterdam has declined somewhat in importance because of the effects of the oil crises and the decline in world trade. The open character of the Dutch economy remains a key underlying theme, so much so that it 'defines the constraints and opportunities of the Dutch economy to ... a high degree' (De Smidt & Wever, 1990, p. 6). The small size of the Dutch domestic market has always been an obstacle and, in conjunction with the Dutch' gateway function, resulted in an even greater concentration on exports.

1.5 Conclusions

In summary, it was argued that the first part of the 19th century was dominated by the textile industry and the second by metals manufacturing. The first half of the 20th century was dominated by the electrical and chemical industry (Brugmans, 1950), while the late 1950s and early 1960s were dominated by more modern industries such as oil refineries, chemicals and fibres, machinery, electronics, transport equipment (cars and aircraft industry) and precision and optical instruments. Since the early 1970s, the Netherlands acquired the status of post-industrial society since over than 50 per cent of its labour force was employed in the service sector. The change from 'blue collar' to 'white collar' activities coincided with the shift from the secondary to the tertiary sector ('civilisation tertiaire' as in: Jansen & De Smidt, 1974, p. 179). The modern composition of the Dutch manufacturing structure shows that it is strong in food and chemicals, but weak in textiles and investment equipment. Germany is stronger in the latter which puts it in a more favourable position with regard to the needs of Eastern Europe.

The conclusion from the above is that Dutch industry over the last century has been characterized by three main processes: deconcentration, dissolution of regional differentiation and the expansion of the urban field.

CHAPTER 2

SMALL AND MEDIUM-SIZED ENTERPRISES: A REVIEW

2.1 Introduction

This chapter will explore the phenomenon called small and medium-sized enterprises (SMEs). The first part will provide a brief history of the development of SMEs in the Netherlands over the last century, followed by a discussion on the re-emergence of SMEs in Western Europe since the 1970s (§ 2.2). The next section seeks to encapsulate SMEs in a one-dimensional definition (§ 2.3) which is closely linked to the positive and negative characteristics of SMEs (§ 2.4) and which concludes with a comparison between large and smaller enterprises (§ 2.4.3). The last part of the chapter focuses on the position of SMEs within Dutch manufacturing, the firm-size distribution and the diminishing influence of economies of scale relative to the increase in economies of scope (§ 2.5).

Since the publication of David Birch's 'The job generation process' (Birch, 1979), policy makers in the Western world have rediscovered the economic potential of small firms. This came at an important point in time as economic recession swept through the Western hemisphere in the 1970s and early 1980s, but it was also at a time when technological change seemed to confer advantages to smaller enterprises.

By the end of the 1970s, the 'Report on the State and Future of Manufacturing in the Netherlands' was published by the WRR (the 'Wetenschappelijke Raad voor het Regeringsbeleid'), which is the scientific advisory board of the Dutch government. On the one hand, this report depicted a gloomy picture of the weakness of the manufacturing sector in the Netherlands in the face of international competition but on the other hand, the report suggested that there was room for improvement for certain activities in Dutch industry, namely those that had the best prospects for the near future. One of the report's suggestions, was the need to upgrade the industrial mix and that the Netherlands should concentrate on products and sectors that require highly skilled labour and specialist know–how.

At the beginning of the 1980s the Dutch equivalent of the British Bolton Report (1971), the Commission for the Advancement of Industrial Policy, the so–called 'Wagner Commission' (De Smidt & Wever, 1990; Stanworth et al, 1982) supported the WRR's views in the 'Report on the State and Future of Manufacturing in the Netherlands'. The Wagner Commission was all in favour of activities being geared towards re-industrialization and recommended that there should be a re–orientation towards small and medium-sized enterprises (SMEs). The Commission proposed the development and application of new technologies in the so–called 'promising' industrial sectors such as telecommunication, transport industry, medical technology, production steering systems (for example CAD systems), the electronical industry and the instrumental and optical industry. In addition, among other things, it initiated research on new firms, the SME–sector, innovations in small firms and the regional profiles of promising sectors (De Jong, 1986).

2.2 SMEs in manufacturing industry

Before industrialization set in, craft enterprises were the dominant type of enterprise in the Netherlands (see Chapter 1), but this situation changed towards the end of the 19th century when it finally experienced its industrial breakthrough. The number of large enterprises gradually increased, partly due to the replacement of the smaller enterprises in the traditional industries by large ones, and also by the creation of new, large enterprises in the modern industries. After WWII, it was increasingly the large scale enterprises that provided employment, and carried out R & D which meant that the government supported the large enterprises but did not take much interest in SMEs (see Chapter 4). This process of scaling up in the size of enterprises was further encouraged by the establishment of the EEC in 1958 which stimulated the process of concentration in the form of mergers and take-overs however, when the oil crisis of 1973 hit the Netherlands and the rest of the world the situation began to change in favour of SMEs. Large enterprises were hit particularly hard during the 1970s while SMEs fared much better and acted as stabilizers from a cyclical perspective (Nooteboom, 1987). In the Netherlands, the employment structure according to size class began to reflect the claims made of the impact of SMEs (see Table 2.1).

Reports appeared on job creation by small firms, such as the ones by Birch (1979) in the United States and Doyle and Gallagher in the United Kingdom which argued that the bulk of new jobs in these two countries in the 1980s were mostly created by the smallest firms. Even though these job generation claims have been the subject of considerable controversy claims rang true and helped initiate a changing attitude towards SMEs (Rothwell & Zegveld, 1982; Storey & Johnson, 1987; Hart, 1987). Gradually the West started to take a much greater interest in small and medium-sized enterprises once more again.

Table 2.1 Employment structure in manufacturing industry in the Netherlands according to firm size class (% employees)

Size class	1968	1970	1974	1979	1984	1987	1990	1991	1992
10-19	6	4	5	6	7	7	7	7	-
20-49	8	9	10	12	12	13	14	14	15
50-99	10	10	11	11	11	12	12	13	13
100-199	11	10	13	13	12	12	13	14	14
200-499	14	14	17	16	15	14	15	16	17
500+	52	54	44	42	43	42	39	37	40
Total	100	100	100	100	100	100	100	100	100

Source: Centraal Bureau voor de Statistiek, 1965-1994.

Moreover, since the early 1970s, the average firm size in the manufacturing industry has declined in most European Union countries (see Table 2.2). There are two major reasons for this phenomenon. First, the oil crisis of 1973 and the subsequent years of recession led in the late 1970s and early 1980s to de–glomeration or specialization of enterprises which in turn resulted in the disinvestment of non–core activities (Carlsson, 1989) (see also Chapter 3). Enterprises reacted by concentrating on their core competencies in a new trimmer form. Secondly, the emergence of computer–based technology such as Flexible Manufacturing Systems have enabled SMEs to improve their flexibility, quality and productivity relative to the standardized mass–production techniques of large enterprises. Technological progress has enabled SMEs to be more competitive by being able to program tool adjustments (flexibility) which reduces set-up times and in addition has improved precision and quality of their products without harming their ability to tailor their goods to specific needs. In other words, computer-based technology has reduced the importance of mass production's economies of scale (large firms) and has given way to flexible production's economies of scope (SMEs) (see §2.4, §2.5 and §3.3). Moreover, the

appearance of light, automated and programmable equipment has considerably lowered the threshold of investment (see §2.4.2) necessary to achieve competitive mass production and paved the way for a return to craft activities, something which had not been technologically possible before. To summarize, technological progress means that efficient equipment is now within the reach of SMEs and the reduced the impact of economies of scale has also increasingly enabled SMEs to compete through economies of scope (Nooteboom, 1986). Thes developments have considerably improved the position of SMEs vis-à-vis larger firms.

Table 2.2 Contribution of SMEs• to employment in manufacturing in the EU countries (%)

	period 1 (approx. 1970s)	period 2 (1988)
Belgium	33.2	55.5
Denmark	36.3	-
Rep. of Ireland	33.0	-
Germany	28.2	46.0
Spain	-	60.4
France	25.2	52.9
Italy••	-	71.4
Luxembourg•••	19.1	43.4
Netherlands••••	36.0	43.0
Portugal	-	56.9
United Kingdom	17.3	47.1

With respect to the 1970s the following is applicable: Denmark 1973; Ireland 1968; Italy 1981; Netherlands 1973; Belgium 1970; Germany 1970; France 1976; Luxembourg 1973; United Kingdom 1978.
Energy and water industries are included in the figures of the Denmark, Ireland and the Netherlands in the 1970s.

- • SMEs: 0-99 employees
- •• Italy without NACE division 9 for 1988
- ••• Luxembourg, data for 1987 instead of 1988
- •••• the Netherlands, data for 1992 instead of 1988

Source: Economic and Social Committee of the European Communities, 1983; and Commission of the European Communities, 1992; Raad voor het Midden- en Kleinbedrijf, 1993.

Thus, specialization and progress in technology are the two main reasons contributing to a

decline in firm size since the 1970s, but there are other contributory reasons for this trend such as the internationalization of markets (globalization) with the ever increasing importance of flexibility enforced by foreign competition; changing consumer tastes resulting in increased demand for specialised products while demand for standard, mass–produced products decreased; the changes in the composition of the labour force which resulted in the availability of a large labour supply and falling real wages (Webbink & van der Tuin, 1985); and finally, the relaxation of entry regulations or deregulation measures such as fiscal measures, subsidies and so on have increased market opportunities for smaller firms (WRR, 1987; Kleijweg & Thurik, 1991).

2.3 SMEs: a definition

SMEs are in fact a very heterogeneous group of enterprises, not only so in scale, but also in terms of function in the production chain and business style (WRR, 1987). SMEs can be very traditional or very modern, they can be an autonomous plant or a branch plant and they can either serve the local market and/or concentrate on exporting. In short, there is no one–dimensional term or definition for SMEs and thus no single term can capture the enormous diversity of businesses within this sector.

Not surprisingly therefore neither at the level of the European Union (previously called the European Communities) nor at any of the individual Member States (or indeed any other country in the world) is there a consistent definition for SMEs (Table 2.3). With different quantitative definitions in operation for SMEs, it is difficult to make comparisons and it is virtually impossible to draw conlusions from them. It is also possible that one is comparing enterprises that are selected on completely different sets of criteria and in addition to the

conceptual problems, there are also the practical concerns such as data availability.

In the Netherlands, different organizations and banks employ varying definitions for SMEs. Small enterprises are generally defined as all enterprises in the private sector (excluding agriculture/fishery and mining) ranging from 0 to 9 employees, while medium–sized enterprises are all the enterprises in the private sector (excluding agriculture/fishery and mining) ranging from 10 to 99 employees (WRR, 1987; EIM, 1988). The content of this definition is not very meaningful and is based on an international agreement between the Dutch Central Bureau of Staistics (CBS) and its related institutions (Nooteboom, 1986).

Table 2.3 Definition of SMEs in eight EU countries

Belgium	1 to 50 employees
Denmark	6 to 50 employees
West Germany	1 to 499 employees
France	6 to 500 employees
Ireland	1 to 50 employees (small business)
Italy	1 to 500 employees
Netherlands	1 to 100 employees
United Kingdom	1 to 200 employees (small business)

Source: Parliamentary Assembly Committee on Economic Affairs and Development, 1980, in : Economic and Social Committee of the European Communities, 1983.

In Belgium and Denmark, SMEs have an upper limit of 50 employees whilst the United Kingdom, France, Italy and Germany all use an upper limit of 500 employees for SMEs (Table 2.3). The latter is equivalent to the upper limit for small enterprises in the United States. The position of Italian SMEs is exceptional and in no way comparable to that of the SMEs in any other Western European country (Boekema, 1984). The European Union defines SMEs as enterprises with a workforce not exceeding 500 employees, net fixed assets should not exceed ECU 75 million and where not more than one third of its capital is

be held by a larger firm (CEC, 1991). By contrast, the OECD defines small enterprises as all those employing less than 100 employees.

Beside the number of employees, quantitative criteria for SMEs are of significance and include such factors as turnover; output; capital employed; sales; value added; labour cost; gross profit; fixed assets; market share and investments or combinations of these factors (Rothwell & Zegveld, 1982; Levicki, 1983; Nooteboom, 1986; Burns & Dewhurst, 1989). Qualitative criteria for SMEs on the other hand include their degree of independence, organizational structure, regional orientation and personal contacts.
At the international level, turnover is considered to be a useful size criteria for retailing and wholesaling whereas employment is regarded as a good criteria for manufacturing, the construction industry and mining but in practical terms one is often confined to using firm size (number of employees) and annual turnover because of lack of statistical data. It is also important to note that definitions, both quantitative and qualitative, need to be corrected from time to time because of changes in the methods of production, technical progress, organizational evolution and so on. From the above it becomes clear that the terms small and medium are relative and the definition of SMEs may even vary according to the sector of activity, the geographical location and time.

However, from the various definitions in use it becomes clear that despite definitions differing widely from one member state to another, there are some common criteria for an SME-definition. In general, small enterprises are regarded as being enterprises employing less than 200 employees and medium-sized enterprises are all enterprises that employ 200 to 500 employees. The term 'employees' includes salaried employment and thus generally

excludes the owner-manager and his immediate family members) (Burns & Dewhurst, 1986).

There is one point that needs to be stressed with regard to the use of the term 'firms'. For small and medium firms, the distinction between an establishment (the operating unit of a business, the subsidiary of a larger firm or the Dutch 'bedrijf') and an enterprise (the company, the legal business unit, the independent firm or the Dutch 'onderneming') is not of great significance, since few small and medium firms operate more than one plant and large firms tend not to operate plants under 100 employees (Thoburn & Takashima, 1992, p. 24). The enterprise is a business that is separately owned and operated. An establishment is the smallest unit in which business activity is conducted and may be a branch of a larger firm (Ganguly & Bannock, 1985). Statistical information in some countries is collected (statistical reporting unit) at the level of the establishment while in others it is collated at the level of the enterprise.

This research has employed the Dutch definition of SMEs (0-99 employees) as it was greatly dependent on data resources from certain Dutch institutions such as the Central Bureau of Statistics, the Economic Institute for SMEs and so on, and the major Dutch banks such as the Rabobank all of which as mentioned earlier employ this particular upper limit.

2.4 The characteristics of SMEs

Despite all these difficulties, there are some cross-national characteristics that SMEs have in

common. Generally speaking, SMEs are defined (Nooteboom, 1987; Webbink & Van der Tuin, 1985) for their:

- flexibility;
- lower overhead costs;
- competitive nature;
- they make a substantial contribution to the economy in terms of innovation and job generation;
- the wider breadth in their product line;
- they make customized products;
- they tend to be mainly concentrated on the local and regional market (the domestic market);
- they often lack management expertise (there is a lack of breadth of management);
- they have poor access to capital markets and information networks.

Also of significance is the point that the employer plays a central role in its organization (Docter, 1986; Burns & Dewhurst, 1989). The vast majority of SMEs are both owner-managed and owner-operated which tend to result in the intertwining of personal and business interests. Employees are often merely executing the instructions and decisions of the owner. Employees in SMEs tend to be less well educated than their counterparts in large enterprises and there are fewer specialists, although in general they are more vocationally trained (Docter, 1986). SMEs also tend to have a higher proportion of personnel directly involved in production, which means that there is a lack of white collar jobs. SMEs are flat and manageable ('lean') organizations and this is reflected in a less hierarchical structure. Overhead costs in SMEs are kept low as a consequence of the maxim that one can only produce competitively if costs are kept at a minimum while at the same

time value added is maximized and explains why one employee in a small or medium enterprise is often expected to fulfil several roles within the organization, resulting in a limited organizational division of labour (Nooteboom, 1986).

In general, smaller enterprises do not appear to meet the popularly-held criteria for 'good employment' such as a good salary (SMEs are known for their lower pay levels), fringe benefits, job security, good working conditions and promotion prospects (as the organizational structure of SMEs is rather flat, the prospects for promotion are limited) (Nooteboom, 1987). Even so SMEs are considered to enjoy a relatively favourable job environment which can be attributed to the atmosphere which is generally perceived as convivial, employees identify more with the company's activity, there is the opportunity for individual craftsmanship and as a consequence the turnover of employees tends to be low (Nooteboom, 1987). It should be noted however, some argue that there is no a big difference between smaller and larger enterprises with respect to industrial relations.

Finally, SMEs are stikingly less capital-intensive than large enterprises, and also invest less than large enterprises.

Despite the negative aspects, there are to be plenty of positive characteristics that will help the SMEs not only to survive, but make them a vital and indispensable part in any country's economy in the sense that tradionally, 'their flexibility, their ability to innovate, and their productivity have been necessary ingredients in the mix of any successful industrial society' (Burns & Dewhurst, 1986, p. xvi).

Looking at the Netherlands, Dutch industry's vulnerability to business cycles has been less pronounced than in other industrialized countries due to the flexibility and adaptability of SMEs. Because of their large number and great diversity, SMEs play a decisive role in the

industrial set-up of both the Netherlands and the European Union: SMEs are considered to be the backbone of both Dutch and Community economic efficiency. A maximum number of SMEs and their great variety and efficiency is not only beneficial for competition, growth, employment and training; it also encourages initiative and creativity and helps to promote a more decentralized and diverse economy which is desirable from a social and economic point of view.

2.4.1 The positive characteristics of small and medium–sized enterprises

SMEs have certain characteristics that are distinguished as being the positive impact SMEs have on regional development and on the economy as a whole. However, it should be stressed here that these characteristics do not hold equally for all SMEs (Piatier, 1984).

One of the positive aspects of SMEs is that they are specialists in their field and produce custom–made products since they tend to be oriented towards specialized market niches which are residual segments of the market (Nooteboom, 1987). They can profitably cover market slots which are of little or no interest to large enterprises or which can only be reached via SMEs.

Secondly, SMEs provide an environment for innovations which are primarily applied or substitute innovations for new combinations of existing techniques and materials or new product–market combinations (Docter & Stokman, 1988). The high innovation potential or creativity of SMEs results from their internal structure (such as the 'human scale') and the incubator facilities (such as the knowledge and R&D infrastructure) in a less stable industrial climate. New ideas and innovations can be given practical application more quickly in an SME than in a large enterprise.

Thirdly, SMEs have a simple though flexible organizational structure. Managerial and production flexibility are high because decision procedures are less bureaucratic (Nooteboom, 1987). Their independence and lack of complex communication channels and of formal procedures results in decisions being taken quickly. This is crucial as their adjustment capability with respect to technological and marketing changes is relatively high and gives them a marked advantage over larger enterprises. SMEs have the remarkable ability to adapt and prosper in the face of economic change. Flexibility and responsiveness are key attributes of SMEs and therefore, they play a key part in the restructuring of the European economy to meet future demand.

Fourthly, SMEs are renowned for their propensity to create employment (Rothwell & Zegveld, 1982). Since the 1980s it is principally the SMEs that created and maintained jobs while also providing places for training. In the past it were the SMEs which helped to relieve unemployment problems at a time when larger enterprises, hit by the crisis, were obliged to rationalize and lay off workers. Thus smaller enterprises seem to serve anti-cyclical purposes in other words withstand the recession better.

Fifthly, SMEs are more efficient than large enterprises because of lower overhead costs (administration costs, better maximum use of materials and equipment, and so on) and their rate of specialization (higher level of expertise because of closer supervision). SMEs can maintain competition better which results in a larger choice of products for the customer and in this sense are important for the preservation of a free market economy.

Sixthly, SMEs are often held to be more profitable than large enterprises. There are several explanations why SMEs are more profitable than large enterprises. First, they are less export oriented than large enterprises and since exports normally command a lower margin it makes SMEs more profitable (Docter, 1984; Nooteboom, 1986; Docter & Stokman,

1988). Secondly, the fixed costs are lower in SMEs, which implies a lower capital base. The higher relative profitability of SMEs seems to apply to most countries within the European Union except for the United Kingdom where in the past few years they have been significantly less profitable than large enterprises (Burns & Dewhurst, 1986).
Finally, SMEs are considered an important factor of dynamics and equilibrium (Nooteboom, 1987). Deconcentrated and diversified SMEs fulfil a necessary complementary function with regard to the usually dominating large enterprises. This complementarity has become even more noteworthy in the last decade and is reflected in the increased salience of, for example, subcontracting. Because of disintegration, large enterprises have increasingly focussed their attention on the core competencies and rely on SMEs to supply them with the remaining components. Subcontracting is moving from cyclical to structural supply and this explains why large firms are viewed as playing a major role in economic development in conjunction with SMEs. This will be discussed in more detail in Chapter 3.

2.4.2 The negative characteristics of small and medium–sized enterprises

While the positive aspects of SMEs are numerous and important, they also have some disadvantages which should be highlighted.

SMEs tend to experience a paucity of finance, for example for funding high risk operations (Van Dijk & Kleinknecht, 1984; Burns & Dewhurst, 1989). They also face financial disadvantages with respect to tax, financing and bank interests. Financial institutions perceive SMEs as being more of a risky investment. Moreover, investments are not as

easily available from profits for SMEs. Despite the provision by the government of funds for this purpose such as guarantee credits, SMEs do not use these resources because of such factors as a lack of information, problems in communication and relatively high transaction costs.

Another problem for SMEs is the scale at which they operate. Not only are they often too small to gain important economies of scale but this results in cost disadvantages with respect to labour (less specialization), the use of machinery, the capacity-cost ratio of machinery, higher purchasing costs and higher costs with respect to product distribution and marketing (Docter, 1986). But a point to note is the fact that the importance of economies of scale is decreasing, with flexibility and adaptation becoming more important (Piore & Sabel, 1984). Economies of scope matter rather more than economies of scale, and it is this which increasingly enables SMEs to operate in a competitive way. Economies of scale refer to the situation where cost advantages are gained by large-scale production and arise as the average cost of production falls with increasing input. In other words, total production costs increase less than proportionally with output, up to a point where diseconomies of scale (cost disadvantages) set in. Internal economies of scale accrue to the individual firm regardless of the size of its industry. They generally result from technological factors which ensure the optimal size of production is large with high fixed costs in plant and machinery (where the larger its production, the lower the cost per unit of the fixed inputs). Large firms can also arrange for the specialization of labour and machines - as in the techniques of the production line - which can increase productivity. Economies of scope refers to the situation where it is cheaper to produce a range of related products rather than to manufacture any of the individual products on their own. They are of salience to SMEs because they make it feasible for them to react quickly to changing market

requirements. Through economies of scope, they can achieve a high level of expertise while they aim for a certain market niche. Economies of scope can provide a basis for corporate diversification. In the future, it might well be economies of scope that can give SMEs a lead over large enterprises (see also § 2.5.2).

Thirdly, large firms can afford the high costs of R & D which SMEs because of their paucity of finance often cannot afford (WRR, 1987). The level of R & D is closely related to the level of innovations which is discussed a bit later.

In the field of expertise and marketing, SMEs often lack relevant knowledge especially in comparison with large enterprises and SMEs tend to lack technically qualified personnel and management expertise (Docter, 1986; Van Dijk & Kleinknecht, 1984: Burns & Dewhurst, 1989). The latter weakness shows in poor understanding of technical possibilities, markets and state provisions. The poor marketing capabilities (even more so for export markets) and the relevant insight into potential markets (which is a problem for all sizes) may result in an inadequate strategic and commercial policy. It proves difficult for SMEs, often as a result of a lack in personnel, to predict future market developments. Too much time is spent on technique and craftsmanship while too little attention is devoted to a commercial policy. SMEs spend on average less time in anticipating organizational problems and on developing efficient organizational structures and methods such as delegation, strategic planning, administration and so on. In general, it can be argued that large enterprises manage their business more strategically, whilst SMEs mainly focus their attention on day-to-day business.

Another aspect that seems to create problems for SMEs, is their inability to establish efficient external (technical) communication such as with universities, (government) institutions and trade organizations that provide information and subsidies and so on

(WRR, 1987).

With respect to innovations, as a general principle, it is the SMEs that are the ones that make incremental innovations while large enterprises make the true innovations (Docter & Stokman, 1988). According to Nooteboom and Vianen, the level of basic innovations increases with firm size. This comes as no surprise since research and development and level of education also increase with firm size (Docter, 1984; Van Dijk & Kleinknecht, 1986; Vianen & Webbink, 1986; Nooteboom & Vianen, 1987). With the input of new knowledge in SMEs being disproportionally small, this results in an output, in innovations, which is equally small and leaves them with a rather limited capacity to innovate (Kleinknecht, 1985; Docter & Stokman, 1987). But not only is the number of innovations smaller, the character of innovations is also different (Vianen & Webbink, 1986; Nooteboom, 1987). SMEs tend to stress applied research and development which are designed to make inventions workable at shop-floor level (incremental innovations), either of the production process or of the product, rather than pure research and development which is a high-risk area with time-lagged result (true innovations). In this respect, SMEs tend to take a 'follow-the-leader' strategy (Vrolijk, 1986) whereas large enterprises invest capital in pure research and development activities. Because of the costs of pure research and development, it simply is too expensive a goal to achieve for SMEs with the consequence that 'low technologies' and applied product and process innovations such as improvements and imitations are much more common (Nooteboom & Vianen, 1987). Thus, research and development possibilities are hampered by the cost of innovative equipment. SMEs show a low level of investment. Rather than replace production machinery, they will adapt the existing machinery. Research and development also requires a high level of qualification and involves taking risks. This is precisely the reason why

SMEs will often turn to others to provide it with innovations which have already been proved to be readily applicable and profitable. As a result, SMEs often are very much dependent on the supply of knowledge from outside the enterprise for its innovations and improvements. The problems they face when assimilating new technologies can keep them from new market places and opportunities and in the final analysis, it is successful products and process innovations that make SMEs both competitive and efficient.

Finally, SMEs are more vulnerable than other enterprises because they do not spread out their risk by supplying various enterprises rather than concentrating on just a few (see § 3.5.2) . Often there are only limited opportunities for SMEs to spread risk and they simply do not have a choice.

One can conclude, that the number of innovations is smaller in SMEs and they are also different in character. Moreover, it is important to note that the innovations of large enterprises are not easily transferred to smaller enterprises. The reason for this is that many technologies such as robotics are only economically viable for large enterprises because of their technical characteristics, the investment costs and the required level of training.

There is one remaining difference between SMEs and large enterprises. The former are generally not considered to be as export-oriented as large enterprises but there is a point that needs to be stressed here. Since statistics cover only the final sale and do not necessarily examine who has contributed the added value, they tend to overestimate the role of large enterprises who make the final sale. SMEs do succeed in gaining shares in export markets despite difficulties in organization (such as distant markets and language difficulties) and of bureaucracy (such as legal aspects). This success can be mainly attributed to their technical ability and the high quality of their products.

2.4.3 Big versus small

When comparing large enterprises with SMEs, it will have become clear that they operate in a different fashion and this section explores these issues in more detail.

First of all, large enterprises tend to be more hierarchical while SMEs tend to be flatter organisations.

Secondly, while large enterprises tend towards mass–production, SMEs will often aim for a market niche or sub–market which requires flexibility and adaptation. As a consequence, large enterprises will have a large share of the market, that is the national and international market. By contrast, SMEs will settle for a small market share and tend to produce mainly for the local and regional market.

Thirdly, because of the larger scale on which large enterprises operate and because of their relatively better financial position, as discussed earlier, they can benefit from using specialized production factors such as research, consultation and staff services. SMEs have to do without these specialized departments and specialists. The capital–labour ratio in large enterprises is high, as is the technical complexity and the labour–force is usually semi–skilled or unskilled. The situation is very different for SMEs where the capital–labour ratio is low, as is the technical complexity while at the same time they require highly skilled labour.

Finally, large enterprises tend to have some power in society in general which is not really the case for SMEs.

There is a need with SMEs for applicable technological innovations and information about market developments. In addition, SMEs could prosper from support with regard to commercial, technical, organizational and financial problems. This could be provided by governmental organisations, of which local and regional governmental organizations stand

out as very important because they are very accessible for SMEs. On the other hand, provided the smaller enterprise is in a subcontracting relationship, assistance could be given by large enterprises themselves where this is beneficial to both.

The general conclusion from the discussion on 'big versus small' is that SMEs have certain 'human' advantages for example in innovation, management and production; while large enterprises have a number of other advantages which are related to the scale of operation such as equipment, R & D, innovations, distribution and marketing.

2.5 SMEs in the Dutch manufacturing industry

The industrial base of the Netherlands, which benefited from restructuring both of the competitive process and of the nature of production forced on it by the recession of the early 1980s and the accompanying technological innovation, remains among the most efficient in Europe. This places the Netherlands in an advantageous position to benefit from the new business opportunities created by Germany's re-unification (since the former West Germany was by far the Netherlands' biggest export partner), and by the change to more market–oriented policies in Eastern Europe.

SMEs have been considered to be the trigger for rejuvenation for Dutch manufacturing since the 1970s, when crisis hit large enterprises. Several factors in the early 1980s influenced the upswing of SMEs. First of all, the recession of the 1980s stimulated entrepreneurs to start their own enterprises. It is generally recognised that 'push' factors in a recession are powerful stimulants towards starting new businesses (Nooteboom, 1987). Secondly, taxes increased while SMEs benefited from tax advantages which also

encouraged people to start new SMEs. Thirdly, the expanding tertiary sector offered possibilities for small service companies. Finally, because of the structural crisis large enterprises are not interested in some market segments which leave these to be exploited by the SMEs (Thurik, 1991; Kleijweg & Thurik, 1991).

Dutch manufacturing has traditionally been mainly oriented towards the international market (see Chapter 1), with about half its production being exported and of which 70 per cent is consumed within Europe. Because of its dependence on exports in combination with the fluctuations in foreign currency (especially the American dollar), Dutch manufacturing industry is very much dependent on foreign exchange rates. As wages tend to be rather high in the Netherlands in comparison with other European countries, the principal way to maintaining its position in the world market is by manufacturing concentrating on the production of technologically advanced products, such as producers' goods. Technological developments for producers' goods follow one another in quick succession and with many enterprises feeling the need to modernise and rationalize their machines, there is potential for Dutch manufacturers. When competing internationally, the small scale of Dutch manufacturing industry does make it very vulnerable especially as countries such as Germany produce on a much larger scale and with lower prices and are thus able to serve the international market better.

SMEs play a significant role collectively in Dutch manufacturing. About 97 per cent of all manufacturing enterprises belonged to the group of SMEs in 1992, which is somewhat below the average of the European Union (99.4 per cent in 1992 (RMK, 1992)) (see Table 2.4). The Dutch share in employment (43%), in manufacturing output (31%) and in value

added (38%) are all below the EU-average (see Table 2.4) and are also significantly below those of all other industries in the Dutch private sector (excluding agriculture) such as construction, wholesale trade, retail trade, hotel and catering, garages and repairs, transport and services. Manufacturing is also a large scale industry in terms of the average labour volume and the average output per enterprise. The average labour volume per enterprise is approximately 20 man years in the manufacturing industry whereas the second largest is transportation with just over 10 man years. The average output in manufacturing was Dfl. 6.2 billion in 1988, followed again by transportation with Dfl. 1.8 billion. In this particular respect, the role of SMEs in Dutch manufacturing is rather modest but the total number of SMEs in Dutch manufacturing is substantial. Nearly one third of the total output of SMEs in the Netherlands in 1990 was generated by the manufacturing industry. This is explained by the fact that although SMEs play a minor role in the manufacturing industry, manufacturing as a whole plays a dominant role in total Dutch private output, with nearly 50 per cent of all output in the private sector generated by the manufacturing industry.

Table 2.4 shows that in the United Kingdom SMEs accounted for 99.3 per cent of all enterprises. They employ 43 per cent of the total workforce and constitute about 31 per cent of turnover. In the European Union, SMEs make up over 90 per cent of all enterprises and employ over 60 per cent of the Union's workforce (CEC, 1992). The picture that emerges with respect to the representation of SMEs in the total number of enterprises in the various countries is remarkably consistent. Employment patterns, however, are more diverse with Italy scoring very high (71.4 per cent) and Luxembourg and the Netherlands scoring lowest (with respectively 43.4 and 43.0 per cent) (see Table 2.4).

It should be noted, that it is virtually impossible to obtain an accurate statistical picture of

the contribution of SMEs to the European economy because of lack of consistency (Burns

Table 2.4 Share of the number of enterprises, employment and turnover by employment size class in the European Union

	share of enterprises		share of employment		share of sales turnover	
1988	0-99	100+	0-99	100+	0-99	100+
Belgium	99.5	0.5	55.5	44.5	57.0	23.0
Denmark	98.6	1.4	-	-	-	-
Germany	99.0	1.0	46.0	54.0	37.4	62.6
Spain	99.6	0.4	60.4	39.6		
France	99.4	0.6	52.9	47.1	46.5	53.5
Italy•	99.6	0.4	71.4	28.6	66.1	33.9
Luxembourg••	98.8	1.2	43.4	56.6	48.5	51.5
Netherlands 1992	97.0	3.0	43.0	57.0	38.0	62.0
Portugal	99.6	0.4	56.9	43.1	54.3	45.7
United Kingdom	99.3	0.7	47.1	52.9	30.9	68.1
Average	99.4	0.6	54.7	45.3	47.1	52.9

• without NACE division 9
•• Luxembourg, data for 1987
Greece and the Republic of Ireland are excluded

Source: Commission of the E.C., 1992.

& Dewhurst, 1986). The reasons for this are several. First of all there is, as is mentioned above, no consistent definition for SMEs in the European Union. Secondly, the statistics collected by national governments are often incomplete and inaccurate - they refer mostly to the manufacturing industry but often only to enterprises employing over 20 employees. Finally, it might prove difficult to make meaningful comparisons as different countries employ different methods of data collection.

In the Netherlands, the share of SMEs in exports is considerable. Exports by SMEs

increased from 29 per cent in 1980 to 36 per cent in 1988, but is expected to decrease to 33.8 per cent in 1993 due to the recession (RMK, 1993). The export share of large enterprises over the same period remained constant at about 60 per cent. Of all exports by SMEs, 90 per cent stay within the European Union of which about 50 per cent is destined for neighbouring countries such as Belgium and Germany. SMEs tend to gain from the export efforts of large enterprises through subcontracting.

In terms of the share of enterprises involved in export, there is a striking difference between smaller and large enterprises. In 1989, 87 per cent of large enterprises were involved in export as opposed to only 26 per cent of SMEs (RMK, 1993) but as discussed earlier, statistics only convey information at the final sale which works in the favour of large enterprises and thus does not reflect the whole picture.

When looking at the development of output volume, the growth rates of SMEs and large enterprises hardly differ. In both cases, labour growth has consistently been below output growth which points at a general productivity growth since 1981. Output generally equals sales in the manufacturing industry which is an inadequate measure for productivity in manufacturing because developments in the purchasing value of (raw) materials are neglected as well as the degree of subcontracting activities. Therefore, value added would be a better measure for developments in productivity.

Looking at the development of the share of SMEs over time, it becomes clear that they are becoming increasingly stronger in manufacturing in terms of the share of the labour volume and in terms of the GDP, with the exception of paper and paper products. The basic metal industries' SMEs are also loosing ground.

2.5.1 Firm–size distribution

This section will explore the firm-size distribution in Dutch manufacturing. Even though there is an overrepresentation of SMEs in Dutch manufacturing in general, upon closer examination it becomes clear that this is not necessarily true for all manufactruing sectors.

Dutch manufacturing has an overrepresentation of SMEs in the sense that 77.7 per cent of manufacturing is made up of small enterprises containing less than 10 employees; and 96.8 per cent of all manufacturing enterprises belong to the group of SMEs containing up to 100 employees (RMK, 1992) (see Figure 2.1). This leaves large enterprises to make up the remainder of the manufacturing industry, namely 3.2 per cent. Despite the small number of large enterprises and the overrepresention of small enterprises, the average size of Dutch enterprises is approximately the same as those of its bigger EU-partners such as Germany, France, the United Kingdom and Italy. This is mainly due to the presence of multinationals in the Netherlands.

However, the manufacturing sectors prove to be more complicated upon closer examination. There are certain manufacturing sectors that operate on a relatively large scale such as the food industry, basic metals, the chemical industry, the paper industry and the electrotechnical industry, whereas others operate on a relatively small scale such as wood manufacturing industry, transport equipment, and the machine and metal products industry (Vrolijk, 1986).

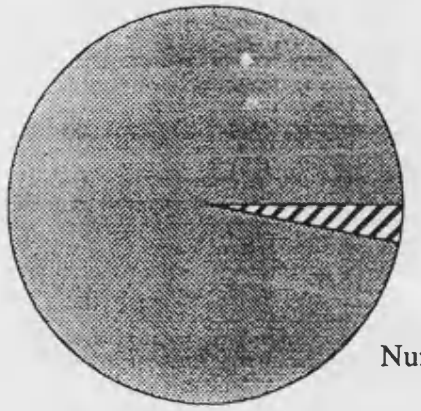
SMEs which account for 160,000 enterprises account for about 60 per cent of non–agricultural, non–government employment which represents approximately 2.2 million full–time jobs (Rabobank, 1992) (see Figure 2.1). Of the Dfl. 326.5 billion that

manufacturing generated in 1993, SMEs contributed Dfl. 99.8 billion, which represented 30.6 per cent of the GDP (RMK, 1993) (see Figure 2.1).

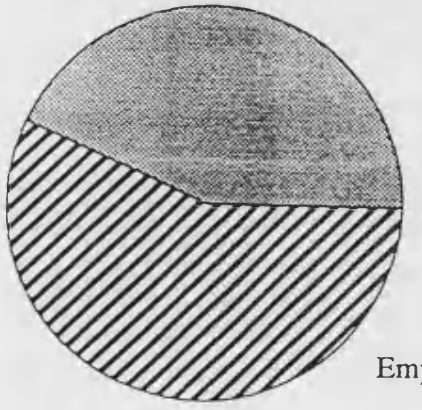
Of all enterprises in the SME-sector, 10.5 per cent are in manufacturing which is estimated to represent 20.1 per cent of the total employment volume and are expected to contribute 22.9 per cent to the GDP in 1993 (EIM/RMK, 1993) (see Figure 2.2). Of the total sum (in GDP) that SMEs generated in manufacturing in 1992, 33.9 per cent was exported; 15.8 per cent were consumer goods and services; 7.7 per cent investment goods; and finally, 42.6 per cent or 42.5 billion Dutch guilders were intermediate goods (RMK, 1993).
Another thing to bear in mind is that of the 857,000 new jobs created in all industrial sectors over the period 1985–1991, almost half of them were created by SMEs.

Historically, SMEs have always been present but since the late 1970s the sector has become a focal point not only at the local–regional level but also at the national–international level. SMEs are considered to be the key niches in a complex and dynamic spatial economic system. It is the SMEs that make the Dutch economy strong. Because of their over–representation and their very small scale, risks are more evenly spread: in the event of a recession in a certain sector of the economy it is likely to be compensated by another sector in the economy that is doing better at the time. This structure of the Dutch economy prevents strong fluctuations and this is reflected in rather stable employment figures.
The prominent presence of the SMEs is not pure coincidence. The small scale of enterprises is one that suits the scale of the Netherlands and the size of its domestic market. Dutch manufacturing mainly produces investment goods which are highly specialized. New

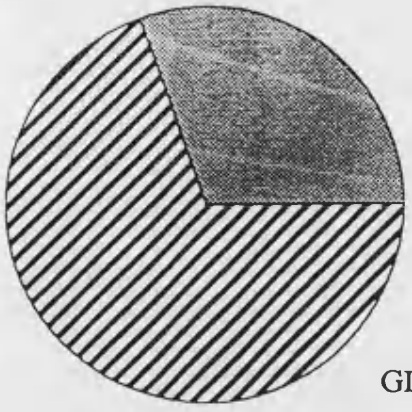
Figure 2.1 The contribution of SMEs in the manufacturing industry with respect to the number of enterprises, employment and GDP, 1992



Number of enterprises



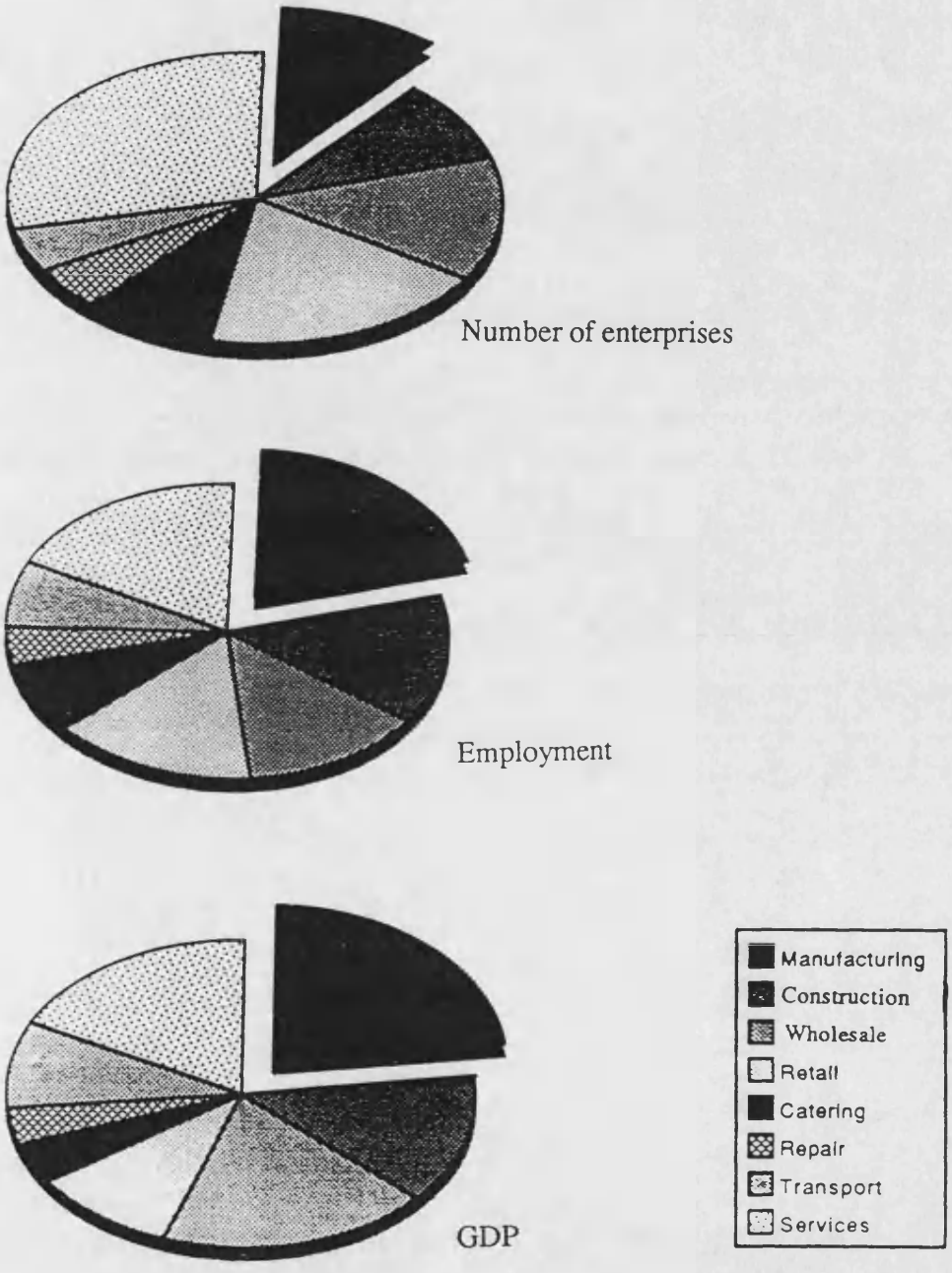
Employment



GDP

Source: Raad voor het Midden- en Kleinbedrijf/Instituut voor het midden- en kleinbedrijf, 1993.

Figure 2.2 The contribution of SMEs in the total number of enterprises, employment and GDP in the manufacturing industry



Source: Raad voor het Midden- en Kleinbedrijf, 1993.

inventions are mainly achieved by the ingenious assembly of components and this sector, therefore, is one of the more advanced industrial sectors of the Netherlands.

While the average firm-size in Western countries has declined, the average number of employees per enterprise in the manufacturing industry has also declined largely because of the much more efficient use of labour. 1986 seems to have been a turning point in this situation which has a number of causes. First of all, in 1993 the twelve countries of the European Communities formed the Common Market which already showed some effects in the late 1980s. This is likely to result in a higher degree of concentration and more resemblance in the firm–size distribution across countries. Secondly, the late 1980s by contrast to the early 1980s are characterised by tighter labour markets and rising real wages, which may be more advantageous for the more capital-intensive large enterprises. Profit margins will stay under pressure as a result of international competition and because of cost developments.

2.5.2 Decreasing economies of scale

When explaining changes in economies of scale, three aspects need to be distinguished.

First of all there are changes in the production process. The emergence of computer–based technologies in production, administration and information have offset the advantages of large scale production considerably. The increasing pace of technological development brings with it great opportunities for SMEs as it becomes more feasible to organize activities in a more dispersed and decentralized fashion. It has put smaller enterprises in the position where they can compete more effectively with large enterprises. At the same time it should not be overlooked that the accelerating pace of technological development poses a major threat to SMEs to the extent that they may encounter difficulties in financing these

developments and it remains to be seen whether their management will be able to cope with the changed circumstances (see §2.4.3). Secondly, there are changes in the demand for products. Consumer behaviour is increasingly characterized by individualism which results in more differentiated and fragmented markets and shorter product life cycles. The bigger variety in products is further stimulated by increased competition and the only way for enterprises to keep up with competition is for their production process to be more differentiated. This has resulted in a shift away from mass–production to craft production with less opportunities to achieve economies of scale, an increased importance of economies of scope and consequently for horizontal and vertical co–operation. The result of this is the deglomeration of enterprises where there is an increase in complicated structures of cooperating enterprises with an increased reliance on suppliers. These issues are fully elaborated in the following chapter. Thirdly, two changes in the business environment are detrimental to economies of scale. One of them is the considerable amount of government support and subsidies for SMEs in the Netherlands such as the advanced infrastructure of technical and scientific support, the INSTIR (the INnovation STimulation Regulation, a subsidy system for industrial innovations) and the SME Security Scheme (a government tool to facilitate financing SMEs which absorbs part of a private investment institution's risk). The other one is that quite a few more highly educated employees have found their way to the SMEs' labour market. Since the 1980s people increasingly started to appreciate working in SMEs with its favourable working climate but even so, the share of higher educated people is still lower in SMEs than in large enterprises.

Downward movements in economies of scale are fed not only by new technologies in a strictly technical way but also by new products, increased competitiveness through

internationalisation, deregulation, unfaithful customers and so on. Since the economic crisis in 1974, there has been a general trend towards a smaller average firm size and increased small business presence. Deglomerative movements can be illustrated not only by a decreasing ratio of value added and sales, but also by an increase in the number of enterprises. Although the total number of enterprises decreased in the Netherlands after 1974, this can be interpreted as a sign of deglomeration that the average firm size, measured in the number of employees, declined far more than the number of enterprises (see Chapter 3).

A considerable process of deglomeration has also taken place within larger enterprises. Although the deglomeration process is partly a mood, a spirit of time, rather than set in motion by economic and technological changes alone, it is likely that without deglomeration the decrease of economies of scale would have been higher. Divestiture mainly concerns tasks which can be performed better elsewhere or independently.

Declining firm size may result from productivity differentials determined by scale. Kleijweg and Thurik (1991) found that unit costs of large enterprises either increased more or declined less than the unit costs of small enterprises. A decline of the scale of production at which a firm can operate efficiently is also supported by the results of a simple cost model in which costs consist of fixed and variable costs. The findings of this new model by Kleyweg and Thurik (1991) show that there is a decreasing importance of fixed costs over time, which points towards a reduction of economies of scale over time.

Changes in economies of scale are not just the result of changes in the production process but also of changes in type of product and in business environment (regulation, labour supply and so on). Furthermore, there are economies of scale which are related to finance,

planning and control, marketing and information, physical production, purchasing and realted issues. Lastly, the role of technological developments in the actual production process (and the resulting influence on the viability of smaller enterprises) greatly depend upon the product. Certain industries such as the textile industry will have to deal with competition from low–wage countries. Craft production flexibility, small seriesand so on. will be some of the weapons to circumvent mass–produced competition. This development clearly creates market opportunities for smaller enterprises. In the production process of bulky goods (basic chemicals, steel, paper) room for SMEs deteriorates even further because of the necessity for large investments in capital goods. In technically high–valued industries (such as metals and plastic) there are increasing opportunities for small enterprises as a result of the decreasing costs of flexible and specialised production methods.

In comparison with other highly developed industrial sectors, investments have been low in the manufacturing industry over the past few years and is a cause for concern for the Netherlands, especially with regard to the Internal Market of the European Union.

2.6 Conclusions

The conclusion can be reached that the characteristics of SMEs such as creativity, flexibility, efficiency and innovativeness are crucial assets for solving the key problems faced with respect to growth, employment and adaptation. At the same time, it should not be forgotten that the majority of SMEs are far from dynamic, most depend upon large enterprises for their markets and their failure rate is high. This chapter has also demonstrated that it would be incorrect to perceive an SME as some sort of deficient large enterprise that just operates on a smaller scale. Not only do SMEs operate in a different

fashion, they also tend to operate in more specialized fields than the large enterprises. SMEs and large enterprises are separate phenomena, each with its own interest and problems.

The Dutch have long recognized that their economy, more than most, depends on an international perspective, rather than a national one. With the official implementation of the Internal Market on 1 January 1993, opportunities have further expanded for the Netherlands and for SMEs.

The decline in firm size became a trend after the recession of the 1970s. The increased importance of SMEs in Dutch manufacturing can be mainly attributed to specialization, progress in technology, globalization and changes in consumer tastes. The deglomeration process of the 1970s was partly a mood, a spirit of time (Kleijweg & Thurik, 1991) and the implication is that circumstances might change once more and that SMEs might start loosing out again.

As SMEs mainly provide intermediary rather than final products, their relationships with their contractors is of the utmost importance. Since the 1980s, subcontracting has experienced an upswing in the Western world and is bound to change as a result of the recent official implementation of the Internal Market of the European Union, a point which will be discussed in the next chapter. Suppliers will have to respond to the ever higher requirements of their subcontractors with respect to quality, delivery time, price, choice and uniqueness; while competition is likely to become even fiercer, interfirm linkages are changing, organizational structures are becoming more efficient and enterprises want to make use of comparative cost differentials which will result in a changing spatial behaviour. The position, organization and spatial behaviour of small and medium-sized

suppliers is, therefore, also bound to change which is why the next chapter analyzes the position of Dutch small and medium sized suppliers in the 1990s.

The next chapter will examine the subcontracting relationship in general and in Dutch manufacturing in particular. With the discussion in this chapter in mind, it is important to note that despite the differences, there also exists a certain degree of complementarity between SMEs on the one hand and large enterprises. Moreover, it is this very complementarity that is becoming increasingly important to SMEs. This is reflected in subcontracting relationships when SMEs develop from jobbers to specialist suppliers to mainsuppliers. In order to work out an effective subcontracting relationship or partnership, it is essential to be aware of each other's differences, strengths and weaknesses and for the SME to decide on its (strategic) role within the subcontracting relationship. The relationship between the SMEs and the large enterprises can range from structural networks and cooperative relationships to dependent relationships. By collaborating or merging with other enterprises, SMEs can improve their position in the market. There is a trend in the market for enterprises to cooperate with other enterprises in so-called turnkey projects, which means that the project carried out remains under the responsibility of the enterprise that has taken on the job. Every enterprise adds value to the project. With these turnkey projects enterprises can get a better grip on the market.

CHAPTER 3

SUBCONTRACTING AND CO-MAKERSHIP

3.1 Introduction

In order to comprehend the resurgence of the phenomenon of subcontracting and of associated definitions such as co-makership, main-suppliership, networks, Just-in-Time and Total Quality Control, it is important to understand the context within which these developments have taken place in the industrial world since WWII.

By no means can one argue that these changes have come to a halt, as the world is effectively in a continuous process of change and development. Indeed, the character of subcontracting has altered substantially, especially since the beginning of the 1980s. The dramatic changes that have taken place in technology and logistics have had repercussions on the industrial world and therefore on firms. Companies started a process of restructuring which made them diversify their strategies (§ 2.3.1 and § 2.3.2) in order to compete and survive. Contractors pursued the strategy of 'back to the basics', in other words, they started to concentrate on their core competencies. This specialization has resulted in a division of labour as everything that fell outside the scope of these activities was sub-contracted to outside suppliers. Other words used for the phenomenon of subcontracting are outsourcing, outside purchasing, homeworking, distancing, buying-in of inputs and

intrapreneuring (Cassels, 1986; Wood, 1990; Thoburn & Takashima, 1992; Nishiguchi, 1994). At the same time contractors want to reduce the number of suppliers with which they have a more intense subcontracting relationship which is referred to as co-makership, co-design and early or continuous supplier involvement.

Co-makership is the new buzz-word in the world of subcontracting. Both contractors and suppliers strive for co-makership which deals with matters such as logistics, quality and development in a somewhat different way from what was done before. To put it simply, co-makership is an exclusive relationship between the contractor and the supplier on the basis of a strategic perspective and, amongst other things, aims to develop products through joint efforts (Berger,1990; Broersma, 1992).

The chapter continues with a review of the rapid spread of subcontracting relationships in the West (§ 3.2 and § 3.3). It will also look into how subcontracting has changed over time from industrial linkages to complex networks (§ 3.4), and takes a closer look at the different types of suppliers that make up the tiers of production (§ 3.5). The chapter continues with a review of the rapid development of subcontracting relationships in the West and it also explains that the different types of subcontracting relationships require different conditions and will, in turn, have different results (§ 3.6). It is important for the contractor and the supplier to realize this so as to be able to make a decision on whether make or buy (§ 3.7) and then subsequently, for the right type of subcontracting relationship to be established.

There has been a marked move away from demand pull (by contractors) to technology push (by suppliers) because of the more dynamic development of the latter (§ 3.8). Demand pull is the market demand created by contractors to which suppliers react; while certain

technological achievements by the supplier are referred to as technology push (Wever, 1985; Broersma, 1991). With competition generally becoming fiercer for both contractors and suppliers, the latter has become more assertive with the consequence that over time, many suppliers have developed from being simple jobbers to all-round co-makers who now stand on an equal footing with the contractor. The trend in subcontracting is twofold: on the one hand, the contractor strives to minimize the number of its suppliers and, on the other hand, the contractor seeks to strengthen its ties with the remaining suppliers (§ 3.9).

When explaining the practice of subcontracting in the Netherlands and the Western world, it is also pertinent to understand how the system operates in Japan (§ 3.10). Subcontracting started shortly after WWII and Japan is considered to be the cradle of subcontracting and is dealt with differently compared with the Western world. Over the decades, Japan has proven to be extremely successful in developing its manufacturing industry, a fact which has been attributed mainly to the way in which the subcontracting practice operates in Japan. It is not surprising, therefore, that more and more Western firms try to apply the Japanese subcontracting technique Kanban with its Just-in-Time system and Total Quality Control (§ 3.11) to their own production process. The chapter will finish with some general conclusions (§ 3.12).

3.2 Background of subcontracting

The changes that have taken place in the industrial world in the last decennia have resulted in the world becoming "a global village" (Levitt, 1983). The rise of Japan and other countries in the Pacific region have adversely affected industrial development in both the United States and Europe. The Western world lost its lead in certain product categories, not

least in car components and audiovisual products. Today, the manufacturers from East Asia at least equal those of the Western world and although East Asian firms are not considered to be highly innovative, they are certainly strong in improving production processes. Initially, these then newcomers in the world market used the price-weapon as a means to enter the market - by offering low wages and guaranteeing high productivity, they were able to produce at low costs. Over the years, however, they have been able to improve the quality of not only their products (the level of product quality in terms of raw materials), but also the specifications, adherence to tolerances, features, organization and established themselves a name as market leaders (Porter, 1980).

Major changes have taken place in the manufacturing scene in the West since the beginning of the 1980s. Firstly, markets have become more international which in turn result in competition becoming more global and technology becoming ever more complex (Broersma, 1991). Secondly, the product life cycle (with its four stages of introduction, growth, maturity and decline) has become shorter (Broersma, 1991) as a result of the acceleration of technological change and the growing volatility (and differentiation) of consumer demand. Within the product cycle we might expect variable stage lengths, divergent magnitudes of profit differentials, and relative differences in regularity, depending on the specific characteristics that shape profitability in each sector. It has become of the utmost importance to deal with product development in the most effective way, especially when it concerns sensitive technologically-based products and as technological developments succeed one another at a rapid pace. Thirdly, it is no longer the price alone that is important - quality, delivery time, delivery reliability and technical sophistication (innovation, in the sense of the original and progressive application of a

discovery, invention or even a concept) are all as significant. Finally, contractors and suppliers have to deal with ever increasing pressures that concern not only the product but other factors that constitute the competitive power of the manufacturer, such as service and quality of the organization. The higher quality requirements in the final market apply equally to the supplier. Such requirements mainly concern delivery time (Just-in-Time), quality and technological competence. A competitive price will always remain important but it is no longer the decisive factor. It is the 'total price' that is all important.

In short, one may conclude that the manufacturer has to be able to respond to the market quickly and flexibly. The latter factor is stressed because firms strive for lower costs in order to strengthen the competitive power of the firm and also because it makes it possible to have more output without extra investments. The opening up of the Internal Market adds a further dimension to the challenge taken on by the manufacturer in the European Union because of the disappearance of internal borders which will result in increasing competition.

3.3 Subcontracting: a definition

With the changes in the economic environment, the manufacturer no longer wants to deal with such pressures as increased competition and market demands, volatility and uncertainty. Therefore, the manufacturer turns to subcontracting since it often means an easier and cheaper way of letting somebody else deal with it.

Subcontracting is but one form of buyer-supplier relationships (see § 3.3.3). A variety of reasons are quoted by contractors for adopting the strategy of subcontracting, many of

which are interrelated. Broadly speaking, the reasons for subcontracting fall into one or more of the following strategies. The first category is the decision by the contractor to concentrate resources on its core activities (RPD, 1990); the second is to reduce costs and to increase flexibility and productivity; and lastly a strategy to enhance job security for the core employees.

One comes across various definitions of subcontracting in the literature. The only trait these definitions seem to have in common is that subcontracting concerns a relationship (transactional dependence) between a company, called the contractor, and another company, called the supplier. The latter produces something and subsequently supplies it to the contractor. The different sets of definitions do not seem to agree upon the contents of the relationship between the contractor and the supplier. A broad definition of subcontracting includes both standard products (i.e. 'products not customized to the requirements of specific principals' (Thoburn & Takashima, 1992, p. 23)) and customer-made (quality) products whereas a more narrowly defined relationship will only include customer-made products. The difference between these two definitions is that in the latter, the supplier produces according to the specific requirements of the contractor while this is not necessarily the case for the broader definition. Some definitions even state that there has to be an official contract (documents of exchange) between the contractor and the supplier in order for the relationship to be called a subcontracting relationship (Thoburn & Takashima, 1992). Finally, there are those definitions that clearly state that subcontracting precedes supplying and that the subcontracting-life-cycle implies that subcontracting has a temporary character and precedes an ordinary buyer/supplier relationship (Nehem/IKON, in: Berger, 1990).

Some of the more common definitions of subcontracting relationships will be defined here. First, there is the definition of the United Nations Industrial Development Organization (UNIDO):

> 'A subcontracting relationship exists when a company (called a contractor) places an order with another company (called the supplier) for the production of parts, components, sub-assemblies, or assemblies to be incorporated into products to be sold by the contractor. Such orders may include the processing, transformation, or finalizing of materials or parts by the supplier at the request of the contractor' (UNIDO, in: Asian Productivity Organization, 1986).

This broad definition clearly does not differentiate between standard products and customer-made products.

In the Netherlands, subcontracting definitions also greatly differ. The Dutch Bureau of Statistics (CBS) and one of the big Dutch banks, the NMB, all operate the broad definition of subcontracting. The Dutch Bureau of Statistics defines it as follows:

> 'Subcontracting in the broadest sense corresponds with the supplying of intermediary parts and services'.

The CBS keeps statistics (input-output tables on intermediary supplies) on subcontracting in the broad sense. These are referred to as intermediary supplies. However, the Dutch bank NMB uses the following definition:

> 'Subcontracting in the broad sense -supplies from firms to other firms- can either be of standard products to the market or of customer-made products. Customer-made products can be subdivided into capacity subcontracting which is only temporarily (cyclical), and specialist subcontracting with longer-term relationships (structural)' (NMB, 1989).

However, if subcontracting is defined in a narrow sense, one will encounter difficulties

which will render useless the statistics, as used by the CBS, as will be the data provided by the NMB.

There are some additional features to a subcontracting relationship. There should be a projected length of trading. There is also the issue of trust: contractual trust (that promises made are kept), competence trust (quality inspection and delivery) and goodwill trust (or discretionary trust which goes beyond the others into a relationship where each side takes positive initiatives to help the other) (Sako, 1991; Thoburn & Takashima, 1992). A good subcontracting relationship will involve the transfer of technology and other skills, and communication between the contractor and the supplier takes place frequently. Finally, subcontracting relationships involve the sharing of risks.

When trying to summarize the various definitions one can but come to the conclusions that there isn't a one-dimensional meaning of subcontracting - it can not easily be contained within a single descriptive category. In addition, there are two persistent definitional problems. A problem is what distinguishes a contract from a subcontract; and the other is what types and degrees of separation between firms define a relationship as subcontracting.

Watanabe (1972) and Thoburn & Takashima (1992) identify three forms of subcontracting:

- Specialistic or structural subcontracting: where the contractor subcontracts work to small suppliers which use specialized technology and labour skills. Structural subcontracting will offer the contractor the opportunity to operate a more flexible production since it needs to spend less time on specialized knowledge, investments, personnel, production capacity and so on. In addition, the division of labour between the contractor and its suppliers may greatly improve its responsiveness to

market demand (Leus, 1989). Because of the supplier's more advanced technical know-how this can develop into a stable relationship (quasi integration). Dicken (1992) and also UNIDO (Germidis, 1980) define this type of subcontracting as specialty subcontracting;

- Capacity or cyclical subcontracting: this type of subcontracting takes place because the contractor can not handle a certain production capacity within a strict deadline. The contractor and the supplier engage in similar work and they are thus competitive. It is for this reason, capacity subcontracting tends to be an unstable, shortlived form of subcontracting as it implies a subordinate status for the supplier. The products of cyclical subcontracting tend to be less advanced in nature. Capacity subcontracting may also be termed complementary, intermittent or overflow subcontracting (UNIDO, in: Germidis, 1980);
- Finally, there is economic or cost-saving subcontracting: this type of subcontracting is formed on the basis of cost calculations about cost effectiveness (reap economies of scale) of different forms of labour organizations. 'A more useful definition is narrower and centres on subcontracting as a way of taking advantage of segmented labour markets, and perhaps itself contributing to that segmentation in an attempt to bypass trade unions' (Thoburn & Takashima, 1992, p. 13).

A distinction can also be made depending on who takes the initiative to enter a subcontracting relationship. Downward subcontracting is the type of relationship where the contractor takes the initiative to subcontract and the supplier has a passive role. Upward subcontracting is when the supplier develops a product and subsequently offers the

innovation to the contractor.

In general, one can say that there is a move away from cyclical supply of capacity subcontracting (with a broad range) on the basis of craftsmanship to a more structural supply of specialistic subcontracting which is technologically highly advanced (Hoftijzer, 1988). It is essentially the quality argument of trendsetting supplying rather than the capacity argument of conventional supplying that is becoming more and more important. The role of the supplier is changing from an assistant role which is characterized by vertical dependence within a power strategy, to a partner role which is characterized by vertical equality within a strategy of co-operation. In the past, suppliers were mainly technically oriented, subcontracting took place on an ad hoc basis (capacity/cyclical subcontracting) and was mostly locally or nationally oriented. Nowadays, suppliers are more business oriented, subcontracting takes place on the basis of a planned policy and moves at an international level. This eventually leads to the tendency for network relationships to be formed (see § 3.4). In many respects the subcontracting relationship is symbiotic in nature - a division of labour between independent firms- in which each partner contributes to the support of the other.

The next subparagraph explains the preceding phase of Fordism, which in turn was followed by the régime of flexible accumulation.

3.3.1 From Fordism to Flexible Accumulation

The Fordist régime of accumulation flourished strongly in the period stretching from the early 1920s up to the 1970s and constituted the pre-eminent form of industrialization,

though other types continued to exist alongside it.

The premise of the Fordist theory of industrial dualism is that the industrial sector is made up of two components (Piore & Sabel, 1984; Nishiguchi, 1994). On the one hand, there is a sector which consists of large, dominating firms that generate mass production and which is referred to as the primary sector. On the other hand, there is the sector that consists of smaller 'craft production' firms that produce on a small scale (flexible accumulation), referred to as the secondary sector, that complements the mass production of the primary sector firms. Because of fluctuations in demand, the market is divided in a stable and an instable component. This market segmentation is the result of the large firm's strategy to concentrate on the stable component while the instable component is subcontracted to smaller, secondary firms (capacity subcontracting). The secondary form of production is inherent to the mass production of large firms. Industrial dualism typically stresses the complementary and subsidiary character of secondary activity (Nishiguchi, 1994).

Fordism is a particular combination of technology and human behaviour which broadly corresponded with the elaboration of the secondary mechanisation stage of technological development. It is characterised by a technological paradigm of the high-volume production of standardized products and gained its efficiency by means of an acute division of labour along with the use of specialized machinery 'dedicated' to the production of long runs and predominantly unskilled labour. The Fordist division of labour is characterized by a structure of jobs organized around the division between horizontal and vertical work roles. Mass production, internal economies of scale, technical division of labour and standardization of output are key features of Fordism (Malecki, 1988; Hirst & Zeitlin,

1991). Labour organization under Fordism is also characterized by deskilling by means of the fragmentation of work tasks.

At the peak of its development, the régime of Fordist accumulation was geographically associated with some great industrial regions in Western Europe such as the Ruhr area in Germany, the regions Alsace-Lorraine and Nord/Pas de Calais in the North of France, the Midlands in the United Kingdom; and in North America such as Boston (Massachusetts), the San Francisco Bay Area (California) and Dallas (Texas) (Lambooy, 1992). With steady technological change of the kind described by product cycle models, selected labour processes were periodically resynthesized and deskilled. As this occurred they were typically re-embodied in routinized branch plants (the term branch plant refers to all forms of manufacturing operations which are not single site independent companies (Phelps, 1993)) and then decentralised to peripheral locations. Core and peripheral regions operated in an interdependent though unequal relation.

This Fordist system entered into an extended period of crisis for various reasons. With increasing international competition, the growing volatility and differentiation of consumer demand, accelerated technical change, the outflow of capital from core regions which left behind large numbers of unemployed workers, the effects of the generalisation of collective bargaining of wage costs and limitations to the exploitation of economies of scale and finally because of growth of competition from Japan and the NICs (Newly Industrializing Countries) which was itself further intensified by the increasing stagflation, the potential for further extension and deepening of Fordism, at least within Western countries, has progressively diminished. Continual spates of mergers and 'rationalisation' of plant and

product ranges have been made in an attempt to try to regain the advantages of economies of scale. The subcontracting of sub-components and modularization of product assemblies has allowed the backward diffusion of mass production techniques to suppliers of intermediate goods. An enormous amount of effort has been expended on attempts to intensify the use of labour to counteract falling profitability. The limitations of Fordism in generating further productivity increases are even more pronounced in areas of work where volume and standardisation of products and components have proved difficult to attain. Variety in products, processes and raw materials, in addition to the size requirements of markets for products, provide strong barriers to the diffusion of Fordist techniques. The standardization of production and consumption can not easily be ensured, as is the case for small-batch production and some services, beside which, productivity growth has tended to be low and such products relatively expensive. In manufacturing, the flexibility of operations characteristic of work processes which exhibit such variety, has mainly been insured by the use of skilled labour.

In the vacuum created by these events, a number of new flexible forms of productive activity appeared in the advanced capitalist societies. Post-Fordism is a régime which is based upon flexible production and flexible specialization, which has led to new organizational-geographical structures (Piore & Sabel, 1984; Sabel, 1982; Scott, 1986; Lloyd, 1989). Specialization means the breaking up of the production chain (Hoftijzer, 1988) and refers to the degree to which a firm focuses its efforts in terms of the width of its product line, the target customer segments, and the geographic markets served (Porter, 1980; Broersma, 1991). The growth of vertically disintegrated forms of economic organization (subcontracting, network organization and so on) with their networks of externalized

transactions leads to the spatial agglomeration of economic activities in new industrial districts (Coase, 1937; Williamson, 1975; Dicken, 1992). Networks are webs of contacts that exist between suppliers, customers and producers in industry. They can also be referred to as relationships, interrelationships, linkages, interfirm linkages or interdependencies.

Even though these new flexible forms of productive activity often differ markedly from one another in terms of technologies, labour processes and outputs, they nonetheless share some basic features. First of all, the new forms of production are generally characterized by an ability to change process and product configurations with great rapidity which is needed because of the advent of an increased heterogeneity of consumption and a more complex, differentiated market. The result of this is that production no longer needs to be on a large scale to be efficient (Piore & Sabel, 1984). Computer-based technology makes small-scale production with constantly changing product characteristics efficient, which in turn opens up market potential for small firms.

Secondly, the new forms of production are also typically situated in networks of extremely malleable external linkages and labour market relations because of an increase in subcontracting. Flexible specialization is often referred to as the strategy of permanent or continuous innovation (Piore & Sabel, 1984).

Flexible accumulation activities are a recurrent historical phenomenon in industrial capitalism. In the past these were located in Lyon (France), Sheffield and south east Lancashire (United Kingdom) and in Solingen (Germany) (Pratt, 1991). It should be noted, however, that the latest version of flexible accumulation has many unique and novel

features. The new régime of flexible accumulation is founded predominantly on three major ensembles of industrial sectors: the revived artisanal and design-intensive industries, mainly producing components for final consumption; the high-tech industries and their associated networks of input suppliers; and finally, the service functions, especially business service.

The basic common trait of flexible production ensembles is disintegration into extended social divisions of labour which result in the development of new specialized subsectors. A countervailing disadvantage of this cooperation is transaction costs. These costs increase with distance and result in a tendency for locational convergence and selective reagglomeration of production, which is further stressed with the implementation of Just-in-Time systems.

Flexible production activities in the 1960s and 1970s were not attached to the old centres of Fordist mass production as they had no special demand for the type of input available there and in addition, labour markets are very much institutionalized and thus not flexible. The consequence is that the activities are rather footloose and thus there are plenty of location alternatives.

The new regions are the spatial outcome of a twofold process. On the one hand, there is the tendency for modern flexible production systems to avoid the traditional Fordist centres and on the other, there is the locational implosion resulting from increased levels of externalization of production. What is at work is not corporate fragmentation, but rather, more effective corporate integration (Amin & Robbins, 1990).

3.3.2 Globalization, specialization and cooperation

In the 1980s, two major trends could be distinguished in world industry:

- Globalization
- Specialization and Cooperation

Globalization: the process of globalization makes it possible for products to be introduced to markets worldwide (the world is becoming a global village) at a very early stage in the product life cycle. This results in an increased sales potential of the product but at the same time coincides with an internationalization and an intensification of competition. The growing internationalization of competition is taking place because of the desire by entrepreneurs to take advantage of economies of scale (these are the cost-advantages gained by large-scale production which arise as the average cost of production falls with increasing input), to reduce transport costs and the costs of communication, and finally because of more uniform consumer preferences. Market power becomes the all-decisive element in this more global competition and as a result, there is a shift away from the multinational company with its national strategies towards the new, global company with one worldwide strategy. It reflects a change from traditional area management to the newer product management. This change will itself have consequences since management will increasingly look for suppliers irrespective of their location.

Specialization and Cooperation: In the struggle for global competition individual firms are restructuring. There are two reasons why market positions can be easily lost. First, there is the shortening of the product life cycle which is a result of the acceleration of technological change. The second reason is a more volatile consumer behaviour. In order to sustain their

position, firms concentrate their resources on their areas of comparative (firm-specific) advantage: the core activities (RPD, 1990; Bakker & van Kooij, 1991). Firms now turn away from a product-oriented strategy to a more market-oriented strategy. This business strategy is called 'Back to the Basics' or 'stick to the knitting' (de Smidt & Wever, 1990). Firms have transformed their organizational structure. Formerly, firms had a functional form according to which they were subdivided into major functional units, such as production, marketing and finance. These days, however, firms have a divisional form, which means that the firm's organization is by product rather than by organization. Firms have to pose themselves the question of whether to 'make-or-buy' (which represents the efficient vertical boundary of the firm) as it is no longer attractive to make all the products themselves. Increasingly, it is impossible for firms to keep up with technological progress, mostly there are no economies of scale and in the turbulence of the markets, only specialists can operate efficiently. Therefore, there is a tendency for internal economies to give way to a progressive externalization of the structure of production which has resulted in the 'thinning out' of hierarchically-structured work-organisations. Every part of the production process that is not considered to be a firm's core activity will be externalized.

The result of this reorganization is that no overlapping manufacturing will take place at the companies' different locations and each site will be assigned more specific roles, a process known as rationalization (Massey and Meegan, 1985). Decentralization of firms is likely to take place as this increases its flexibility. At the same time, the separate divisions and subsidiary companies gain more autonomy which better equips them to react quickly to changes in the environment.

The internal structure of the whole organization becomes one of 'simple form, lean staff'. Lean production refers to the limiting of overhead costs and the abolition of most hierarchical structures within a firm. 'The leaner, the meaner' is an often used expression. What this amounts to, is that the firm will operate in a diminished number of product/market combinations (combinations of a certain product and a specific market are referred to as the product market combination (PMC)). The strategy for a product on one market can differ for the same product on another market. Thus the firm brings about a stronger market position, it improves the efficiency of the organization and also ensures there will be less uncertainty. At the same time, as a result of these developments, the volume of subcontracting increases.

This strategy of specialization leads to a vertical disintegration and thus of a hollowization (de Smidt & Wever, 1990) of the firm where, in the most extreme case, the firm is only involved in the final assembly ('screwdriver' plants), which lack high value-added activities or not even that (De Smidt & Wever, 1990). The most important advantages of this type of firm is that it can respond quickly to changing market requirements, it is flexible and the firm is assured of high quality components (Kok, 1988).

The 'network firm' steps forward as a new phenomenon. It is 'a new non-market/non-hierarchy institutional arrangement' offering an alternative to big business, but at the same time giving corporations an opportunity to reorganize along the lines of selective vertical and lateral integration of production phases and intensive subcontracting.

The network firm is based on economies of scope and coordination (Dicken, 1992). Economies of scope refer to the situation where it is cheaper to produce a range of related products rather than to create products independently of one another without sacrificing economies of scale (Schoenberger, 1988). Economies of scope can provide a base for

corporate diversification. The Fordist division of labour is characterized by a structure of jobs organized around the distinction between horizontal and vertical work roles.

The problem with the network firm is one of where to limit it. Epstein (1969) has suggested the concept of the effective network which limits the network to those who interact most intensely and most regularly, and who are therefore likely to come to know each other and to let the remainder form the extended network.

3.3.3 Flexibility for contractors

Why is there a need for flexibility? Flexibility is required because of market volatility and uncertainty; because of technological change; and last it is needed to consolidate productivity gains by improving productivity and cutting labour unit costs. It should not be forgotten, however, that flexibility to some, is a constraint to others.

There are three different kinds of flexibility strategies implemented by large firms. There are the flexible manpower strategies; the use of flexible technologies; and there is production subcontracting. It turns out that subcontracting is but one form of buyer-supplier relationships amongst a range of others.

Similarly, the three major types of manpower policies that are implemented by large firms are the use of temporary workers, part-time workers and there is job mobility within the workplace. Temporary and part-time workers provide numerical flexibility, whereas the third option offers functional flexibility.

Flexible technologies have made increasing market differentiation possible. Examples are Flexible Manufacturing Systems (FMS) which made it possible within one production system to produce routinely very small batches to any specification without any change-

over time, and Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM) which together have reduced the influence of economies of scale, making it possible to produce smaller batches of specific products with shorter delivery times without being confronted with high costs (economies of scope) (Kaplinsky, 1984; Lloyd, 1989). As a result of the ever increasing pace of technology, products and processes are quickly replaced by new ones.

Various forms of 'soft automation' such as the FMS, sharply reduced industry's need for capital expenditure. When a firm switches to a new product, flexible machinery is merely reprogrammed rather than replaced to cope with product changes (Schoenberger, 1988).

FMS evolved as an aid to the transition in production methods from the mass production of a small range to the small-batch production of a diversified range of products (Kodama, 1991). It is particularly attractive to firms with medium-sized batches which are too small for specially dedicated machines and too large for stand-alone CNC-machines (Computer Numerically Controlled machines). FMS cuts down on handling time, which is the most time-consuming part of the production process. It may in turn be linked with CAD and CAM into the final form of systematic automation, CIM (Computer Integrated Manufacturing) which integrates the whole production organization (administrative, management information and production systems (De Haas, 1989)). Productivity gains, however, are just as likely to result from reorganization caused by the integration of new technology as from the introduction itself.

Two types of technological advance, both microprocessor based, can be outlined in relation to the argument being made here. On the one hand, there are those innovations which have enabled firms to organize their production in more flexible ways (the technostructure of flexibility). On the other hand, there are those innovations that mainly increasing

productivity and output rather than increase flexibility.

The flexibility which large firms seek, via subcontracting, takes various forms (Imrie, 1986). There is functional flexibility, which enables firms to redeploy people quickly. Then there is numerical flexibility, which allows firms to vary the number of people they redeploy and enables them to cope with short-term changes in demand. Lastly, financial flexibility is partly achieved by using outside or temporary labour which is cheaper to take on and/or lay off.

The majority of manufacturers opt for concentrating on their core business. This choice has consequences for their position in the production chain (or filière).Since the contractor started to concentrate on its core activities and subcontracted part of its work to suppliers, the contractor has become more dependent on suppliers and, in a way, the contractor has become more vulnerable. For example, if a supplier does not supply its components to the contractor, the whole production line will come to a halt. This problem is further aggravated in the case of a flow or a Just-In-Time production system: if products are not delivered in time, in the right quantity or the agreed quality it will paralyze the production process throughout the enterprise.

From the supplier's point of view, we can see that to supply a contractor with products goes further than merely being able to deliver products in time. The quality of the product has to be assured and the only way for the contractor to be certain of this is by being actively involved in the production process of the supplier. Product certification by either the contractor or an independent organization is a way of ensuring and supporting the quality of the products and of the organization. Looking at it the other way around, the

supplier is greatly helped by knowing how its components fit into the final product. The supply of vital components and knowledge will be affected in a positive sense if a number of additional factors are fulfilled. The way in which logistics operate on the supplier's side should ideally connect with that of the contractor's, as should the system of quality assurance, which refers to the process of ensuring that the quality of a product is satisfactory, reliable, and yet economical for the consumer (Imai, 1989). Furthermore, the supplier should be involved in the development process of advanced products where not only the functional demands are to be met but also the feasibility of the actual production process. Both the supplier and the contractor will benefit from long-term relationships. Cost calculations should ideally be open cost calculations (Broersma, 1991). In case of an assembly-line break-down, both the contractor and the supplier should share the costs of valuable time and money lost instead of the supplier bearing the brunt of them alone. Both parties should have a good understanding of one another's organization and the means of communication. If and when all of these conditions are fulfilled can one speak of full-blown co-makership.

On the contractor's side there is the phenomenon of 'back to the core business', but the same thing applies to the supplier's in quite a few cases. This is reflected in the depth of the production line which refers to the models, sizes, styles, or colours offered within each product line. Suppliers concentrate on their core competencies by specialising in products, product technology or product market combinations. Through greater specialization the competitive advantage may increase, however, the market becomes smaller. On the other hand, there are suppliers who try to broaden their business in order to be able to supply the contractor in a more complete way, a process which is reflected in the breadth of the

production line namely, the number of product lines handled by a firm. Whatever permutation the supplier opts for, its vulnerability will increase. The contractor and the supplier will have to get used to the idea that they have to deal with increased vulnerability within the subcontracting relationship.

Some conclusions can be drawn from the above discussion. Relationships between contractors and suppliers tend to be longer-term now than in the past, and contractors prefer to deal with fewer suppliers with whom they will develop a more intense relationship. The supplier has also evolved from a producer of simple components to a co-maker. In the latter case, subcontracting requires an interactive and constructive perspective where the interaction between both parties (the contractor and the supplier) comes centrestage and will result in a cooperation which is beneficial to both (Biemans & Binsbergen, 1991).

3.4 Subcontracting: from industrial linkages to complex networks

It seems we are now in an era of 'competitive competition' and relationships between contractors and suppliers are being constantly shuffled as they continually have to adapt to changing circumstances.

The basic building bloc of the production system is the production chain, a set of linked production units or firms. Each stage of the production process which is represented by a firm adds value to the sequence (value added chain) and changes the character of the product (Lambooy, 1992; Roobeek, 1988). This chain of firms is interconnected through a set of transactions which are usually referred to as linkages or functional interdependencies.

Transactions are structured organizationally and geographically and it is impossible to separate out the two: internal and external linkages bind together organizations and geographical areas in complex, interrelated and overlapping divisions of labour (Dicken, 1992).

The production chain has to be co-ordinated in an organizational sense because of the changes that have taken and are still taking place in the industrial world and may be achieved either within an individual firm or between firms. From a geographical stance, the various components of the production chain may be concentrated in particular places, dispersed or comprise some combination of the two. This might involve within-border (domestic) subcontracting, or cross-border (international) subcontracting (Watanabe, in: Germidis, 1980). The trend is that the potential geographical scale becomes more global. One should take notice of the fact that the boundary between externalization and internalization of production is in a continuous state of flux.

3.4.1 Linkages

It was Sargeant Florence (1948) who first introduced the term 'linkage' though this does not mean that the phenomenon as such is new. For example, although Alfred Marshall did not use the term, his discussion of industrial districts in the 1870s-1890s dealt with this phenomenon in his works on the Principles of Economics and so on; Weber (1909) talks of 'the concentration of production' (agglomeration) that results in independent production-units; Hotelling (1929) discusses 'the concentration of economic activities as a result of a common market'; while Lösch (1940) talks about 'the spatial proximity of firms of the same kind because of the presence of production and service companies'.

The term linkage (other terms used are relationship, interrelationship and interfirm linkages) is not used unambiguously in the literature, and this is compounded by the fact that its meaning has changed over time. Originally, the term linkage referred to "a functional interdependence of industries or to geographical coincidence or to both" (Florence, 1948, p. 60). More recently, linkage has come to refer to "all operational contact ... between the separate functional elements of the manufacturing system" (Taylor and Wood, 1972, p. 129).

Florence's approach to linkages has, though not on purpose, led to a geographical interpretation of the term which limits it to locational linkages. This interpretation is important in the analysis of regional industrial complexes and it exhibits similarities with the term 'agglomeration economies'. It can greatly influence location decisions while linkage in the broader sense, is relevant in studies of interregional relationships. For example, in order to study the effects of the enlargement of economic activities in one region on another.

Whichever way defined, linkages are all about relationships and can be distinguished according to three characteristics. First, according to the type: material or non-material linkages or contacts that make such relationships feasible. Regional development models such as the growth pole concept and cumulative causation make a distinction between forward and backward linkages. Forward linkages refer to relationships with contractors or customers such as distributors and service agents; backward linkages to relationships with suppliers who provide raw materials, parts, components, services, and so on. In the case of backward linkages, it is likely that if a plant increases its output as a result of a rise in

demand, monetary flows increase at the same time along its backward linkage to the localities of its suppliers. This might stimulate further expansion of them and their suppliers. Forward linkages are unlikely to react in the same way. Finally, there is the matter of control: in multi-site establishments there is a hierarchical structure of control in contrast to single-site firms where the manager exerts all the influence.

The term linkage is used in two different ways in research. It can be used as an object of analysis or as a characteristic or attribute of certain phenomena. The first approach, linkage as an object of analysis, can be summarized as interaction-research. Within this approach, three groups can be distinguished: the Swedish tradition (Törnqvist), the geography of transport (Ullman), and the analysis of changes in relation-patterns (Steed). Depending on the type of counterpart, five types of interaction are distinguishable:

- Vertical interaction: which includes all the interaction between sellers and buyers, for example manufacturer-customer interaction;
- Horizontal competitive interaction: encompassing interaction between companies which are basically competitors;
- Horizontally, complementary interaction: includes cases where the manufacturers of complementary products cooperate. The complementarity is often based upon the fact that the customer uses products from completely different suppliers (systems selling, large turn-key projects);
- Diagonal interaction: which embraces all cases of interaction between two partners belonging to two different systems. This distinction is particularly relevant with respect to instances of extensive technical cooperation between the parties involved;

- University-industry cooperation: the inherent differences between the scientific world of the university and the commercial reality of the industrial world formed the underlying factor accounting for most of the problems and frustrations that occur during the process of product development.

The second approach, in which linkages are used as a characteristic, can be applied in a multitude of ways. From a global perspective two characteristics can be distinguished: 'spatial patterning' of industrial locations and the 'cross-sectional' approach.

The linkage approach in classical and neo-classical studies has been criticized for lacking depth of explanation. Linkage analysis not only fails to particularise the environment of the single focal organization, it treats interrelationships almost exclusively in terms of the exchange of goods and information. Furthermore, it assumes cost rational decision-making, perfect competition and implies that plants and business organizations are equal participants in webs of interaction. Nothing could be further from the truth. Linkages need to be reinterpreted.

The new perspective on industrial geography is based on the concepts of segmentation and power networks. A segmented or dualistic economy comprises two types of enterprises: large organizations and smaller firms. The former can mainly be found in the assembly sector while the latter belongs to the secondary sector in the parts and components sector. The significance of this dualism, however, is not that a society is divided into two autonomous and discontinuous segments, with the size of organizations as its main criterium. The main issue, as Berger and Piore argue, is that a society is divided segmentally and not continuously (1980).

The two types of organization, display great interorganizational variations in power. Such power can be defined as the ability of one organization to control the resources necessary for the functioning of another (Pfeffer & Salancik, 1978): as a result, one firm becomes subservient to the other firm. The resources handled include finance, capital, materials, land and labour. However, power needs to have an economic consequence in order to be relevant and the access that different organizations have to resources is uneven and asymmetric. This clearly shows the existence of power relationships between organizations (the organizations of a segmented economy). Power networks arise when organizations emerge as unequal participants in webs of interaction. Factors such as firms' differential access to finance (finance gaps), differential taxation and the bargaining process before contracts are entered into are but a few examples that divide enterprises into the dominant and the dominated and the controlling and the controlled. Whatever the scale of the differences between organizations in the dualistic economy, they are developmentally discrete yet functionally interrelated and combine to form a segmented economy (Taylor & Thrift, 1982).

Increasingly, transactions take place across national boundaries and become international linkages or global transactions, which implies that specialization is taking place. This process of specialization implies a breaking up of the production chain (Biemans, 1989) with each separate firm performing a part in the production chain, which creates a final product (Hoftijzer, 1988). In the case of specialization, a firm focuses its efforts in terms of the width of its line, the target customer segments and the geographical markets served (Trevor & Christie, 1988). Ideally, specialization should result in functional flexibility or the increased ability to redeploy workers and firms between tasks.

Various trends in the world economy have brought about new developments in transactions both necessary and otherwise, such as technological change and improvements in transport (transport is now an 'enabling' rather than a 'determining' factor) and communications (improved communications erode the need for linkage proximity and 'faster communications now mean that time is worth more money') (Hamilton in: Bennet and Estall, 1981); these changes being complementary.

Technological change in the form of inventions and innovations (in production, distribution and organization) has greatly contributed to the process of internationalization and globalization of economic activity. Technological change is very much at the heart of economic change and development, however, the path of technological change can not be characterized as being deterministic, and neither is it linear and sequential. Technological change is a social process and it is created and adopted by individuals and organizations (Dicken, 1992); and some would argue that it is not technology that drives choice, but the other way around (Borrus, 1987).

On the other hand, there are those innovations which have enabled firms to organize their production process in a more flexible way (the technostructure of flexibility). The major technological innovations are those associated with the convergence of two initially distinct technologies -computer technology and communications technology- into information technology. Information technology is transforming both the technologies of transport and communication; as well as the technology of products and components. Technological change for products and processes has resulted in new forms of production that are generally characterized by an ability to change process and product configurations with great rapidity. This is needed as there is now an increased heterogeneity of consumption

and a more complex, differentiated market. Information technology has rendered both of these more flexible.
There are also the innovations that mainly increase productivity and output rather then flexibility.

In the past, the final producer dealt with all its suppliers directly, that is with the entirety of its production chain but because of the great number of suppliers that it had to deal with, the relationships tended to be remote. This conventional relationship did not need to be intensive as suppliers only had to produce single parts exactly according to the specifications and price as set out by the principal.
It operated as a pure 'line organization' (the top priority in a line organization is to have line balance rather than flexibility) which made creative or inventive suppliers redundant. For a principal firm it would be unthinkable that machines should stand idle which geared every supplier in the production chain towards the principal's production process.

This system was called a Just-in-Case system with suppliers holding large stocks or inventories of materials and components to insure against interruptions in supply or faulty components (Schonberger, 1982; Malecki, 1988).
In the top-down structure, with the principal at the top and below it different echelons of suppliers, it was the principal who decided the pace of the subcontracting relationship. The supplier only provided capacity, thus resulting in the term production firm or jobber. Jobbers were considered low-tech suppliers of products who were merely selected by price, that is by invoicing price.

3.4.2 Complex networks

Things started to change in the early 1980s. With globalization and vertical disintegration of production setting in, the relationship between the principal and its suppliers changed and strategic networks emerged. Such networks can be defined as a web of

> "long-term, purposeful arrangements among distinct but related for profit organizations that allow those firms in them to gain or sustain competitive advantage vis-à-vis their competitors outside the network" (Jarillo, 1986).

Organizations were no longer treated as atomistic units but are part of networks where organizations are linked with one another through technical, knowledge-based, social, economic and legal relationships. Different from other organizations, firms within a network are independent and the position of an organization within a network is determined by several factors. It is not only the identity of the firms with which organizations have direct or indirect relationships that is important, but also the role and importance of the organization within a network, and the intensity of the relationships with other organizations. A network is based on co-ordination through adaptation.

First and foremost, networks should be considered at two different levels: the internal and the external (Biemans, 1989). While each of the major parties involved in the product development process is part of a large external network, every one of them has its own internal network as well. The distinction between external and internal networks is crucial, since the functioning of each of the internal networks directly influences the efficiency and efficacy of the external network.

A further distinction can be made between simple and complex networks. Simple networks consist of a single interactive relationship between the contractor and the supplier, where

the product development process is uncomplicated and the manufacturer possesses most of the know how. The complex network applies when the development process involves a very complicated innovation, the contractor lacks expertise, or unanticipated problems arise during product development. In these cases the contractor needs to hire specialized organizations.

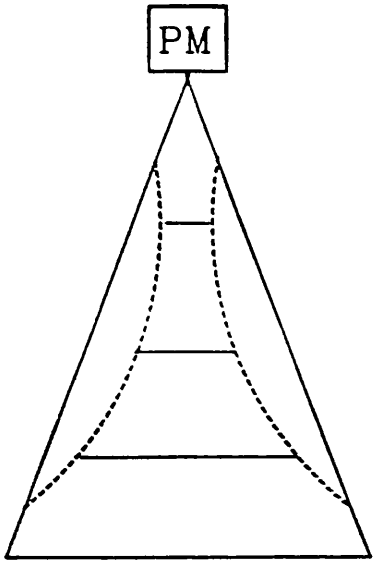
The external networks for parties involved in subcontracting can be divided into several categories (Biemans, 1989):

- networks dominated by manufacturer-user interaction;
- networks dominated by manufacturer-third party interaction; and
- mixed networks, consisting of a manufacturer with major relationships with both users and third parties.

According to Jarillo & Ricart (1987), the key ingredients of a successful network are a long-term outlook and the ability to elicit trust. For a network to survive, it needs to be both effective and efficient. It is considered to be effective if it can produce at a lower total cost than alternative modes of organization, which in turn depends upon its technological strength and transaction costs. Network efficiency is displayed when it offers firms within the network more than it demands from them. The participating firms realize that there is a larger pie to share and that they gain more by being part of the network.

Principal firms these days prefer to deal with fewer suppliers directly and at the same time intensify their relationships with the remaining 'preferred' suppliers (see Figure 3.1). The subcontracting relationship within a network is one of a structural kind (the long-term relationship) and is based on implicit contracts without specific legal ties. The organizations are flat and informal.

Figure 3.1 The subcontracting pyramid



---------- = trend of fewer suppliers per contractor

PM = Product Market

Source: Ministry of Economic Affairs, 1988.

The relationships within the network are enhanced by the existence of frame contracts and orders on the basis of forecasts, which greatly improves the flexibility of the subcontracting relationship. The production process of the principal is not a line organization any more since nowadays it concentrates on several projects within the production process.

Just as in the Just-in-Case system, the Just-in-Time system is gaining in importance. The Just-in-Time system is more than just a system for the procurement of supplies, as it is part of the broader system of the organization of production adopted by the firm. The essence of the Just-in-Time system is that work is done only when needed, in the necessary quantity and time. Very small stocks, approaching zero (zero-stock is the strategy to minimalize

stocks and lead times (de Wit, 1988)) are kept by the firm. Supplies of the needed materials and components are delivered Just-in-Time to be used in the production process immediately instead of being stocked. Small and frequent deliveries (possibly several times a day) and hence proximity to its suppliers is essential. It is of the utmost importance for the Just-in-Time system that the internal and external lead times (this is the time needed for delivery of materials so that they will be available when needed in the business) are perfectly attuned. This is not easy to achieve as lead times and optimum batch size can differ markedly but in general, no stock is kept either at the contractor's or main-supplier's site.

The development of a long-term relationship can be described in five stages:

- the preceding stage, when the contractor is looking for a supplier. At this point there is as yet no relationship between the contractor and the supplier;
- the early stage when the first negotiations about orders take place;
- the development stage, when a contract has just been signed. There is now an actual relationship between the contractor and the supplier;
- the long-term stage, in which mutual dependency (interdependency) increases; and
- the final stage, when the relationship between the contractor and the supplier is institutionalized.

Not only is the length of the subcontracting relationships changing, the scope is similarly changing. The principal firm expects the 'privileged' suppliers to be more involved in the whole production process, a trend called early or continuous supplier involvement (Kok, 1987).

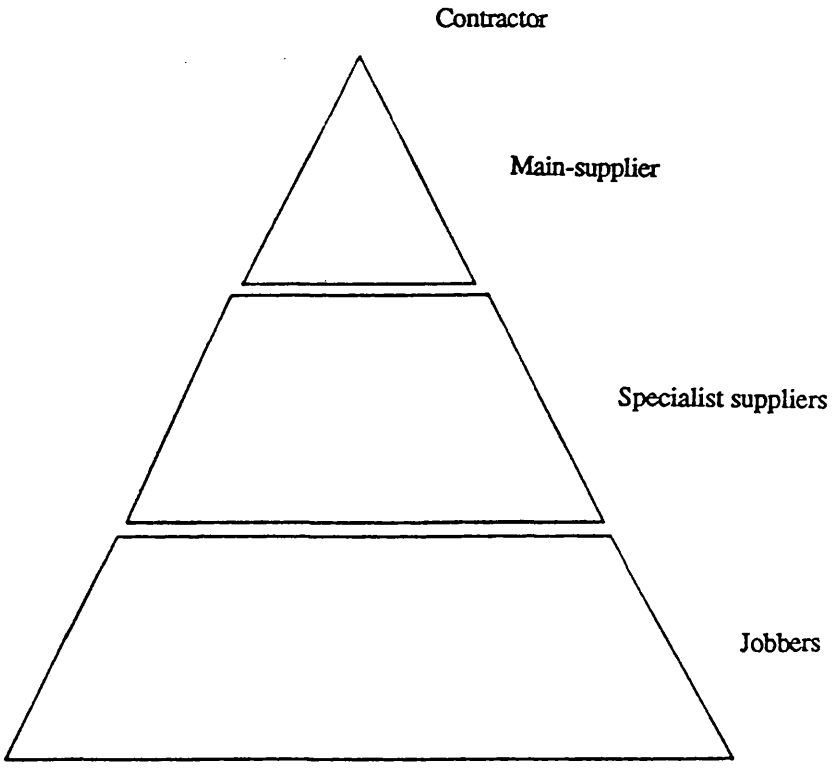
For the principal firm it is only necessary to provide the functional requirements of a product. This frees the main-supplier to work according to its own judgement. This means that the principal firm increasingly focusses its attention on its core activities and relies on the main-supplier to provide the functional units and subassemblies. The main-supplier turns to specialist suppliers and jobbers to subsequently acquire high-tech and low-tech components. As a result, complex, dynamic, continuously changing networks emerge.

This new phenomenon of the subcontracting of production within networks requires certain aspects to be respected in order for it to operate satisfactorily. Trust is essential within such networks: both the contractor and the supplier must trust one another in order to secure a long-term relationship. The contractor must trust the supplier to ensure that products arrive on site, in time, in the required quantity and quality. The supplier's priority is to ensure that the contractor places follow-up orders. The supplier invests in equipment and spends a lot of time sorting out teething problems arising from (new) products. This investment in time and money is only worthwhile if the contractor sticks to the supplier for a long period (long-term relationship).

3.5 The tiers of production

Within the myriad of subcontracting relationships various groups of manufacturers can be discerned, each of which them fulfil a different function in a pyramidal structure (Thoburn & Takashima, 1992) (see Figure 3.2). Three key stages or tiers can be distinguished: the assembly stage, the subassembly stage and the component stage. The subcontracting of whole products is referred to as commercial subcontracting and involves both the contractor and the main-supplier. The subcontracting of processes and components is referred to as

Figure 3.2 The tiers in the subcontracting pyramid



Source: Ministry of Economic Affairs, 1988; Broersma, 1992.

industrial subcontracting. The former reflects the relationships between the main-supplier and its specialist suppliers, the latter refers to the relationship with the jobber.
Whereas the contractor is market and technology-oriented, the main-supplier concentrates on organization and production.

The principal firm can be motivated to sub-contract by various reasons. Specialist subcontracting involves the subcontracting of specialized functions by a supplier who has the requisite skills and equipment. Cost-saving subcontracting takes place when the supplier can produce certain products at a lower cost than the contractor. Finally, complementary or intermittent subcontracting, which is only used by the contractor when it has to cope with fluctuations in demand and does not want to expand its own capacity.

Recently, there has been a strong shift in the distribution of value-added towards the component stage. Every supplier seeks out orders with a higher value-added component. Even though the final product manufacturer contributes a small share of the value-added, it is often the component supplier which reaps a disproportionally small share of the profit. The relationship between the contractor and its main-supplier is usually long-term, while for its suppliers it can range from long-term to just a single batch. Single batch production can only benefit the contractor and certainly not the supplier who has to put in investment and time. This may be in vain if there will not be a follow-up order but of course, a supplier does not know beforehand that it is just a one-off contract.

The 'quality' of the relationship between a contractor and a supplier may be evaluated from the contribution a contractor makes to the production process of the supplier. In the case of

the jobber, the subcontracting relationship limits its freedom by giving exact specifications for product and process development. The relationship that provides advantages to the supplier is the one where the contractor provides the supplier with finance, machinery and equipment and/or access to technology.

Ideally, a subcontracting relationship should be symbiotic: where both partners in the subcontracting relationship contribute to the support of one other. Companies in this type of relationship can combine complementary technologies, production capacity, R&D capabilities, and so forth.

The next sections, therefore, analyze in detail the pyramidal tiers of production.

3.5.1 The Principal Firm

At the top of the pyramid is the principal firm or contractor who normally determines which work is to be subcontracted. As discussed above, the principal firm prefers to deal with fewer suppliers directly, thus resulting in a smaller, direct supply base due to the 'survival of the fittest' syndrome.

The principal firm undergoes a more intense relationship with the remaining, 'preferred' suppliers. The principal firm is also gradually moving towards a relationship which is based on trust with its direct suppliers - a trend which has only become possible as a result of taking a long-term approach to co-operation (§ 3.4.2).

In this new context, the principal firm can concentrate on its core activities which are the development of technologies and products, the production of strategic components and the assembly of the final product. In addition, it is responsible for the marketing of finished products and the rest of the work is left to its suppliers, either directly or indirectly.

3.5.2 The Main-supplier

The first layer of the subcontracting pyramid comprises the suppliers with which the principal firm has direct transactions. The supplier is called the main-supplier because it is the coordinator of a subcontracting network. The main-supplier takes total responsibility for its products and the whole organization around it. The main-supplier is a problem-solver which prefers to supply to its principal firm on-line.

The relationship between the principal firm and its first-tier suppliers is neither arm's length (market) nor purely internal (hierarchy) (Sako, 1992). The new approach of the principal firm towards its direct suppliers is often referred to as the arms around philosophy (Asian Productivity Organization, 1986).

The two relationships, markets and hierarchies, correspond to the two extremes of a continuum. In the case of markets, a function in the production column may be performed by individual, independent firms so that the links in the column consist of a series of externalized transactions between separate firms. Transactions are organized through the market (Dicken, 1992). An arm's length contractual relationship refers to a relationship between trading partners wherein contractual obligations are made as clear-cut and explicit as possible so as to prepare for all unforeseen contingencies. Risks are spread by dealing with multiple trading partners at a time. Unforeseen contingencies due to uncertainty are settled by universalistic legal or normative rules.

In the case of hierarchies, the whole production column may be performed within a single firm. The links in the production chain consist of a series of internalized transactions within the boundaries of a particular firm which are organized hierarchically through the firm's internal organizational structure (Dicken, 1992).

Other forms of inter-unit coordination exist between the two extremes, but they are neither markets nor hierarchies: they are something in between.

With the principal firm concentrating purely on its core activities, it leaves specific functions in the production chain to its 'preferred' direct suppliers, the main-suppliers, to perform. However, as long as this involves a high degree of uncertainty -whether over the availability, price or quality of supplies, or of the price obtainable for a firm's output- there exists a great incentive for the firm to abstain from subcontracting and to control these transactions itself.

Main-suppliership has become possible because of the modular way in which products are increasingly manufactured. It is the modularization of product assemblies that has allowed the backward diffusion of mass production techniques to suppliers of intermediate goods. Previously, one had to choose: either standardization at low cost or flexibility at high cost. However, the modular or flotilla (Drucker, 1990) structure combines standardization with flexibility. A modular design divides the final product into a number of units which are designed independently of one another. Each individual unit or module is standardized and with just a few standardized units a broad range of products can be assembled. The modular design is aimed at easy assembly of the units, thus saving time and increasing flexibility tremendously.

To achieve this, the factory has to be structured differently. The plant consists of modules centred either around a stage in the production process or around a number of closely related operations. Each module will have its own command and control and each will be manoeuvrable, both in terms of its position in the entire process and its relationship to other

modules. This organization will give each module the benefits of standardization and, at the same time, give the whole process greater flexibility. It allows for rapid changes in design and product, speedy response to market demands, and low-cost production of 'options' or 'specials' in fairly small batches. However, this is still very much the factory of the future.

The main-supplier provides the contractor with both functional units (these are ready-made assemblies or systems that just need to be build into the final product of the contractor) and subassemblies which are becoming only more complex (Bakker & van Kooij, 1991). The latter does not need to carry out any work on the assemblies or systems. In the past, it was common to produce according to the exact specifications of the contractor, however, nowadays the contractor only provides the functional specifications to the main-supplier. The principal firm gives the main-supplier a free hand. Since the main-supplier more often has to supply a 'total solution' to its principal firm, the 'preferred' supplier may have to focus on activities formerly unknown to its company. Despite this pressure the main-supplier must beware of becoming too specialized (as the contractor wants it to be) as the market often is simply not big enough for that.

A contractor relies more and more on the expertise of its main-supplier. It usually takes years to develop such a relationship which is characterized by great dependence on one another. Once established, this relationship allows the contractor to involve the main-supplier at an early stage of the production process. This is called early supplier involvement which means early involvement of the supplier in product design also known as co-makership and may bypass problems of attuning the design stage to the production stage (Kok, 1988).

The responsibility of the main-supplier now extends from the development stage to the

engineering stage. The contractor takes it for granted that the main-supplier develops products and focuses solely on its core activities not least because the main-supplier can manufacture products at a competitive rate because of lower overhead costs. As a result of this trend, the contractor will start to lose knowledge and experience.

The ideal main-supplier offers a wide range of products and process applications, both in breadth and in depth, and these are supplemented by good subcontracting relationships. The main-supplier has metamorphosed into both a contractor and a supplier, often a sole supplier.

In the case where the main-supplier is the sole supplier to a contractor it becomes possible, indeed likely, that the latter takes up all or most of the main-supplier's capacity which might threaten its flexibility. Other disadvantages of this so-called single sourcing are the following (Van Eck, 1989). When a supplier enters into a long-term contract with a contractor it often results in a decrease in the supplier's number of contractors. If the supplier subsequently loses that customer it will have disastrous effects. Long-term contracts also tend to distract the supplier's attention from creativity to product improvement and cost reduction. Another aspect is that the economic vitality of the supplier becomes dependent on the contractor. In the extreme case the supplier no longer has its own identity. The contractor may as well dictate the costs for sales costs and profit as a direct result of the open cost structure requirement. Also, it is the contractor who requires quality control but it is the supplier who has to pay for the expensive equipment. Finally, contractors may well prefer to choose for short-term survival rather than longer-term profit maximization.

It would be better for both that neither one comes to rely on single sourcing, but on dual or

multiple sourcing. Single sourcing refers to the situation where one buys a (customized) product from only one supplier with which the contractor has a long-term relationship (Ministry of Economic Affairs, 1988; Dicken, 1992). With single sourcing a firm gains economies of scale (and lower costs) but risks putting all its procurement in the hands of a single firm (Dicken, 1992). Dual sourcing is when a contractor buys (customized) products or services from two suppliers. Multiple sourcing takes place when the contractor buys (standard) products from several suppliers (Wissema, 1989), which means that the subcontracting network is spread more widely. In the case of dual and multiple sourcing independence is likely to increase with a supplier's range of customers and especially a highly diversified customer base is an insurance against demand fluctuations (Thoburn & Takashima, 1992). Networks can form when the principal firm operates a system of multiple or dual sourcing. In the case of multiple sourcing the prime contractor's bargaining power over price, quality, logistics and so on is strengthened (Ministry of Economic Affairs, 1988; Nishiguchi, 1994).

Dual and multiple sourcing make a distinction between their various suppliers which indicates the importance of the suppliers. It all comes down to the issue of whether to produce strategic or non-strategic components. In order to differentiate one supplier from the other, one can use the Pareto principle to classify suppliers into two basic categories:

- a relative few suppliers or the 'vital few': these are the so-called main-suppliers and as discussed above are of great importance to the contractor. The main-suppliers supply the principal firm with 'strategic' components and subassemblies that are directly related to the main activities of the contractor. The relationship with these main-suppliers has always been long-term in nature and main-suppliers provide the

principal firm with information of a production-technical kind. These main-suppliers are involved at a very early stage in the production process of the contractor (early supplier involvement or co-makership). The ultimate goal is to achieve an optimalization and possibly elimination of stock (zero-stock) and strict quality control (Kok, 1988). Examples of 'vital few' suppliers include large original equipment manufacturers (OEM) and large merchants;

- a relatively large number of suppliers: these suppliers are involved in the production of components of non-core activities are only of modest importance to the contractor (they are usually referred to as the 'useful many'). This type of supplier includes consumers, merchants, the workforce and the public.

The subcontracting game is played by a tough set of rules and it is not necessarily a 'win-win' environment for both the contractor and the supplier.

The main-supplier in turn subcontracts work to its suppliers (and so on down the line) because it cannot attain the required economies of scale and technological development change rapidly renders machines obsolete.

3.5.3 The Supplier

The supplier makes up the next tier in the subcontracting pyramid though a distinction can be made between specialist suppliers and the non-specialist suppliers or jobbers. The specialist suppliers can be subdivided into co-suppliers and co-engineers.

The main-supplier produces more expensively than the supplier for various reasons. The first reason is, that it has bigger overhead costs. From a cost perspective it does not make sense for a supplier to manufacture both high-tech and low-tech components, as the higher

overhead costs of the high-tech components will be transferred to the low-tech components. Thus the supplier will not be able to offer low-tech components at a competitive price.

Secondly, the main-supplier cannot attain economies of scale. Economies of scale refer to declines in unit costs of a product or operation or function that goes into producing a product as the absolute volume per period increases (Porter, 1980).

Finally, technology develops so quickly that machines are often obsolete before they need to be replaced. Thus the main-supplier cannot justify the investment of the purchase of new machines and, from a cost perspective, it is more attractive to leave the lower value-added jobs, to its suppliers.

3.5.3.1 The Specialist Supplier

The specialist suppliers are the ones that provide the main-supplier directly and the principal indirectly firm with products of a more specialist nature. Main-suppliers have intense relationships with specialists in particular fields.

For the main-supplier subcontracting part of its work means that it can concentrate on prototypes and first series of products and in due course, part of this work may also be subcontracted to specialist suppliers.

Depending on the type of products that a specialist supplier manufactures, the position of the supplier within the subcontracting pyramid can vary considerably.

Generally speaking, specialist suppliers can be divided into two categories. For instance, there is the supplier that is involved in the manufacturing of functional units according to

the specific requirements of the main-supplier. This kind of supplier is limited in number and the main-supplier normally intends to develop a long-term relationship with them. Development potential is a strong characteristic of this kind of supplier and it has to be able to control the production side, the business administration and the logistics of the firm. This supplier has to be willing to make investments, share risks and controls its logistical system completely. This supplier is called a co-supplier and is mainly concerned with developing and manufacturing high-tech components. The co-supplier is responsible for both the technical and the functional final tests and, as a result, the production controls become redundant but the contractor can be regarded as its sales department. The co-supplier must be willing to make specific investments and to share certain risks. Close proximity to the main-supplier definitely is an asset.

The second type of supplier covers the complete engineering project, from the initial steps of the manufacturing process to the supply of the prototype. This suppliers is called a co-engineer.

3.5.3.2 The jobber

The suppliers or jobbers come last, at the base of the pyramid. The organization of the jobber differs considerably from that of the main-supplier or specialist supplier. The jobber stresses productivity and process control.

It is of the utmost importance to the jobber to choose which markets and products it will concentrate on and adapt its organization accordingly. It is only by distinguishing itself from other jobbers that it will be possible to survive.

This supplier must reserve capacity for its contractor and short lead times are essential in order to respond quickly to demand for components. It is also important to stress that jobbers are not just low-tech suppliers which are solely selected on the basis of price. If the jobber can guarantee good quality, it can risk asking a higher price for its products but even so, a jobber remains highly vulnerable and it is only by being part of a subcontracting network that this vulnerability can be minimized.

The contractor increasingly goes for total price (the total value concept) and not just for the invoicing price. Traditional cost accounting tends to measure only the costs of producing and ignores the costs of non-producing, whether these result from machine downtime or from quality defects that require scrapping or reworking a product or part. Labour costs are clearly the wrong unit of measurement in manufacturing.

The new unit of measurement which is evolving is time, which is why the new approach includes non-producing time costs. Such costs are as significant as producing time - in wages, heat lighting, interest, salaries and raw materials.

A final point to note is that close proximity of the jobber to its contractor does not seem to be as important to the jobber as it is to the co-supplier. The fact that close proximity of the jobber is not very important for the contractor can be illustrated by the trend of subcontracting of standardized or catalogue components to low-wage countries such as the Far East and Southern and Eastern Europe. Nevertheless, this kind of international subcontracting only becomes worthwhile with a certain volume of turnover.

3.6 The conditions for, and the results of, subcontracting

The main condition for subcontracting and especially for co-makership is the willingness of

the contractor and the supplier to work together in mutual confidence and attempt to produce the final product as well as possible.

It is important that the contractor and the supplier are rightly attuned and contribute equally to their relationship. For this to materialize, the contractor and supplier must cooperate on an equal footing, thus enabling each other to develop a good understanding of their production process and their conduct of business to the extent to which the relationship is germane. A key component of this relationship is that whenever there is a major setback, they should share the costs arising from it.

If these conditions for an effective co-makership relationship are fulfilled, the final products are more likely to achieve a higher level of quality and innovation, and the contractor will be able to respond to the market in a more flexible way. It may be possible to reduce the integral costs in the whole production process and the overall output will increase, not only for the contractor, but also for the supplier. A rather significant byproduct is that it will be possible to reduce stocks all along the production process.

As a result of the intense relationship between a contractor and a supplier, a further set of shifts may occur. The functions and tasks of the contractor and the supplier will undergo changes and the risk that both have in the production process will diminish. Of course, there will be a change in value-added to the product of the contractor and the supplier, and there will be a change in quality assurance and development of the product.

3.7 Make-or-buy

Until recently, the decision as to whether to make-or-buy would come up in the case of capacity subcontracting, and every now and again there was a need for quality

subcontracting. Firms would mainly produce components in-house and this required firms to master all the know-how and operational capacity of the development and production of their products.

Nowadays, the prominent question in the strategic management of firms is one of make-or-buy. A distinction can be made between company-made parts and supplier-made parts. A company can decide whether it will produce the products in-house (make) (a portfolio of businesses) or to purchase them from outside suppliers (buy) (a portfolio of competencies) (Prahalad & Hamel, 1990). When making this decision, the following issues are taken into consideration. First, whether components are very important to the company. Vital parts are produced in-house whilst non-vital components are subcontracted to outside suppliers. Secondly, whether the company has the technical know-how and the process capabilities to produce parts internally; and whether there are any suppliers readily available that are specialized in the components needed by the contractor. Following on from this, even if specialist suppliers are not readily available, is the contractor willing to nurture specialist suppliers. If certain components require the attention of a specialist, the decision will be made to subcontract the components. In addition, the firm must also consider the factor costs, the required quantity of components and the accumulation of technology.

3.7.1 Make

There are several reasons why the contractor might decide to produce the components in-house, or in other words, opt to make the components itself. When producing the components in-house there is a simpler integration of plant operations and the contractor does not have to rely on outside suppliers and thus will not experience delivery delays

(Prahalad & Hamel, 1990). It may also be less expensive because there will be no transaction costs. The decision to produce components in-house means that it will help carry overhead costs and there will be no problem with respect to secrecy if the contractor does not want designs to be widely known. It is also possible that a contractor may decide to produce components in-house since they are unusually complex parts that require direct supervision to attain the very high quality levels that the contractor believes can only be achieved in-house.

3.7.2 Buy

Under the present circumstances, with flexibility being a major issue, companies may decide to externalize the production by opting to buy. There are several advantages to be gained including the following: the contractor may benefit from the supplier's specialized abilities, often the contractor perceives more positive attitudes from the supplier, deliveries are quicker, newer and better equipment is used, productivity is higher, there is higher production flexibility and also the use of foreign technology may turn out to be cheaper (Hoftijzer, 1988; Prahalad & Hamel, 1990). Less plant space is required by the contractor, there will also be substantial savings on the maintenance and replacement of equipment and further savings to be had on employment costs such as recruitment, absence, holidays and such like. And subcontracting will also result in a simplified control of the internal production processes.

Subcontracting tends to be used by the contractor when the volume of an order is not big enough to justify capital and inventory investment (the major costs of inventory are from storage facilities, spoilage and obsolescence, insurance, handling and interest) which reduces the organization's total overhead costs. Subcontracting is also used when demand

varies since it gives the subcontractor greater flexibility to deal with peaks, troughs and seasonal variations.

Subcontracting works out cheaper for the contractor in the above-mentioned circumstances since the supplier will function essentially as a 'buffer' for the contractor.

Nevertheless, there may also be some potential drawbacks to the decision of the contractor to buy which it should consider. There is the legal status of the supplier. Whether the contractor or the supplier takes responsibility for manufactured components, is closely related to the involvement of the supplier in R & D, design and so on. The supplier's involvement and responsibility in the contractor's production process can change the legal status of the supplier. The supplier's commitment and its involvement in quality control is also relevant, as is the issue of training and skills. If the supplier does not have the required skills to produce certain components the contractor may have to provide the supplier with the requisite training.

The supplier will have some advantages in case the contractor decides to buy (Hoftijzer, 1988). First, the contractor will give the supplier the opportunity of a higher turnover. Secondly, suppliers will indirectly have access to the possibly worldwide marketing and sales organization of its contractor. And lastly, technology transfer may take place from the contractor to the supplier which facilitates a quicker technological development.

3.8 Demand pull versus technology push

There are two main factors that are relevant in subcontracting: on the one hand there is the demand side (contractors) and on the other hand there is the supply side (suppliers). The demand (market pull) of contractors creates a demand in the market to which suppliers can respond. The supply (technology push) of suppliers can be a reason for a contractor to

embark on a relationship with them (Wever, 1985). Sometimes demand and supply are in conflict, for example, better quality and performance against lower costs. It is also possible for demand and supply to complement each other, for example, the supplier's know-how complements the contractor's lack of it. In the last decennium, the supply side has been in resurgence and this is depicted in a dynamic development of the technology push, while the demand side (back to the core business) has also become stronger (Broersma, 1992).

3.9 Trends in subcontracting

It is noticeable that the amount of parts purchased relative to the total amount of firm's turnover has increased greatly, for example in the automobile industry, the electronics and the synthetics industry, the amount of parts purchased has increased by 5-10 per cent in the last five years. At the same time there is a trend of a reduction in the number of suppliers.

Not only is the contractor subcontracting more of its work to outside suppliers, at the same time, as discussed in §3.4.2, it has also reduced the number of suppliers with which it is dealing. The remaining suppliers must be capable of dealing with the greater demands of the contractor concerning delivery reliability, quality and technological competence. This has resulted in a deeper mutual involvement and a more intense exchange of information between the contractor and the supplier. The current subcontracting relationship closely resembles that between the different departments within a firm, however, the former is generally not as hierarchical as the latter.

In traditional firms, the boundaries between firms motivate them to maintain stock. The supplier tends to deliver products in large batches and keeps safety stocks, and once the goods arrive at the contractor's, quality control becomes necessary and stocks are held.

Modern firms are increasingly of the opinion that boundaries between firms should be

'transparent', thus avoiding a lot of extra work and operating effectively. The logistical systems of the co-operating firms are connected with each other and they coordinate the future activities.

Quality Assurance is another aspect of the production process that is also dealt with differently. In the past it was common for product quality checks to be made before or after delivery. This would either be in the form of 100 per cent quality controls, however, nowadays there is a different approach to quality assurance. All the components of a product are now subject to quality control. This is at random or 100 per cent, depending on the product being a strategic or a non-strategic component in the final product. This is part of the modern, zero-defect approach which seeks the elimination of production faults (de Wit, 1988).

Once the contractor and the supplier have reached agreement on an adequate way of dealing with process control, quality control as previously required by the contractor becomes obsolescent.

Lastly there is the matter of product development to consider where suppliers are increasingly involved in their contractor's product development process. It is to the supplier's advantage to be able to discuss not only the product specifications and the product design with the contractor but also the operational part of the production process.

3.10 Western versus Japanese subcontracting

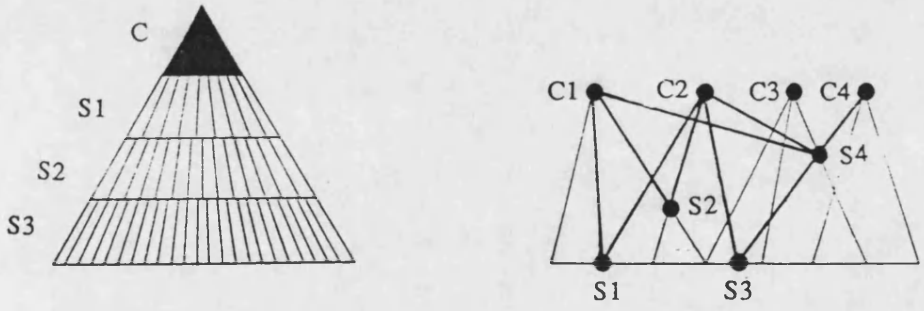
Having reflected on the way in which subcontracting operates in Western countries (that is, Western Europe and North America) it is relevant to compare it to the somewhat different subcontracting practices in Japan.

The key point to note is that productivity is high in large Japanese enterprises. This is essentially because they produce standardized products at a very large scale that can be manufactured in huge quantities using the latest machinery. As much as 70% of all parts can be made by outside suppliers. Smaller enterprises, their subsidiaries or their suppliers provide the various components which cannot be mass-produced. Usually, the contractor will also leave it to the supplier to design a component and merely draws up a description and a list of desired specifications. Beside the design, suppliers will also test, produce and assemble parts and sometimes even deliver them straight to the customer. The components made by the suppliers, therefore, require a lot of time-consuming, elaborate and costly manual work. If the low productivity of the small enterprises were averaged with the high productivity of those they serve, Japanese industry would not turn out to be so efficient. It is the small business sector that is the backbone of the Japanese industry and manufacturers who want to subcontract definitely have a competitive advantage because of the preponderance of small and medium-sized enterprises in Japan.

In addition, there is a notable difference in the supply situation between Japan and the Western world. Japan is characterized by a vertical or pyramidal structure, with the large manufacturer at the top and the parts suppliers below. This is called a pyramid keiretsu (business group) which is called 'tate' (Miyashita & Russell, 1994). This type of keiretsu can be subdivided into production and distribution keiretsu. This formalized structure rigidly ties hundreds or thousands of suppliers to a single contractor. Suppliers are (very) dependent on one contractor since the tradition of loyalty within a hierarchy makes it very difficult, especially for the smaller suppliers lower in the pyramid, to work for more than one keiretsu. It is also important to note that the contractor sets the price it pays for its components and this is downwardly adjusted at least twice a year. Recently however, the

dependency of suppliers has begun to change as a result of increased competition: lower tiered suppliers are free to tie up with a contractor from another keiretsu while the situation for the key suppliers remains unchanged. In the West, however, the supply side is characterized by a horizontal division of labour where suppliers are independent entities operating on a more equal footing (more symbiotic) with their contractors (see Figure 3.3). Suppliers have traditionally been chosen on a spot market (low bid) basis which is no guarantee for a stable subcontracting relationship. Other factors beside price such as quality, delivery reliability and flexibility have gained in importance since the 1980s and have affected the duration of subcontracting relationships in a positive way.

Figure 3.3 Network structures in Japan and the Netherlands



The Japanese network structure

The Dutch network structure

s = supplier

c = contractor

Source: Broersma, 1992.

While the West is oriented towards an innovation- and results-oriented way of thinking, Japan with its Kaizen (which means continuous improvement involving everyone - managers and workers alike (Imai, 1989; Wood, 1990; Nishiguchi, 1994)) is process-oriented. With regard to the buyer-supplier relationship, one can say that in the West the relationship is characterized by cut-throat competition whereas Japan has experience a good deal of success in getting the best of both worlds, namely competition and collaboration.

Contrary to popular belief, the distinction between the way in which subcontracting operates in the West and Japan is not one of nationality, but of mentality.

It is not so much that Japanese subcontracting dates back longer than any Western subcontracting system, rather it is more that subcontracting has been practiced on a wider scale and over a longer period of time.

Japan started its subcontracting relationships shortly after WWII. Western subcontracting relationships only started in the 1960s and more seriously on a wide scale in the 1980s, leaving the West with a lag of over thirty years.

As stressed before, one of the features of subcontracting relationships is that they need time to develop and mature before one can speak of long-term relationships based on trust and in this respect, Japan definitely has a lead which is likely to take a couple of decades for the West to reign back.

Taking a closer look at subcontracting relationships both in the West and in Japan one can discern significant differences in which it operates and not surprisingly, Western companies turn to Japanese subcontracting relationships to try to learn from them and alter their own relationships accordingly.

The system of production and quality management of Japanese subcontracting practice may

have cultural roots (Thoburn & Takashima, 1992). The idea of TQC as "a never-ending cycle in which designers, suppliers, producers, and customers are all intimately involved" was first introduced by the American W.E. Deming in the early 1950s (Baillie, 1986, p. 18; Linge, 1991). His ideas were rejected in the U.S.A. but were listened to in Japan, partly because of the difference in cultural roots.

It is true that the Japanese behavioural tendencies, which are products of a unique Japanese environment, have accommodated the development of highly effective production systems. However, the systems themselves consist of simple procedures and techniques which often do not require a particular environment. Essentially, the main concern of the Japanese subcontracting system consists of two types of procedures and techniques: productivity and quality. One aspect of the Japanese system dealing most directly with productivity is the Just-in-Time system (JIT). JIT directly addresses the material cost component of productivity from scrap to worker motivation to process yield. Japan's quality improvement is partially addressed by JIT and various Japanese quality improvement concepts and procedures called Total Quality Control (TQC), which in return encompasses some of the JIT techniques and improves efficiency by programs aimed at the avoidance of waste, which has been defined as "any operation or process that does not raise added value" (Linge, 1991, p. 316; Monden, 1994). JIT and TQC play a central role in the Japanese strategy of market dominance.

JIT and TQC procedures are not the sole preserve of white-collar staff advisors and specialists. The Japanese rely very little on staff specialists. It is the workers and the line managers rather than the 'top' element of the workforce that are the focal point (Malecki, 1988; Wood, 1990). Innovations concerning productivity and quality improvement are

nurtured on the shop floor and therefore the prime orientation is setting up quality circle groups which are concerned with the style of supervision, the extent of cost and quality consciousness (Wood, 1990, p. 18). It is the TQC techniques, implemented in concert with the JIT system and a host of related productivity enhancing techniques, that give Japan a decisive edge in industrial management. Catching up with the Japanese does not depend on changing tax, trade, all kind of regulations and policies, but rather on changing management policies, procedures and systems. Most of the management concepts and approaches can easily be adapted to Western companies.

The prevalence of small businesses in Japan has been an important factor in Japanese competitiveness. After WWII the small business sector grew more rapidly in Japan then in any other country. Small companies in Japan could take advantage of loans at lower interest rates than those in North America and in Western Europe, besides which the Japanese banking system was more geared towards industry. Thus small businesses were able to innovate in plant and equipment and compete harder for orders. Large companies tend to create structural rigidity, but the vitality of the small business sector provided greater flexibility. Japan also differed from the situation in the West, to the extent that there is a clear division of labour between the big companies and the specialty suppliers and the contractors they rely upon. It is the small business sector that sustains the Japanese economy.

Taking a closer look at the Japanese production process, it becomes clear that it is the foreman who leads design efforts and who adjusts plans as required. The Japanese clearly try to simplify problems and proportionally employ more machine operators in direct production than companies in the West. The people closest to the production process are

best able to deal with production problems on the spot -it is the machine operators who have the hands-on knowledge needed to act effectively. The greater number of machine operators is offset many times over by the sharp drop in the number of non-operators such as inspectors and those who do not produce anything such as repair staff. Small machines are bought or made and more machines are added only when necessary. The machines are applied in capital-intensive sub-assembly and fabrication work, and they strive for mixed-model production. Stations are put close together in order to avoid conveyors.

By contrast, top priority is given to trying to maintain the line balance in Western countries. A production line is considered to be in balance when every worker's task takes about the same amount of time. Line-balancing is a manufacturing-engineering function in which the whole variety of production-line tasks are divided into equal portions, each being assigned to a different worker. Line balance is planned by staff and not by people close to the production process. They work with big machines that operate on a continuous basis, as the aim is never to let machines stand idle. Machines are applied in labour-intensive final assembly and mixed models are only run where labour content is similar from model to model. The machines are not put together in stations as conveyorized material movement is desirable.

The completely different approaches to the production process of the contractor in Japan and the West naturally affects the subcontracting relationships.

The top priority in the Japanese system of subcontracting is flexibility since they expect to have to rebalance often to match output to changing demand. Line management comes second.

The Western strategy, however, is based on stability. Production runs are long and the

need to rebalance seldomly occurs. The Western contractor can thus assume fixed labour assignments while its Japanese colleague expects labour to be flexible and continually adaptable: they need to adjust to problems or to where the current workload is.

With the Western approach, inventory buffers are needed to cushion the effects of equipment failure. Usually these inventories are kept at the supplier's site but it is the contractor who enjoys the advantages.

The Japanese approach is to employ maximum preventive maintenance which prevent the equipment from breaking down in the first place. Ideally no stocks are kept, either at the contractor's or at the supplier's site. The Western approach keeps buffer stocks that usually comprise non-standard tooling and methods, as well as non-standard parts.

3.11 JIT and TQC

The Just-in-Time system or no-buffer principle (Kumazawa & Yamada, 1989) was first operated in Japan at the Toyota company (kanban koshiki or card system) shortly after WWII. It is known in various other ways. At Daf in the Netherlands, the equivalent of the JIT system is called 'Direct Material Supply' (T & U, April 1991, p. 9). At Ricoh it is called 'Speedy and Timely Flow' (Imai, 1986). Other terms used are Zero Inventory Production System (ZIPS) (Omark Industries), Nick-of-Time (Shea Manufacturing Inc.) and Harley-Davidson Motor Company's Material-as-Needed (MAN) (Waters, 1984).

The JIT pull system of production reverses the more conventional push system with its standardization, buffer stocks and its Just-in-Case mentality (Malecki, 1988; Linge, 1991). The Japanese production system appears to have successfully reversed these principles. It has proven to be efficient at producing smaller batches of products. The minimization of

intermediate stores and JIT supply of 'perfect' parts have increased the process yield - quality has improved without additional costs. TQC, on the other hand, was originally based on final inspection but nowadays is carried out as production proceeds (in-process QC), at the supplier's level (Malecki, 1988; Commission of the E.C., 1989). TQC has become a continuously evolving, totally integrated effort towards improving performance at every level. The improved performance is directed towards quality, cost scheduling, labour power development, and new product development.

The essence of Just-in-Time manufacturing is that instead of keeping stock, the manufacturer relies on suppliers to provide parts just-in-time for them to be assembled (Nishiguchi, 1994). The contractor receives small batches of material daily of several times a week. The contractor tends to operate a daily delivery schedule which specifies the delivery date and time for each supplier. It guarantees the specific time available for the delivery for its suppliers in order for goods to be delivered smoothly. Contractors can facilitate frequent suppliers' deliveries by introducing a repetitive master production schedule, and the standardization of products will facilitate frequent small deliveries and therefore enhance the effect of a JIT system. Repetitive manufacturing of finished products and standardization of components is desirable in that it evens out demand for parts which has a great effect on transporting or shipping quantities. Such linear production schedules greatly contribute both to the improvement of the supplier's delivery performance, as well as the performance of the contractor. Another requirement is for the contractor to minimize set-up times and reduce lead times in order to encourage suppliers to deliver materials frequently in small quantities. To take advantage of the frequent deliveries, it may be desirable for the supplier to adopt the same production system as the contractor (Malecki,

1988). JIT ultimately points to synchronized manufacturing - both within each plant (supplier and contractor) and between contractor and supplier (Nishiguchi, 1994). The supplier may have to start producing in smaller batches and to support this, the supplier may also reduce the internal set-up times.

The JIT manufacturing system which is a production and inventory control technique is specifically designed to cut waste (inventories) in production and to maximize material flows in order to smooth production.

Inventories is a term used for stock, work in progress and finished goods (Nishiguchi,1994). They are an inevitable part of the process of production and redistribution but represent capital tied up in unsold goods and require storage place, insurance and other incurred costs. However, the need for stock is minimized by matching deliveries more closely to production requirements. JIT entails both Kanban and TQC. Kanban is a communication tool in the JIT production and inventory control system developed by Taiichi Ohno at Toyota (Linge, 1991). A kanban, or signboard, is attached to specific parts in the production line signifying the delivery of a given quantity. When all parts have been used, the same sign is returned and the procedure is repeated. At Ricoh this system is called Ream Time Plate (Imai, 1989).

JIT and TQC attempt to control costly resource waste such as idle inventories, the storage of idle inventories, defective parts, subassemblies and final products. Work is only done when needed.

Often, the principal firm may use JIT in order to transfer stockholding to its suppliers, though this merely moves the storage cost rather than reducing it. This is referred to as JIT delivery or JIT stock control without the real procedures and TQC and is thus distinguished from JIT production or JIT management (Wood, 1990). There should be no such thing as

JIT warehousing since if there has been a '... transfer of the responsibility for stockholding to another point in the supply chain...' (Wood, 1990, p. 48), nothing has been accomplished: stocks, lead times, scrap and rework have not been reduced and thus no pressure has been exerted upon suppliers. In fact, the addition of another middleman is certain to increase costs, lead times and related costs.

The materialization of maximized material flows are achieved by using flexible machinery which is quickly adaptable to various products and allows for small lot sizes. Secondly, employees are expected to rotate job tasks, carry out in-process QC and resolve minor problems themselves rather that turning to the engineering staff. And lastly, contractors and suppliers should maintain close subcontracting relationships in order to achieve a fully integrated JIT production system (Malecki, 1988).

Both the supplier and the contractor should benefit in any contractual relationship. If the contractor-supplier relationship is indeed mutually beneficial this will only strengthen their relationship and considerably add to their chances of attaining JIT. On the one hand, there is the supplier who is committed to a JIT system, is involved in the design and production stage and is willing to offer financial assistance. On the other hand, the contractor should strive for a long-term relationship which support the supplier and improves the production line for successful and effective JIT implementation. Mutually beneficial relationships are established in a 'win-win' environment.

The new approach to the organization of production results in the fact that competition will be measured not only in terms of price but also in quality, delivery times and the choice offered by a range of products. Considerable efforts must be made to accelerate the materials flow and thus reduce stock levels and capital investment.

The JIT production system maximizes material flows (which is based on maximum production flexibility by tool change and machine adjustment and allows for manufacture of relatively small lots), TQC (which nowadays is carried out as production proceeds at the level of the supplier), and mutual trust between the partners. The concept, however, is still very much at a trial stage, not least because JIT poses several problems to the Western way of subcontracting. First of all, there is the complexity and the inefficiencies of border crossings within the European Union, which have been eased only since 1 January 1993 because of the disappearance of the internal borders. Secondly, there is the fragmentation of manufacturing which adds further complications to achieving an optimum scale with JIT.

The key issue is the extent to which JIT represents a break with conventional methods in the manufacturing industry. Often it ends up being interpreted in rather conventional terms whereby aspects of Fordism are perfected, albeit through developing such new practices as kanban. Some argue that Taylorism (scientific management) and Fordism (mass-assembly line) have come to an end and that the new era of flexible specialization has arrived however, these are extreme approaches to the issue of JIT.

Japanese competition has certainly forced Western manufacturers to converge to a JIT environment, but there have been additional factors that have been of significance. The increasing refinement of computing and software developments have greatly aided the increased sophistication of production planning and control. Secondly, the high interest rates and the currency fluctuations have also affected stockholding policies. And finally, measures to improve quality were dictated by the market.

It very much remains an open question as to whether JIT is a phenomenon of mass

production that is confined to certain sectors such as car manufacturing and the electronics industry. The trends are that such processes will be amenable to transfer to other areas.

3.12 Conclusions

The crisis of mass production has been associated with major changes in the world economic environment such as the end of the post-war boom following the 1970s oil crises, the restrictionist macro-economic policy at the end of that decade and in the early 1980s, and the apparent failure of Keynsian demand management. Other factors of importance have been the growth of competition from NICs to established industrial producers, the growing volatility and differentiation of consumer good markets, and accelerated technical change, especially in electronics technology. The upswing in subcontracting that has been experienced since the early 1980s has also been influenced by the recent official implementation of the Internal Market of the European Union on 1 January 1993.

Bearing in mind the discussion in the previous chapter, it is important to note that despite the differences there also exists a certain degree of complementarity between SMEs. As SMEs mainly provide intermediary products rather than final products, the relationships with their contractors are of the utmost importance. It is the complementarity with larger enterprises that is becoming increasingly important to SMEs. This is reflected in subcontracting relationships when SMEs, as suppliers, develop from jobbers to specialist suppliers to main-suppliers. In order to work out an effective subcontracting relationship or partnership, it is essential to understand each other's differences, strengths and weaknesses, and for the SME to decide on its (strategic) role within the subcontracting

relationship. The relationship between the SMEs and the large enterprises can range from structural networks and cooperative relationships to dependent relationships. By collaborating or merging with other enterprises, SMEs can improve their position in the market. There is a trend in the market for enterprises to cooperate with others so that they can gain a better grip on the market. This is especially important since suppliers, which tend to be smaller enterprises, have to respond to the ever higher requirements of their subcontractors with respect to quality, delivery time, price, choice and uniqueness. In addition, competition is likely to become even fiercer, interfirm linkages are changing, organizational structures are becoming more efficient and enterprises want to make use of comparative cost differentials which will result in a changing spatial behaviour. The position, organization and spatial behaviour of small and medium-sized suppliers is therefore also bound to change.

CHAPTER 4

THE EUROPEAN AND DUTCH REGIONAL POLICY CONTEXT

4.1 Introduction

A nation's policy can be defined as

> "a set of policy instruments which have been assembled for the purpose of achieving certain objectives" (Armstrong & Taylor, 1993, p. 213).

Regional policy is only a part of government's policy. Because of regional dynamics, regional policy needs to adapt to changing circumstances continuously. In other words, it is essential for regional policy to be context sensitive and it has to be reformulated on a regular basis. Regional policy can range from simply donating money to subsidizing infrastructure and industrial estates which stimulates business activity, to attracting enterprises through subsidies or a regional policy which lowers the costs of labour resulting in regions being more competitive. To put it simply, regional problems can be solved directly through the transfer of money or indirectly through subsidizing provisions which means that regional policy is as much an economic issue as it is a political matter (Lambooy, 1992).

With respect to the Netherlands and the European Union (EU), the economic situation has

changed in a number of ways in the past two decades.

For the Netherlands, the disparities between regions with respect to for example unemployment and GDP per head, are and will continue to converge (see Tables. 4.1 and 4.2) with the exception of the North. On the other hand, increased internationalization will influence economic developments as was already analyzed in § 3.3.2. This together with the official implementation of the Single European Market (SEM) and the developments in Eastern Europe since 1989 will provide new opportunities as well as pose some threats. The likely outcome of the disappearance of the internal borders of the European Union which is the result of the creation of the SEM is that border regions will become part of larger regions which will stretch across national borders. This process is accompanied by an increasing influence of the European Union with respect to regional policy which is likely to increase even more in the future.

The situation is very different for the regions in the European Union. While regional disparities decreased during the 1960s and early 1970s in what was then still called the European Communities, the process of convergence came to a halt during the 1970s. Rather, the process became one of divergence mainly as a result of the recession which followed the oil shocks of 1973 and 1979. Another reason for the relapse were the successive rounds of enlargement of the European Communities (the United Kingdom, the Republic of Ireland and Denmark in 1973; Greece in 1981; Spain and Portugal in 1986; the unification of East and West Germany in 1990; and lastly, Sweden, Finland and Austria in 1995) (CEC, 1991; CEC, 1992) as most of the new Member States were at the bottom of the European Union (EU) league table of per capita incomes at the time of accession.

To combat regional disparities, which is the main objective of EU regional policy, the

Member States of the European Union have for decades run their own regional economic policy. Regional policy in the United Kingdom for example dates back to 1928 and in most other major industrialized countries such as the Netherlands, regional policy dates back from shortly after WWII (Van Laer & Van de Ven, 1982).

By contrast, regional policy in the European Union was only established in 1975 with the introduction of the European Regional Development Fund (ERDF) whose primary goal was to reduce regional imbalances in the Community. The idea behind the EU's regional policy is that it should not so much be a policy that operates in its own right, but rather that it operates in conjunction with the national policies of the Member States. Regional policy of the European Union is designed to be complimentary by nature.

This chapter is divided into three main sections. The first section (§ 4.2) explores regional policy in the European Union, the way in which regional issues have been dealt with over the decades and the direction regional policy has taken since the ERDF was first implemented in 1975. The key questions include: the main arguments for a regional policy at the level of the European Union and the priorities have changed over time; which sectors and regions have benefited most out of regional policy; in what way has the SEM influenced regional policy; and is there room for improvement for regional policy at the level of the European Union. Finally, this section examines how SMEs are taken care of within the ERDF and whether there is a separate policy for subcontracting, which as discussed in the previous chapter is an issue of vital importance.

In the second part of the chapter (§ 4.3), regional policy in the Netherlands will be reviewed. The premises and objectives behind regional policy will be examined, as will be the way in which regional policy has changed over time since it was first implemented in

the late 1940s, and whether the goals of regional policy have been achieved or not. This section will discuss how SMEs are represented in regional policy and whether there is an explicit policy for subcontracting or is it merely part and parcel of the policy for SMEs. Finally, § 4.3 analyzes whether the policies at the different levels (European Union and the Netherlands) are as compatible as they should be, given the supposedly complimentary nature of the European Union's regional policy.

The third section of the chapter (§ 4.4), analyzes the regional policies of other major industrialized countries such as Germany, France, the United Kingdom, Japan and the United States. The position of SMEs and subcontracting within these regional policies will be analyzed as well as the way in which other major industrialized countries' policies differ from those of the Netherlands in order to find out whether there is room for improvement.

The last part of the chapter (§ 4.5) draws some conclusions from the various regional policies at different levels and from the various countries and embarks on some preliminary recommendations for future regional policy for both the Netherlands and the European Union.

4.2 The European Union and the Single European Market

The term 'Internal Market' was first introduced by the European Communities in its founding Treaty of Rome in March 1957. The aim of the Internal Market back then was to create a Single Market across the European Communities, with a free movement of goods, persons, services and capital. But even though the four fundamental freedoms were enshrined in the Treaty of Rome, they were never fully materialized. Although a customs union was established (see §4.2.1) there was no free movement of goods and persons; and administrative, physical and technical barriers continued to exist, even though customs

duties and taxes were reduced (CEC, 1991). This prevented the creation of a genuine single market and was believed to result in a loss of commercial dynamism and economic competitiveness. The continued maintenance of internal barriers perpetuated the costs and disadvantages of separate national markets such as border controls, administrative procedures, problems with respect to currencies, differences in VAT, insufficient coordination of scientific research and different national technical norms and standards (Van der Geest, 1985; De Clercq, 1988; Armstrong, 1989). National tariffs, standards and other protection policies were often merely used as a means of assisting domestic economies or key industries in a specific region against foreign competitors (Armstrong & Taylor, 1993), a phenomenon also referred to as internal 'balkanization' (Dicken, 1992).

For a genuine Single Market to be achieved, two conditions needed to be satisfied. First, the internal barriers or border controls had to be eliminated and additional measures implemented which are aimed at economic and social cohesion, scientific and technical cooperation and coordination of economic, monetary, environmental and industrial policy (De Clercq, 1988). Secondly, a common external policy was required that is in tune with the politics of the European Union.

The turbulent world of the 1980s and 1990s, where globalization was the keyword to success, made the issue of creating a true internal market only more poignant. In 1985 the EC resolved that it must after all seek to turning the customs union into a true common market. The 1985 White Paper on the Completion of the Internal Market gave new impetus to the process originally started in 1957. It talked about the completion of the integration of the European market and proposed no less than 284 regulations which set out the

framework for the SEM. The White Paper became the 'chart and compass' that would enable the European Union to reach its ultimate destination: the Single European Market (CEC, 1992). According to Jacques Delors the SEM will promote the convergence of the EU regions and the attainment of a higher level of welfare and he expected that all regions will benefit from the European economic growth, and regional disparities will be reduced because of falling transport costs, the greater locational flexibility of investment and government assistance.

The 284 articles of the White Paper are for the most part confined to the removal of internal barriers rather than the promotion of commonality in Member States' policies, where issues of national sovereignty prevail. The ratification of the Single European Act in July 1987 changed the institutional set-up of the Union by replacing the principle of unanimous voting with qualified majority voting in the EU's main decision-making body, the Council of Ministers, for most of the measures (according the principle of subsidiarity) aimed at completing the Internal Market (De Clercq, 1988). The Single European Act laid the legislative groundwork for the Single European Market, its aim being reflected in Article 130A of the Single European Act (1986):

> In order to promote its overall harmonious development, the Community shall develop and pursue its actions leading to the strengthening of its economic and social cohesion. In particular, the Community shall aim at reducing disparities between the various regions and the backwardness of the least favoured regions.

As such, a major obstacle for deepening the European Union was removed. In addition, the Single Act provided for the implementation of policies such as social policy, economic and monetary union, economic and social cohesion, science and technology, the environment and political cooperation in the sphere of foreign policy (Cockfield, 1989).

The year 1992 supposedly marked the turning point in the history of the European Union (EU). The EU first came into being on 1 November 1993 and represents the updated version of what was once called the European Communities. 1992 is the year that stands for the Single European Market (SEM) which is also sometimes referred to as the European Domestic Market (Pelkmans and Winters, 1988)) of the European Union. The objective of the EU is to remove all existing physical, technical and fiscal barriers to the movement of both individuals and enterprises within the EU. At the same time the EU marks the starting-point for the next stage of European integration: political union and economic and monetary union with the creation of the single currency.

The Cecchini report (1988) has analyzed the likely impact and the possible cost reductions that the implementation of the SEM will have. The report argued that the premise of the SEM is efficiency through increased competition (the strategic role of the larger single market in encouraging firms to exploit economies of scale) which will create a virtuous circle of growth and development for the Union and its Member States and, in the longer-term, is expected to move the European economy on to a higher sustainable growth rate (Dicken, 1992a; Armstrong & Taylor, 1993). The SEM was expected to increase GDP by 4.5 per cent; would create an extra 2 million jobs and reduce consumer prices by approximately 6 per cent (Leus, 1989; De Clercq, 1988). This was Cecchini's calculated aim but whether it is on course to be achieved is another matter. Furthermore, it was anticipated that the SEM would improve the competitive power of European businesses as through increased intracommunity trade in three respects (Armstrong & Taylor, 1993). First of all there would be lower cost prices and firms could purchase their means of production at lower prices while prices for distribution would also drop. This would be the result of the elimination of border controls, mutual recognition of certification procedures

and harmonization of product standards. Secondly firms would strive to improve their position through a higher level of utilization, reorganization, concentration and improved internal cost control (economies of scale). Thirdly and finally there would be a higher level of innovation, for example as a result of the rapid development of cross-border cooperation between firms with respect to R & D. Besides these supply-side effects, there are also demand-side effects. As a result of the opening up of markets, prices would decrease which would result in a 'consumer surplus'. Also, for consumers there would be reduced costs of distribution as a result of the liberalization of transport procedures; freer access for goods and services would encourage the growth of purchases; while purchasers of industrial inputs would be able to source their inputs more effectively which would result in cost reductions. Thirdly, the SEM was expected to yield an increase in income as a result of which consumption could well increase.

This time around, the programme is different in a few respects. First of all, the Internal Market programme is a complete and effective programme in that the Internal Market is defined as an area without internal frontiers in which the freedom of movement of goods, persons, services and capital is ensured. Secondly, the programme is set within a timescale in that the Single Act states that the Internal Market should be achieved progressively over a period expiring on 31 December 1992 (Commission of the European Communities, 1989). The Common Market is an evolutionary programme of measures with different elements coming into force at different times. It is an ongoing process and not a fixed-time event (De Clercq, 1988) and it therefore remains to be seen what form the Common Market will finally take. Finally, the European Union is based on a 'free and voluntary agreement and was not undertaken in time of war or under the duress of war' (Cockfield, 1989).

Nevertheless, one should be aware at all times of the fact that 1992 is a date which has symbolic value rather than having a functional purpose.

4.2.1 Regional trading blocs

The SEM with its characteristics of a large domestic European market and a common external tariff for non-members, transformed the European Communities into a regional trading bloc called the European Union.

The general principle of non-discrimination of the Gatt agreement goes against regional trading blocs. In essence trading blocs are discriminatory by nature as they are strongly defensive in character and by definition try to gain advantages of size by creating large markets for their producers and partly protect them from outside (Gibb & Michalak, 1994). However, one should bear in mind that regional trading blocs tend to offer only second-best options as they may increase economical and political contradictions and may also lead to a much desired trade creation but also to a less desirable trade diversion. A trading bloc can either create or divert trade (Begg, 1992).

Trade is created when a country starts to import the products it formerly produced itself (a switch from a domestic supplier to a cheaper partner-country supplier). Trade creation is an increase in the movement of goods between countries as a result of preferences that partners allow one another (such as a lowering of tariffs) within the same trading bloc. As a result of the change in the production structure and also because of an improved labour division, a new kind of import and export starts to emerge. These factors have resulted in an increase in the movement of goods between countries within the European Union and as

a result of that, the Netherlands might start buying certain goods instead of making those products itself.

Trade is diverted when a country starts to import products it formerly imported from elsewhere in the world (a switch from lower cost third country suppliers to more expensive partner-country suppliers). Trade diversion is a result of the lower tariffs within a trading bloc against the higher external tariffs. A Member State of the European Union for example which would formerly buy machines from a non-Member State will start buying these from a fellow Member State because of the lower import tariff. It is the diversion of trade in particular that makes countries which do not belong to a particular trading bloc very apprehensive towards it. However, buying from within a trading bloc remains a second-best option. If external tariffs would not be applied then of course Member Countries would simply buy their products from non-member manufacturers.

Various types of trading blocs can be distinguished such as sectoral cooperation, the preferential trade area, the free trade area, the customs union, the common market and the full economic and political union (Cockfield, 1990; Armstrong & Taylor, 1993; Gibb & Michalak, 1994). The first four take a functional approach in that they primarily seek to diminish tariffs and contingencies at a global or regional level, while adjusting and controlling authorities keep a low profile. Sectoral cooperation, the preferential tariff area and the free trade area retain their own independent trade policies with non-members while the customs union operates a common external policy for trade with non-members. The Internal Market is basically a customs union but with capital and labour moving freely within its trading bloc.

The economic union takes an institutional approach in that a true liberalization in the

economic sense is only feasible if tariffs and contingencies disappear completely, as well as the differences in legislation of competition; the economic and social policy of all countries involved converge; and supranational (central) authorities emerge to implement and control all this. There may also be a common currency. Economic union seeks to bring about full integration.

Sectoral cooperation, the preferential tariff area and the free trade area are the simplest of all trading blocs. Neither one in any sense constitutes a form of community membership, they do not erode national sovereignty and are compatible with complete and continuing independence in the political field (Cockfield, 1989). The first aims to reduce discrimination in certain well-defined sectors of the economy. In the second, Member States set lower tariffs on imports from one another than they do on imports from non-Member States. Partners in the free trade area will gradually reduce tariffs and contingencies for one another, however, they all retain their own external tariff policy towards third countries. The EU has never been a free trade area although the countries surrounding the EU have assembled in the European Free Trade Agreement (EFTA) in 1972/73 in order to strengthen their economic position (the countries that belong to the EFTA are Iceland, Norway, Sweden and Switzerland while the provisions of the EFTA Convention also apply to Liechtenstein which has a customs union with Switzerland) (EC, 1991).

The customs union and the common market as trading blocs do require community membership. The customs union is essentially a free trade area with a common external policy for non-members while the essence of the common market is the freedom of circulation -the freedom of movement of goods throughout the whole territory, the absence

of tariffs and contingencies and a common external tariff.

The European Community started off as a customs union with a common external tariff, a common external trade policy and with its powers vested in a supra-national body.

Finally, there is the economic and political union, which Lord Cockfield for the European Communities suggested should simply be called the European Union (Cockfield, 1990). An economic and political union requires community membership, further control and international organs with special authorities which make a further integration of national authorities possible.

There are two degrees of ambition in 'completing' the internal market of the EU as it stands now. One is to define what principles are aimed at and what policy measures are deemed necessary by the group of Member States to implement the set of principles. The two key documents in Community policy-making are the EC Treaty of Rome and the White Paper. When full ratification is completed one could add the Single European Act, particularly Article 8. The Rome Treaty and the White Paper could be viewed as formulations of the final aim: what is written in the Treaty and, much more specifically, what is set out in the White Paper, is then defined as the 'completed' Internal Market of the European Union.

A much higher degree of ambition is to compare the state of the European market integration, or even the concept of the 'common market' as implied in the Treaty of Rome or in the White Paper, with the ideal 'common market'. It can be shown that both fall short of realizing the concept of the 'ideal' common market. The omissions can be identified and traced back to the differences in deep-rooted economic, social, legal, and political traditions and preferences. Therefore it is unlikely that the 'ideal' common market would also be an optimum for the European society, unambiguously raising overall welfare and wellbeing

beyond those in any other alternative.

The Single Market, the economic union and the monetary union are complementary. Just as the completion of the SEM is a pre-condition for economic and monetary union, the single market can only be fully materialized when economic and monetary union is in place. Strictly speaking, a true European Union has not been attained as yet. There are different degrees of incompleteness of the Internal Market. Whereas serious incompleteness may be costly in economic, social and political terms, striving for the ideal common market of the European Union may well turn out to be a questionable goal in that it will give rise to a different set of costs. It very much remains an open question today whether the Single Market will ever be achieved because it does not appear to be equally desirable for all the Union members, especially the United Kingdom and Denmark (Gibb & Michalak, 1994).

Picking up an earlier theme, at this stage it is not clear what kind of regional trading bloc the European Union will turn out to be but it looks as if there are four potential groupings (Cockfield, 1990). There is an inner circle of EU members who might progress to a full economic and political union which include the Benelux-countries, Italy and Germany. The second group is a number of countries who would accept economic but not political union. Thirdly, there is a group who would accept the 1992 programme but no more (the United Kingdom and Denmark). Finally, there is an outer circle of countries comprising a free trade area (such as Iceland, Norway and Switzerland).

4.2.2 Key issues behind regional policy

The European Union is characterized by large economic disparities between countries and

regions, which greatly exceed for example those within the United States, both in unemployment and GDP per head (Armstong, 1993; Williams, 1992).

Equity and redistribution are therefore central elements of policy at the national level of the Member States of the European Union. The objective of the EU extends beyond a balanced distribution of gains and losses associated with integration to the reduction of existing disparities between regions as well as countries. It was only after the international, economic recession of the 1970s that the divergence increased within the European Union, caused mainly by successive rounds of enlargement and by the deepening of the process of integration that explicitly redistributive instruments became part of EU regional policy. Policy is, however, limited in the sense that it is complimentary by nature and it does not have the power to administer ERDF project applications locally (Armstrong, 1993).

There are four main arguments that support and strengthen an EU regional policy (Armstrong & Taylor, 1993; Armstrong, 1990; Williams, 1992). First, the EU aims to channel resources to the most severely depressed or disadvantaged regions of the EU so as to improve the overall efficiency of regional policy. However, there may be regions which, in effect, act as 'drains' on resources and which impair the efficiency of the whole. The Mezzogiorno is an old example, but there are other regions, too. Secondly, EC regional policy can act as a co-ordinating activity and thus prevent inefficiency. Thirdly, it is in every Member State's interest that other EU regions are prospering (which is what the EU regional policy is trying to achieve). Lastly, regional disparities, especially the existence of underdeveloped regions, may act as a strong barrier to further economic and monetary integration.

None of the arguments implies, however, that the regional policy of the EU should replace

that of the Member States which is part of the reason why the Committe for the Regions has been set up. Over-centralization should certainly be prevented, and there are three arguments to support this view (Armstrong & Taylor, 1993). There is the danger of a uniform approach to solving problems whereas regional problems actually differ very greatly. Local knowledge and experience of specific regions are an absolute must which makes the regional policy of Member States essential. Over-centralization is bound to stifle innovation in the development of policy instruments while decentralization allows for greater diversity. Lastly, decentralization encourages greater local participation and also makes policymakers more accountable.

4.2.3 Regional policy in the European Union

The existence and the long-term persistence of substantial inequalities within the European Union has always been looked upon as morally and socially unacceptable. The problem regions of the European Union, which include both agriculturally marginal and declining industrial areas, are characterized by higher than average levels of unemployment and lower levels of GDP per head of population. The majority of the agriculturally marginal regions are in the southern part of the European Union such as Greece, much of Spain, Portugal and the Mezzogiorno in southern Italy but can also be found further north in the Republic of Ireland, Northern Ireland and finally the French overseas départements and Corsica (CEC, 1991). The industrially declining regions are mainly to be found in the northern countries of the European Union such as the United Kingdom, France and Belgium (Armstrong, 1993).

Before 1975, an explicit regional policy did not exist in the European Union and could be

characterized as largely rudimentary even though some provision was made in Article 2 of the Treaty of Rome. There were a few EC institutions that provided some assistance to depressed regions because of the kind of industries they were involved in, namely the European Coal and Steel Community (ECSC); the European Agricultural Guidance and Guarantee Fund (EAGGF); and the European Investment Bank (EIB) also provided loans to depressed areas but this could hardly be described as a systematic regional economic policy with the consequence that declining regions had to rely on the regional policies of their own national governments. The problem with national policies, however, was that they were "subject to a number of fairly ineffective EC competition policy regulations designed to try to prevent member-state regional inducements being misused in ways which would undermine free trade and free competition" (Armstrong, 1993, p. 136).

This omission of a regional policy at the level of the EU stemmed from the misplaced faith in the power of market forces to eliminate regional inequalities and the belief that there was no real need for an EU regional policy because of the favourable national and international growth conditions up to the 1960s (Williams, 1992). As discussed earlier, it was the combination of a recession followed by the oil shocks of 1973 and 1979 and the successive rounds of enlargement of the European Communities which provided the stimuli to action. It was only with the introduction of the European Regional Development Fund (ERDF) that the European Union first established a separate, explicit and systematic regional economic policy which can today be divided into three main constituent parts. First and foremost there is the ERDF, which is the principal financial instrument of the EU regional policy. Then there are the EU Initiatives which are designed to improve the EU coordination of regional policy at all levels. These are respectively the competition policy, regional impact assessment, regional development plans, Union support frameworks, operational

programmes and Union Initiatives, periodic reports and regional policy priorities and guidelines. Finally, there are a number of other EU funds and institutions that operate with a deliberate regional bias, such as the EIB, the European Social Fund (ESF), the ECSC and the EAGGF). In actual fact the form of the ERDF is very different from the European Commission's initial and far more ambitious proposals.

The ERDF has undergone major reforms in 1979, 1984 and 1989 and were accompanied by a succession of other regional policy initiatives. The latest reform of the ERDF and the other Structural Funds (the European Agricultural Guidance and Guarantee Fund and the European Social Fund) in 1989 was prompted by the fear that the creation of the SEM would precipitate severe restructuring problems in the disadvantaged regions of the EU. The reforms were designed to enable the Structural Funds to tackle regional problems in a co-ordinated way. Five key objectives were established of which three are explicitly regional: encouraging development in lagging regions, the conversion of regions in industrial decline and the promotion of the development of rural regions; and the ERDF was both expanded and altered. In addition, a series of key decisions were taken in order to make the new policy operational. A new map was produced with areas that were eligible for Structural Funds assistance; financial aid was henceforth concentrated in the most disadvantaged regions; the budget of the Structural Funds doubled between 1988 and 1993; a strong emphasis was placed on programme assistance which involved partnership between the EU, the Member States and the regional and local authorities (Committee for Regions); the EU attempted to prevent Member States from cutting back on their own regional policy spending once they received support from the EU; ERDF industrial assistance was increased; and finally, the system of co-ordination was improved.

The reforms to the ERDF have strengthened the role of the EU in the sense that although it was once just a financing body, the ERDF has now evolved into a development agency (CEC, 1991). The majority of decisions are taken on the basis of a genuine partnership between the EU, the Member States, and increasingly the regional and local authorities.

4.2.4 The impact of the Single European Market on the regions

The key question for the regions of the EU is whether the SEM will exacerbate the problems that they already experience or whether it will improve their relatively disadvantageous position. As mentioned earlier, it is not clear yet what form the Single European Market will finally take. It should be pointed out right from the start that only assumptions can be made about the general impact the SEM will have on regions (it is an ongoing process). It is very likely that the advantages accruing to the EU economy through the completion of the SEM will not be distributed equally among its regions. Moreover, the specific impact of the SEM on different industrial sectors will vary as this is very much dependent on the intrinsic structural and technological characteristics of different sectors as well as on their history and organizational and spatial configurations (Dicken, 1992a).

Broadly speaking, two points of views are held on the possible impact of the SEM on the regions of the EU. There are those who say that it is likely that in the short term the SEM will increase the prosperity of the already advantaged areas at the expense of the poorer regions, which is referred to as short-term economic dislocation. Under the competitive pressure of the integrated EU market, companies will rationalize by scaling up their performance and exploiting larger economies of scale. It is likely that there will be fewer and larger companies which will become more specialized as they concentrate on serving

the larger SEM instead of their more restricted national market. This makes the issue of subcontracting and the resurgence of SMEs even more important as was discussed in Chapter 3. These larger, more efficient firms are likely to capture the markets which were previously protected for home-based firms. Sometimes these larger, more efficient and more specialized firms are even referred to as 'predators' while the others are referred to as 'prey'. This is only considered to be a short-term feature. This point of view greatly corresponds with Myrdal's theory of cumulative causation which explains the growth of a region in terms of spread and backwash effects: as a result of the existence of increasing returns to scale a disequilibrating process will take place between rich and poorer regions. In the longer term, according to the neo-classical theory, economic spread or 'trickle-down' will take place from the core areas providing a stimulus for growth in the depressed regions. As the costs of production rise in the core regions a redistribution of investment will take place in favour of the lagging regions. As the competitive advantage of the poorer regions increases, their ability to attract business investment will improve. According to this view if left to the free market and competition, regional inequalities will eventually be eliminated. It was Hirschman who also referred to the trickling down and polarization effects in his model of interregional income inequality. In this model Hirschman implied that 'if an imbalance between regions resulting from the dominance of polarization effects develops during earlier stages of growth, counter-balancing forces will in time come into operation to restore the situation to an equilibrium position' (Keeble, in: Chorley & Haggett, 1972).

On the other hand, there are those who argue that because of the competitive disadvantage of problem regions, their location, infrastructure, labour costs and entrepreneurial base, these regions are expected to lose economic activity in business activities exposed to

increased competition following the completion of the Internal Market.

It remains to be seen what the SEM will bring -it was meant to create a climate favourable to growth which implies that the SEM could make a major contribution to stimulating the economies of the EU, both the core and the lagging regions. Economic growth is an essential prerequisite to economic convergence and in conjunction with the considerable increase in the Structural Funds (the 1987 budget was doubled by 1993) should make it possible for the lagging regions to catch up with the more prosperous regions in the EU. How the SEM will affect regions all comes down to questions such as whether the region has a high concentration of sectors which are likely to be affected; the ownership and financial structure of firms; the balance between SMEs and large transnational enterprises; the economic functions a region is specialized in; the degree of protection a region obtained from the disappearance of internal borders; and finally, the scale and character of policy assistance from the EU and its national government.

4.2.5 The European Union and SMEs

The aim of any company or business, particularly small and medium-sized enterprises, is to become more competitive and to link up with other firms in order to increase market share, expand the distribution network, share innovation, cut costs and improve the brand name. The European Commission acknowledges the important role played by SMEs and encourages them to cooperate with one another and for this purpose has established what is commonly known as the MINIMUS rule, which is particularly favourable of SMEs in that it largely excludes them from the application of the competition rules. In addition, the European Commission has developed a number of instruments to encourage cooperation

between firms which all resort under the Task Force SME which is now the DG XXIII at the European Commission:

- the Business Cooperation Centre and the Business Cooperation Network which is a computerized network of businesses (BC-NET), advisors covering the entire Union and allowing potential partners to be matched up for the purposes of transnational cooperation;
- Europartenariat (which means Euro-comakership), designed to stimulate cooperation between SMEs in less developed regions or regions of industrial decline and enterprises in other regions of the European Union;
- Measures to encourage transnational subcontracting;
- The European Economic Interest Grouping (EEIG) which provides a legal basis for cooperation projects involving firms in different Member States;
- Community programmes such as ESPRIT, BRITE and Comett.
- There are also the European Action Programmes for SMEs for which the European Commission has discussions on a regular basis with a committee of representatives of the Member States of the European Union.

The EU aims to extend both the advice centre and the BC-NET to former East Germany. The European Commission will make 20.000 Ecu available to EU-advice centres for services rendered to the European Union. In the Netherlands the 8 advice centres cooperate and try to improve the quality and efficiency of their services to Dutch SMEs; and at the European level, an initiative is being taken to improve cooperation between SME-research institutes in Member States. However, this should not result in a new European research centre. The European network will produce the publication 'State of Small Business in Europe'.

The Action Programme mainly stresses vocational training and management services. The budget of the Action Programme up to the end of 1993 was 110 MEcu and an extra 25 MEcu was added. Therefore, the European measures which affect SMEs include fiscal measures, business law, competition, government projects, laws with respect to location and social policy.

4.2.6 EU regional policy and subcontracting

The European Commission has developed several initiatives since 1976 which try to promote transnational subcontracting. The aim of the Commission is to foster the development of harmonious subcontracting relationships and to give a European cross-border dimension to subcontracting by creating a legal and financial environment favourable to the development of subcontracting, improving the flow of information and communication between main contractors and suppliers and promoting European suppliers to non-EC investors. The Commission action comprises three parts.

- Creating a favourable environment for subcontracting: the Commission is taking steps toward ensuring a favourable environment for SME subcontracting by establishing community rules on competition as well as on standards and certifications. Also, by eliminating physical, legal and regulatory obstacles, the completion of the single market will create favourable conditions for subcontracting in general and for cross-border subcontracting specifically.
- Better information and communication: the Commission has taken a series of measures aimed at improving information and communication between contractors and suppliers at the Community level. Because the products of subcontracting often are not standard products, they are not listed in conventional nomenclatures. The

creation of multilingual sector glossaries facilitate contacts between contractors and suppliers in different countries as well as the setting-up of data banks and subcontracting exchanges, especially across borders, through compatible electronic data transmission systems. Such nomenclatures already exist for the metal sector, plastics and rubber, textiles, ceramics and general services for enterprises. The nomenclatures for electronics, electrical engineering, industrial services and wood are in preparation. In addition it provides tools to assist in the search for partners. The systems available to the BCC in the search for partners, for example advertising in the BC-NET system, are a useful means of improving communications both between the contractors and suppliers and of facilitating the search for partners in other Member States. There is also the electronic data transmission which is spreading rapidly in EU trade and represents a particular challenge for SMEs. The programme aims to encourage the development of electronic data transmission systems. Lastly, it promotes subcontracting and partnership relations. The Commission has developed a series of actions aimed at reinforcing skills in subcontracting and promoting partnership relations between contractors and suppliers. The European Commission seeks to educate businesses on the partnership approach, enhance the status of suppliers (by providing a practical guide to the legal aspects of subcontracting, improving access to public procurement, promoting cross-border cooperation between suppliers) and promote European subcontracting to foreign investors.

But as discussed earlier, it is not only EU policy that matters, but national policy as well with which it fulfils a complimentary function. The next section will, therefore, analyze the aims, objectives and evolution of Dutch regional policy and its policies with respect to

SMEs and subcontracting.

4.3 Regional policy in the Netherlands

4.3.1 The aims of regional policy

Dutch regional policy is based on the Neoclassical paradigm of equilibrium which seeks to achieve the equal distribution of prosperity and economic conditions and which stresses the fact that there are differences in the production environment and the production structure of regions. At the same time all regions are expected to operate in a certain, nationally determined socio-economic context but firms and regions can only influence this to a limited extent because factors such as monetary policy and labour and capital costs are all determined at the national level.

4.3.2 The objectives of regional policy

The objective of regional policy is to diminish the influence of the above-mentioned conditions and has a dual goal. Regional policy seeks to achieve a geographically equal development of economic activities (equality goal) as well as a maximum contribution of the regions to national development in general (efficiency goal) where ideally, each goal is an extension of the other and vice versa.

4.3.3 The evolution of Dutch regional policy

From the above one may conclude that regional policy is simply about finding solutions to regional problems. In the past, regional policy would implement all sorts of measures that were created on the basis of generalizations (Lambooy, 1992).

As discussed in Chapter 1, regional policy was first implemented in the Netherlands shortly after WWII at which time the economy of the Netherlands was focussed on agriculture, trade and transport. The regional policy of the 1950s up to the 1960s was dominated by a national recovery plan which sought to improve the sectoral structure in general by cultivating a strong manufacturing sector whilst at the same time paying attention to regional problems. The lagging regions with high unemployment rates and dominated by agriculture were pre-dominantly in the north such as Groningen, Friesland and Drente and were also characterized by low incomes, bad housing conditions, a relatively low level of education and high levels of emigration.

Until 1966, the objectives of Dutch regional policy changed towards achieving the industrialization for the whole of the Netherlands; to encourage lagging regions to try to attract manufacturing industry from elsewhere via capital subsidies; and finally, it focussed on attracting workers from the rural areas to the industrialized West. Regional policy up to the 1970s was in fact an industrial policy which tried to achieve its goals via the so-called Industrialization Programmes. The instruments of Dutch regional policy were made up of subsidies and premiums which could merely influence economic conditions indirectly rather than directly. After 1970, when structural change set in, it became increasingly clear that regional problems were not solved so easily: it became apparent that regional policy could no longer be a matter of coming up with general solutions for regions with similar problems but rather of coming up with solutions which were targeted at specific regions.

Traffic congestion and environmental pollution in the West, the Randstad, have increasingly becoming a problem since the 1960s but the national economic growth in the 1960s made it possible for other issues to gradually receive more attention in regional

policy. There was also more appreciation for the fact that there were unemployed people who preferred to stay in the lagging regions rather than move to the West. Another important issue in the 1960s was that the coalmines in the south of the Netherlands (Limburg) were closed down and a more explicit policy concerning the restructuring of regions in the south of the Netherlands (SIOL: Stimuleringsregeling voor Industriële Omschakeling in Limburg (1965)) came into force. All this means that regional policy during the 1960s developed into more than just an industrial policy and in fact became a separate policy.

From 1969, there was a change in regional policy which was characterized by a change in its sectoral thinking where the service sector was increasingly acknowledged to play an important role in generating employment and economical growth. This was reflected in service industries becoming eligible for subsidies and the Industrialization Notes being abolished but the regional policy of the 1960s continued in the 1970s despite growth in the Dutch economy coming to a halt and a dramatic absolute decline in manufacturing employment. The goals of regional policy until the mid 1970s remained targetted at the regions that were lagging behind whilst also supporting the movement of activities from the Randstad and strongly discouraging development there. The regional policy of the 1970s distinguished three types of regions:

- The West or Randstad, with its anti-congestion policy (selective investment);
- The Intermediary zone, without any stimulation or slow down measure;
- The North, the East and most parts in the South with stimulation programmes and the relocation of certain public services such as the Bureau of Statistics (CBS) and the P.T.T.

This meant essentially that from that point on, the instruments of regional policy were able

to exercise a direct influence on the economic environment.

Despite the increase in unemployment the Dutch government continued in 1977 its regional policy from the previous period and failed to acknowledge the fact that the world was facing recession. The problems experienced by the cities in the West (the Randstad which takes in North-Holland, South-Holland and Utrecht), were recognized but it was hoped that they were of a temporary nature. Regional policy was further intensified in the latter part of the 1970s, for example via the WIR (a special measure aimed at investment) and the integral development plans for the North (such as Groningen and Friesland) and the South (Limburg). These programmes ('Nota's') were new in the sense that they sprang from a bottom-up approach, they set themselves a goal and were characterized by more guidelines than the programmes at the national level.

Until the 1980s the Netherlands mainly stressed the equity dimension of regional policy but since then the focus has switched to national growth once again:

> "..... goals for regional socio-economic policies shifted from a distributive equity approach linked to principles of the welfare state, to an efficiency or factor-allocation-oriented approach, expressed in the concept of the self-organizing capacity of regions" (De Smidt and Wever, 1989, p.85).

The additional component of efficiency sought to increase the contribution of all regions to national development. The government became increasingly conscious of the problems of the big cities and introduced the Conditional Policy which allowed the Randstad for the first time to be included in regional policy and in 1983 abolished the Measure for Selective Investment (SIR) which was in accordance with the efficiency goal of regional policy.

In the period 1986-1990, regional policy started concentrating on the Randstad as the motor

of economic growth again. The role of new firms and technological development was acknowledged and it was assumed that all regions could contribute to national prosperity in their own way. There was a gradual change in government policy from a top-down approach to a bottom-up approach which appreciated the fact that economic developments start at the lowest level and that each region should be granted the opportunity to cultivate their own characteristics. The central approach to regional policy was therefore substituted by a far more decentralized one and the decision-making process moved closer to where the actions were taken (local and regional authorities). The government's approach has become one which stresses the specific characteristics of the regional production environment and structure. Therefore, the government through its regional policy will only be able to stimulate and is up to the region itself to pursue a development policy. It is expected that each province will cooperate with the Chambers of Commerce, employers' and employees' organizations and other regional organizations.

With regard to the outcome of regional policy, it is difficult to quantify its influence on the economic development of lagging regions since there are other factors, such as technological developments and the world market, that have contributed to regional development. Possible influences are the globalization of markets and the increased purchasing power of lagging regions as a result of a more generous social security system. As for the matter of spatial dispersion, technological developments tend to make enterprises rather footloose and render other production factors such as knowledge, labour and land more important.

Despite the fact that it is difficult to quantify the influence of regional policy on regional economic development, regional policy since WWII has contributed considerably to the

improvement of the production environment of all Dutch regions and disparities between regions for key indicators such as investments, employment and unemployment have decreased. Instead of the former regional policy which subsidized many kinds of projects and which was broadly oriented and integral in its approach, there is now a more targeted policy which has direct links with the market sector. It becomes clear that over time, the changed perception of what makes a good regional policy is reflected in Dutch regional policy. More general trends such as deregulation, privatization, decentralization and the decrease of subsidies for individual enterprises are the issues that have affected regional policy over time. The government has a less regulating role as it has considerably distanced itself from interfering and acknowledged the increased importance of the market sector, therefore, the policy of deconcentration of the 1970s is no more.

4.3.4 Dutch policy and SMEs

The Ministry of Economic Affairs' policy that is aimed at SMEs provides assistance in the following fields:

- information and advice: Various measures designed to stimulate SMEs that contribute to the generation of self-employment and improvement in the quality of business management.

  A national network for business information and advice and product development for SMEs was created in 1989 comprising the Coordinating Institute for SMEs (CIMK) and the 23 Regional Institutes (RIMK) present themselves as the (12) Institutes for SMEs (IMK). From 1992 the Ministry of Economic Affairs began to provide subsidies to these Institutes for SMEs which covers 6 to 7 per cent of all SMEs (approximately 20,000 enterprises). The

contribution of the Ministry of Economic Affairs to the Institutes of SMEs so far is Dfl. 25.4 million which is half the budget of the Institutes of SMEs;

- research and training: This is provided by a range of organizations. First, there is the Economic Institute for SMEs (EIM) whose budget is Dfl. 9.1 million and which carries out research and analyzes the development of SMEs in specific sectors (Ministerie van Economische Zakens, 1991). Then there is the policy supporting R & D which finances research which provides information that is a demand (as far as SME policy is concerned) mainly with respect to technology, environmental issues, and international cooperation. Thirdly, the Ministry of Economic Affairs administers courses for starters in business. The subsidy amounts to Dfl. 0.6 million of which Dfl. 0.3 million is for ethnic minorities and self-employed women (Ministerie van Economische Zaken, 1991). The Ministry also provides education for employers such as those who are already in business or who want to get started in the business. The budget provided by the Ministry of Economic Affairs is Dfl. 12 million and that granted by the Ministry of Education is Dfl. 5 million (Ministerie van Economische Zaken, 1991). The joint subsidy for the eduction for employers totals Dfl. 21.8 million and there is a sum available for other projects of Dfl. 4.8 million. There is also training for employees which is subsidized by the Central Organization for the Provision of Employment and finally, there are credit facilities for SMEs (1976-1985) and guarantees for SME-credits (the budget provided is Dfl. 600 million) (RBMKB, 1988) which attempt to remove the barriers to SMEs and provide them with access to a capital guarantee fund.
- concessions for the self-employed who are on a low income and for health insurance.

In addition, there is the programme SME with a of budget Dfl. 6 million per year which

helps TNO (a scientific organization) to transfer knowledge acquired in the TNO institute to SMEs. There are also 19 Innovation Centres (ICs), which were openend between December 1988 and Novemebr 1989, that operate in a national network and which are important in the transference and application of technological knowledge to SMEs.
The business termination assistance which was previously available ceased to exist in 1987 (Ministerie van Economische Zaken, 1991).

4.3.5 Dutch policy and subcontracting

In the early 1980s contractors started concentrating on their core business which made subcontracting a more widespread phenomenon. Subcontracting is not a new phenomenon but this time around it manifests itself in a different way (see § 3.3.1): the contractor has reduced the number of suppliers (mainsuppliers) it deals with directly; while at the same time the subcontracting relationship between a contractor and a supplier tends to be more intensive; while the products involved are more complex and requirements with respect to quality, specialization and flexibility have increased. The recent official implementation of the Single European Market may further strengthen the trend in subcontracting as protectionism will disappear, increased specialization will lead to increased competition between European suppliers and as a result there will be a regrouping of the subcontracting pyramid (see Chapter 3).

An important impediment to subcontracting relationships, however, is the lack of market transparancy with regard to opportunities, requirements and threats (Ministry of Economic Affairs, 1988). Suppliers tend not to be very well informed about the requirements of the contractors, while the other way around, the contractor is often not aware of what suppliers

have on offer. This situation arises mainly due to a lack of contact and communication between both parties while the number of tiers in the subcontracting pyramid tends to further blur the picture. It not just just the suppliers and contractors, but also branch organizations and government organizations also lack in important insight in markets. This despite the fact of increasing international competition and the resulting shortening of the product life cycle which have increased the costs for R&D considerably and make co-operation between enterprises more desirable. The Dutch Ministry of Economic Affairs has stepped in by formulating a Subcontracting Programme ('Programma T & U') whose objective it is to strengthen the position of suppliers and also enlarge the number of qualified suppliers. Developing a network of qualified suppliers is the starting point towards becoming part of a European and a wider international industrial network. The Subcontracting Programme is proactive in character. Firstly, it provides information in order to increase awareness and thus hopes to bring about a change in behaviour in industry with respect to the trends in subcontracting; it is an important instrument in motivating suppliers to participate in its model projects or to start up their own activities; and information is also an instrument of the Subcontracting Programme in general. Secondly, it also implements model projects in 8 product/market combinations (PMCs) in the field of logisitics, quality, project management, production innovation and so on. The choice for these is clearly driven by the PMCs' economic importance and the chances and threats of suppliers but in general reflect the composition of the Dutch industrial sectors. It is important that each PMC is supported by enterprises and organizations within the product/market combination (Ministry of Economic Affairs, 1989). Thirdly, the Subcontracting Programme aims to improve the relationship between the contractor and the supplier and all in all, should result in the improvement and broadening of the industrial

base of the Netherlands (Ministry of Economic Affairs, 1990). As discussed in Chapter 3, increased subcontracting has rendered SMEs more important within subcontracting relationships while at the same time contractors also want small and medium-sized surprises to increase their involvement. And if suppliers are able to move upwards in the subcontracting pyramid, contractors will benefit and the industrial base will be improved and broadened.

The Ministry of Economic Affairs first introduced its Subcontracting Programme in 1988. Initially it set out to improve the position of the first and second tier suppliers (performance improvement) and to encourage and improve cooperation between suppliers in a designated number of PMCs. The performance improvement projects that were carried out were mainly concentrated on quality, delivery reliability and the shortening lead times. Beside that, it also dealt with the consultation of external experts and feasibility studies. The cooperative projects stressed technological and R & D co-operation. Up to 1991 about 475 enterprises were involved in these performance improvement projects of the Subcontracting Programme; and almost 900 enteprises participated in the information meetings (Ministry of Economic Affairs, 1992). Other organizations that hold information and discussion meetings on subcontracting include intermediary organizations such as the branch organizations for technology, Innovation Centres, Chambers of Commerce, the Nevat (the Dutch organization for subcontracting) and so on. These types of meetings may be sponsored through the regional policy of the Ministry of Economic Affairs.

The performance improvement projects were abolished in 1993 and since then the Subcontracting Programme has fully concentrated on R&D co-operation for both products and technology. It covers co-operation not only between contractors and suppliers but also

between suppliers and it aims to stimulate networks, taking in the whole production chain from contractor to mainsupplier to specialist supplier and jobber. The idea behind this is that through intensive cooperation, suppliers can become more innovative and thus improve their market position. By cooperating firms will be able to reduce risks and development costs and it will also pace up the time to the market for products. Lastly, since 1994 the Subcontracting Programme also encourages the involvement of third parties such as research organisations (such as TNO) and universities.

Since 1992 the budget of the Subcontracting Programme comprise Dfl. 3.86 million and covers 70 projects of which 53 improvement projects and 17 projects for R&D cooperation in which 150 firms are involved (see Table 4.1). About 70% of these are SMEs (T & U NU, 2/95). The Subcontracting Programme has mainly stressed technological cooperation and provides suppliers with the opportunity to acquire R&D experience at the national level which will enable them to strengthen their industrial networks. This may be the first step for suppliers on the road to a position as European mainsupplier.

Table 4.1 Budget for the Subcontracting Programme (T & U)(in Dfl million)

1988	1989	1990	1991	1992•	1993••	1994••
2.75	6.45	10.8	10.0	3.86	5.4	7.5

• The Subcontracting Programme for 1992 comprises 70 projects of which 53 are improvement projects and 17 are projects for R&D cooperation.
•• The Subcontracting Programme for 1993 and 1994 only involves R & D cooperation projects.

Source: T & U NU, 1/94; Ministry of Economic Affairs, 1989, 1990, 1991, 1992, 1993.

As Table 4.1 shows, the budget for the Subcontracting Programme is set at Dfl. 7.5 million for 1994 (T&U NU, 1/94, p. 4). The existing projects in the 8 PMCs that were eligible for

subsidies in 1993, namely the automobile industry, energy/offshore industry, machinery for the process industry, telecommunication and office equipment, defense industry, audiovisual industry, IC-industry, and aircraft industry were extended to the machinery industry and the existing IC-industry now also includes the electronics industry (see Table 4.2). The Subcontracting Programme aims to spread the projects that it subsidizes over the appointed PMCs since the subsidized programmes are meant to be model projects for other suppliers.

The way in which the Subcontracting Programme works in practise is as follows. The Dutch Ministry of Economic Affairs will initially contribute considerable financial sums to appointed projects in order to get both parties interested, that is the contractors and/or the suppliers. All participants will financially contribute to the project right from the start and in the later stages the Dutch Ministry of Economic Affairs' contribution will gradually decrease while the firms involved are expected to take up the shock. Investments are not financed by the Ministry of Economic Affairs - this comes down to the participating firms.

Every year the Ministry of Economic Affairs decrees certain PMCs that are eligible for subsidies under the Subcontracting Programme (see Table 4.2).
The international dimension of subcontracting should not be overlooked as this aspect has become even more poignant since the official implementation of the Single European Market. The Subcontracting Programme of the Dutch Ministry of Economic Affairs (which since 1 January 1992 has been managed by Senter (previously StiPT)), however, is nationally oriented and is only applicable to enterprises based in the Netherlands (Ministry of Economic Affairs, 1992). In order to stimulate cross-border subcontracting a European

Table 4.2 The PMCs in the Subcontracting Programme in 1992

1. Automobile industry
2. Energy/offshore
3. Machinery for the process industry
4. Telecommunication and office equipment industry
5. Defence industry
6. Audiovisual industry
7. Machine industry (1993)
8. IC and electronics industry (1993)
9. Aircraft industry

Source: Ministry of Economic Affairs, 1992.

approach is essential. This idea has been further encouraged by the establishment of Japanese enterprises whose move to the European Union tends to be accompanied by their own Japanese suppliers. The European Commission has developed initiatives to strengthen the subcontracting structure through information and pilot projects, amongst others in consumer electronics. In addition, there is a technology programme called CRAFT which is specifically aimed at SMEs and offers suppliers the chance for international co-operation. The opportunities for international subcontracting need to be further explored, especially since the technological requirements for subcontracting are changing all the time (see Chapter 9).

It is important to note that the Subcontracting Programme correlates with the Ministry of Economic Affairs' other policies (Ministry of Economic Affairs, 1989). First, it can be associated with the policy for SMEs, as the majority of suppliers belongs to the group of SMEs. Secondly, there is a link with IT-policy such as VEDI, which are examplary projects for Electronic Data Interchange, and which contribute considerably to the optimalization of the relationship between contractor and supplier. Then there is the CBIN-

policy which springs from an acknowledgement that a good subcontracting infrastructure is important for foreign investors since it may even be the decisive element in the location decision. Fourthly, there is education policy: quite often suppliers face the problem of finding people with adequate training, mainly vocational training combined with some practical experience. Education now receives some extra attention because of this type of labour shortage. Finally, there is the policy for quality and logistics which aims to stimulate both aspects.

4.4 Subcontracting policies in other major industrialized countries

Of all major industrialized countries in the world, Japan and France are the countries that are most advanced in appreciating the trends in subcontracting -this is reflected in their policies for SMEs and suppliers and the fact that there is even a Subcontract Enterprise Division in the Japanese Ministry of International Trade and Industry (MITI).

Japan clearly acknowledges the inequality (as discussed in Chapter 3) in subcontracting relationships which has motivated the government to support SMEs and suppliers (Miyashita & Russell, 1994). Its policy for these two categories is elaborate and mainly stresses technical support and cooperation. Japan's SME policy includes such aspects as information provision for SMEs; research into SMEs; supply of statistical data; and technical support of SMEs at the regional level. This policy is also applicable to suppliers. The subcontracting policy arises from a law passed in 1956 which protects suppliers from the power of contractors, such as unfair prices, late payments and even entitles the MITI to look into the actual contracts. Secondly, there is a law dating from 1970 which supports suppliers in SMEs. The main components of this law are firstly, a guide-line which regulates the contact between suppliers and contractors and provides guidance and advice

with respect to certain aspects ranging from quality, productivity and product innovation of suppliers to improving the contractors' order procedures, promoting cooperative activities between suppliers and improving transaction conditions. Secondly, there are the sectoral stimulation plans where at the national level certain sectors are appointed, for example the automobile industry, within which contractors and suppliers organizations have to draw up plans which will stimulate the performance of suppliers. These plans can be supported by low interest loans and tax reliefs. Thirdly, every one of the 47 provinces in Japan has its own Suppliers Stimulation Organization which is there specifically to facilitate the interaction between contractors and suppliers. In addition, there are loans and tax reliefs for suppliers and there are also special organizations such as Quality Circles (QCs) which aim to improve contacts between contractors and suppliers.

In France subcontracting is actively represented by the 'Centre National de la Sous-traitance'. State enterprises succesfully function as the main pioneers and models in the field with respect to the development of fair subcontracting relationships and policy is mainly geared towards specialized co-makership (Partenariat) and targets the SMEs in particular. French policy thus explicitly acknowledges the fact that SMEs need extra support. Since 1982, there has also been the 'Commission Technique de la Sous-traitance' (under the Ministry of Industry) in which public organizations and branch organizations cooperate on matters such as quality assurance, logistics, production innovation and the changing relationships between enterprises (Ministry of Economic Affairs, 1988). The Commission is generally looked upon as some sort of practical think-tank. France emphasizes and supports subcontracting relationships, especially co-makership, between suppliers and contractors. With networks such as Creati large contractors give technical support to suppliers and SMEs.

Another country which acknowledges the trend in subcontracting is Germany. Subcontracting manifests itself most clearly in the automobile industry but there are indications of increasing activity in other sectors. German policy mainly concentrates on the smaller enterprises -the 'Handwerk' which comprise all enterprises with up to 30 employees. Enterprises with over 30 employees are assumed to be able to cope without any government support. The policy for SMEs entails an elaborate network for advise and support by the Chambers of Commerce where government subsidies are given to advisers, rather than to enterprises directly. Secondly, the 'Zentralverband Deutsche Handwerk' (ZDH) comprises 43 'Handelskammer' which implement programmes designed to stimulate innovations, educational courses and information about normalization. They also provide suppliers with checklists for contracts whilst leaving the actual drawing up of contracts to the parties involved. Finally, the German 'Länder' carry out technology stimulation programmes for SMEs which can also be used by suppliers. The German subcontracting policy provides suppliers with subsidies for developing databases and for fairs, however, there is no specific organization for suppliers.

In Spain the subcontracting policy is based on the cooperation between the government, the Chambers of Commerce and industry. It concentrates on mediating between contractors and suppliers; the organization of fairs and trading trips; seminars and trainings; and recruiting large Spanish enterprises to promote Spanish small and medium-sized suppliers abroad. Austria also has its own separate subcontracting policy.

Other countries like the United Kingdom, Belgium, the United States and Sweden have not progressed very far in creating a subcontracting policy and at best suppliers may be able to resort under the SME policy. In the United Kingdom, because of the lack of interest from government in subcontracting and because of the absence of branch organizations no trend

in subcontracting is evident, although suppliers can benefit from the 'Quality Campaign'. In Belgium, the government in cooperation with branch organizations created a programme which aims to stimulate product and process technology (IGPP) which can be of value to suppliers. The Flemish part of Belgium tries to help subcontracting through its five provincial Development Companies (GOM) which amongst others, organize the collective participation of Belgian industries in fairs. The United States mainly concentrates on the strengthening of subcontracting networks and to improve the innovation potential of medium-sized enterprises.

4.5 Conclusions

From the above it can be concluded that both the EU and the individual Member States have their own distinctive role to play when it comes to regional policy. The role of the EU is to ensure that resources are directed to the most disadvantaged regions and it also has a co-ordinating role with respect to the regional policies of the Member States. The individual Member States on the other hand, have a major role in the financing and implementation of their own regional policy. Alltogether, the diversity of regional policy at the various levels should be perceived as a strength (Armstrong & Taylor, 1993). The implementation of the Internal Market of the European Union stresses the international dimension of subcontracting. Dutch policies are nationally oriented and are only applicable to firms based in the Netherlands. Therefore, a European policy approach is needed to stimulate cross-border subcontracting.

The Netherlands compares quite well with other major industrialized countries with regard to its policies for SMEs and subcontracting. Because of the differences in subcontracting practices in Japan and the Netherlands it is not feasible to move as far ahead as Japan but it

is worth learning from the Japanese experiences.

What remains very important for SMEs and suppliers is the proximity of organizations that provide them with information and subsidies. This is the reason why the regional Quality Circles are a success.

The next chapter will discuss the methodology implemented for and the areas of enquiry of the emprirical research.

PART 2

METHODOLOGY AND EMPIRICAL EVIDENCE

CHAPTER 5

METHODOLOGY AND AREAS OF INQUIRY

5.1 Introduction

Having introduced subcontracting relationships, their actors (suppliers and contractors) and their policy environment, it is time now to shed light on various components of subcontracting relationships in certain business groups of Dutch manufacturing. To achieve this goal and obtain a balanced picture, research concentrates on both small and medium-sized suppliers and contractors alike.

This thesis basically seeks to analyze the trends that are taking place in subcontracting relationships. It has already been established that a considerable number of development trends have and are still taking place, changing the structure of subcontracting relationships. Beside scanning reports on existing published research and statistics, the only way of truly appreciating subcontracting relationships and their components is by carrying out primary research among the firms that are involved in subcontracting. This is the only way of finding out more about the actual conduct of firms in subcontracting relationships and to reveal the rationale behind it. As mentioned in Chapter 3, since the early 1980s the character of subcontracting has changed from cyclical, capacity

subcontracting to structural, specialty subcontracting; and within subcontracting relationships the role of suppliers has evolved from a subservient one to one on a more equal level with the contractor.

This chapter summarizes the questionnaire methodology and the data analysis carried out in this thesis. The empirical research is based on in-depth interviews which were used for the general survey and the case studies. These were conducted using a semi-structured set of questions with both small and medium-sized suppliers and contractors. In order to prevent ambiguity, definitional problems with respect to the terms SMEs and subcontracting have to be overcome, while the manufacturing sectors included in the research also need to be specified before starting the empirical research.

Five parts can be distinguished in this chapter. The first part (§ 5.2) formulates the research question and the target population groups. The second part (§ 5.3) discusses the areas of enquiry such as the background of the firms, the production system and so on. The next section concentrates on the definitions used for SMEs, subcontracting and identifies the relevant manufacturing sectors for the research while also discussing the research methodology (§ 5.4). Subsequently, the fourth part examines the process of the mailing and the interview (§ 5.5). It also contemplates on the problems that arose during the data-collection exercise. The last part (§ 5.6) draws out the main conclusions from this chapter and leads into Chapter 6-8 which deals with the empirical research in depth.

5.2 Research questions and hypotheses

As will be discussed in § 5.4.1.3, the aim of the thesis is to analyze subcontracting relationships in certain, specified manufacturing sectors in the Netherlands. The research

concentrates upon an examination of the position of suppliers in subcontracting relationships but also analyzes the contractor's point of view, so as to achieve a somewhat more balanced picture. As mentioned in the introduction, the objectives of the thesis are fourfold:

- to identify and interpret the various types of subcontracting (inter-firm) relationships in certain sectors of the manufacturing industry in the Netherlands; it is preferable to investigate characteristics within a sectoral context;
- to examine the shifts in subcontracting relationships in the specified manufacturing sectors since the mid-1980s and whether the Internal Market has been of any influence thus far;
- to develop an insight into the background of subcontracting; and
- to explain the reasons for the shifts in the dynamics of the subcontracting relationships.

Within subcontracting relationships, SMEs are important because 'something is only as strong as its weakest link' and it is mainly the SMEs that are in general still considered to be exactly this. Following this line of thought, published research tends to mainly stress subcontracting relationships from the contractor's point of view since they are the ones that set the pace in most if not all respects. Research in the Netherlands has mainly focused on the developments in subcontracting in general (such as Hoftijzer (1988), Biemans (1989, 1991), Berger (1990), Bakker & Van Kooy (1991) and Taen (1991)); on the position of contractors within changing subcontracting relationships (such as Royen (1991) and Broersma (1991, 1992)); and also on the characteristics of SMEs in general (such as Van Dijk & Kleinknecht (1986), Nootebom (1986), Vianen & Webbink (1986), Vrolijk (1986)

and Docter & Stokman (1988)). However, the supplier's position in subcontracting relationships has remained somewhat underresearched (only Kok (1987) and Leus (1989a) have approached this aspect).

This thesis, however, aims to investigate subcontracting relationships from the small and medium-sized supplier's point of view but also takes the contractor's perspective into consideration in order to get a more balanced picture. The contractors, which tend to be large enterprises, are the ones that generally have some advantages over their suppliers, the latter usually being SMEs. Despite the often disadvantaged position of the latter, their role is important as both partners in the subcontracting relationship should be strong. Contractors for example often point at the suppliers as being the Achilles Heel. Although this is a common point of view, it is not necessarily true. Ideally a subcontracting relationship involves both contractor and supplier contributing their expertise to the fullest extent possible, which also implies that each should allow the other to maximize their contribution irrespective of their position in a subcontracting relationship. Ideally, this should result in early supplier involvement, (shared) responsibility in product design and so on (see § 3.5.2).

The present research, therefore, focuses mainly on the supplier's position. It starts from the point of view that the behaviour of small and medium-sized suppliers should not be either overlooked or underestimated. As seen in the previous chapters, since the 1970s there have been plenty of dynamic changes, such as the stagnation in the world economy, the developments in technology and logistics and finally the opening up of the Internal Market of the European Union, that have provided SMEs and suppliers with new opportunities for development. Small and medium-sized suppliers increasingly fulfil a necessary

complementary function to large enterprises which is reflected in the increased salience of subcontracting. This increased importance is reflected in the move from cyclical, capacity subcontracting to structural, specialty subcontracting (see § 3.3). Therefore, this thesis investigates what the small and medium-sized suppliers can offer in these new and ever changing types of subcontracting relationships, what their strong and weak points are and the attitude and performance of the contractor will also be reviewed. The thesis also examines whether support offered by the Dutch government and the European Union are of any influence on the position of smaller enterprises involved in subcontracting. So far, larger enterprises seem better able to acquire subsidies than smaller ones. Policy support can certainly help the latter in the sense that they may take away some of the disadvantages related to scale which will enable them to make products more competitive with respect to quality, price and so.

5.3 Areas of inquiry

The empirical research conducted through the questionnaire provides information about the dynamics of small and medium-sized suppliers. It investigates the organizational and economic characteristics of SMEs, their input-output relations and the level of technology within a sectoral context, so as to grasp the underlying characteristics of SMEs so vital for strong and lasting subcontracting relationships. The research mainly focuses on the following eight dimensions:

- Background
- Production System
- Product design
- Quality

- Type of supplier
- Type of contractor
- The role of the Dutch government and the European Union
- 1992: The Internal Market of the European Union

5.4 The research methodology

The research is basically split into two parts, as two sets of questionnaires were used. Firstly, there is the suppliers' questionnaire and secondly, there is the contractor's questionnaire. The two are essentially the same with the difference that the phrasing of various questions varies to reflect the different status of the two types of respondents. Various trade sources such as trade organizations, Chambers of Commerce, Quality Circles, newspaper articles and so on were used in order to prepare for the in-depth interviews.

The Dutch Organization for Subcontracting, Nevat, was used to contact potential companies for study (see also § 5.5). The supply firms surveyed are all members of the Dutch Nevat Organization which tend to be more specialized with respect to the products made and more advanced in their approach to subcontracting than most firms in the subcontracting industry. On the one hand, because of the selection made, the research population is not entirely representative for Dutch supplier firms precisely because these represent a subset of the most advanced suppliers. However, on the other hand, one can argue that these firms show what other suppliers may be capable of. Because the selected suppliers are the leaders in their field, they represent a model of what the other suppliers are

capable of doing in the long-term.

The following paragraphs will discuss the definitions (for SMEs, subcontracting and the business groups in the manufacturing sector) and research methodology used for the empirical research.

5.4.1 Definitions

Firms were selected on the basis of three criteria: firm size, subcontracting in the broad sense (standard and custom-made products) and all firms have to belong to certain business groups (STIC 34-38) in the manufacturing industry. This selection is made in order to prevent ambiguity.

5.4.1.1 Definition of SMEs

One of the criteria for this research is firm size. As pointed out in Chapter 2, because of their heterogeneity SMEs cannot be contained into one unique definition, either at the Dutch national level, or the European Union. There are many facets to SMEs which are of a qualitative and/or quantitative nature.

For this research the quantitative definition of SMEs being those which have 0-99 employees is adopted. This has the added advantage of also being the one officially used by the Dutch Ministry of Economic Affairs, the Dutch Bureau of Statistics (CBS) and some of the big Dutch banks such as NMB (Nederlandse Middenstands Bank) and Rabobank.

5.4.1.2 Definition of subcontracting

The second selection made was with regard to the term 'subcontracting'. This research has complied with the methodology employed by the Dutch Bureau of Statistics and the Dutch NMB Bank, namely to use the broad definition of subcontracting. This definition of subcontracting includes both standard and custom-made products, whereas a more narrowly defined relationship would only include custom-made products.

The choice for the broad definition of subcontracting proved better because of reasons already mentioned in § 3.3 but more importantly because it was not until the actual interview took place that it was known what kind of supplier the firm was, that is whether subcontracting was applicable in the broad or narrow sense.

5.4.1.3 Selection of the business groups

A further consideration made in selecting for diversity beside firm size and type of subcontracting is related to business groups within the manufacturing sector. Five business groups were chosen for studying two-sided (suppliers and contractors) approaches to subcontracting relationships. The following business groups for the research were identified (see Table 5.1):

- Metal products
- Machinery industry
- Electrotechnical industry
- Transport equipment
- Instrument and optical industry

Table 5.1 Business groups and their STIC• code

Business group	STIC
- Metal products industry••	34
- Machinery industry	35
- Electrotechnical industry	36
- Transport equipment industry	37
- Instrument and optical industry	38

• STandard Industrial Code
•• (excluding machinery and transport equipment)

According to the Rabobank, NMB, Nevat and CBS, the selected business groups are considered to contain a relatively high concentration of suppliers while the most important contractors are also mainly to be found in these groups (Broersma, 1991). The business groups which have been selected are known for the customized nature of their components, which makes close coordination of the production process between suppliers and customers a common concern. Co-makership, JIT and related organizational trends have grown in importance in these business groups since the early 1980s. However, product components may be very different in the functions they satisfy as some are key or vital components, while others are non-vital components which have a more cosmetic value.

The nature of supplier firms in general is such that they produce components which do not just belong to one particular business group of the manufacturing industry but rather to various business groups simultaneously. It is, therefore, impossible to make a link between the number of firms surveyed and the specific number of firms there are in each business group.

5.4.2 The empirical research

The aim of this research is to get an insight in subcontracting relationships with as much breadth and depth as possible. It was decided not to opt for a postal survey as this would not provide the adequate results in the sense of depth of information. Therefore, the approach of a survey through semi-structured interviews was chosen which would provide breadth and in addition case studies were selected which would add the required depth to the semi-structured questionnaires.

5.4.2.1 The survey

Research was carried out among Dutch firms with respect to subcontracting relationships in 1990/1991 in the form of in-depth interviews using a semi-structured questionnaire (see Appendix A). The questionnaire also contained open-ended questions which sought to provide complementary and particular knowledge about certain issues which are hard to evaluate through direct questions such as the way in which the JIT system operates, the use of quality control and so on.

The Dutch subcontracting organization Nevat was used which was able to provide contact names of supplier firms. Out of the total number of 150 Nevat suppliers, 81 firms were selected on the basis of both the definitions used for SMEs and subcontracting and the selection made with respect to business groups of the manufacturing industry (STIC 34-38). Personal letters were then written to owners and managers rather than having to send a standard, impersonal letter which might have yielded a lower response rate.

A selection of contractors was made after the empirical research among suppliers was

finished. During the actual interview, suppliers were asked to mention their main contractors. From these 21 contractors, a selection was made on the basis of the selected business groups of the manufacturing sector (STIC 34-38) (it is preferable to investigate characteristics within a sectoral context!) and all contractors also have to be located in the Netherlands. On this basis 9 contractors were selected and approached for an interview.
It should be noted that a careful approach has to be taken when comparing the suppliers and contractors because of the difference in numbers.

Of the 81 questionnaires sent off to suppliers 70 were followed up by a personal interview which resulted in an 86.4% response rate; of the 9 contractors approached 7 took place in the actual research wich resulted in a 77.8% response rate. The total response rate for the whole survey turned out to be 85.6% with 77 out of 90 companies contacted taking part in the research.

5.4.2.2 Case studies

The idea behind the case studies is to get an insight into the details of subcontracting relationships at all levels. To achieve this, basically every tier of the subcontracting pyramid as well as the contractor have to be represented. Therefore, one contractor and subsequently one mainsupplier, one specialist supplier and one jobber were selected. The selection of the suppliers was made on the basis that all have the same contractor as their main customer and each should also belong to a different tier in the subcontracting pyramid.
Basically, the in-depth interviews of the survey were used in full detail in the case studies. The advantage of the case study approach is that it adds depth to the survey results.

However, the usual proviso for case study methodology applies, namely that no claim is made to having a statistically representative sample of Dutch firms.

5.5 The mailing and the interview

After the first selection of firms on the basis of such criteria as the firm size, type of subcontracting and manufacturing sectors, the selected firms were grouped according to geographical proximity, for example all companies in the north-west of the province of Friesland. Every week a batch of personalized letters based on geographical proximity would be posted to these companies, requesting their participation in the research. The letter mentioned that they would be contacted by telephone in order to arrange a date for a personal interview.

It was relatively straightforward to reach the CEO / owner given the research approach, and once contacted, they were uniformly co-operative so long as the independent nature of the research and anonymity were guaranteed.

Appointments were made and the questionnaire was mailed in advance to the prospective interviewee on that same day. This gave the respondent a good idea of what was going to be asked and enabled them to prepare for the interview. Actual interviews typically took an hour, as respondents liked to discuss the questions at length. In practice, interviews ranged from as little as 40 minutes up to 2 hours.

Considering the high response rate the pre-interview stages proved to be successful. With respect to the empirical part of the research, various things proved to be rather remarkable, such as the fact that all respondents were without exception male, and tended to be in the age category 40-55 years of age.

After the actual interview I would often be invited to take part in a guided tour of the shopfloor. This was especially the case if advanced equipment was in-house (CIM, CAD/CAM, laser equipment and so on).

Most firms had a waiting room which usually contained business documentation with up-to-date information about the firm. The content of this material often gave me the opportunity to integrate points into the in-depth interview. Occasionally, documentation would mention certain equipment which had not yet entered into use or for which customer certification had not yet been granted. Interviews were able to clarify these situations.

People who inquired about the duration of the interview because they did not really have much time often ended up spending over two hours on the interview, followed by a guided tour of the shopfloor. This was explained by the fact that initially respondents were suspicious about the relevance of the research, but their reservations generally faded away during the actual interview.

After the actual in-depth interview there was usually time for some discussion about subcontracting in general and a firm's position relative to others. Firms were without exception interested in the other firms that were taking part in the research but because of the confidentiality clause, it was impossible to answer their questions in more detail. Respondents were also interested in fellow respondents' response especially to the questions about certification, Just-in-Time supply, government support and the Internal Market which is considered by many in this sector to be a 'black box'.

The fact that they were being interviewed by a woman did not pose any problems, even though initially respondents were hesitant to use certain technical terms, but this sporadic impediment was quickly overcome when they realized that the interviewer understood the

technical language.

The anonymity of interviewed companies has to be preserved as this was the basis on which research was carried out and the information collected. It is therefore unfortunate that certain information on the nature of specific products, location and so on had to be withheld for this reason. But overall, the benefit arising from the willingness of the interviewees to disclose information, which they would not have done if they were to be identified by name, outweighs the disadvantage in concealing their identity.

Finally, there was the stage of data-processing, results and conclusions. Because of the limited number of respondents, no advanced statistical analysis could be implemented. Chi-square tests were carried out to see if real and estimated values matched. However, because of the requirement that every cell frequency should be at least 5, most chi-square tests did not prove valid. The chi-square tests where all cell frequencies were 5 and over turned out to be non-significant. The research, therefore, concentrates on descriptive statistical analysis.

5.6 Conclusions

The initial selection of 90 firms resulted in a response from 77 firms and an 85.6% response rate. Research was carried out among 70 small and medium-sized suppliers and 7 contractors in certain business groups of the manufacturing industry in order to evaluate the subcontracting relationships in the Netherlands. For this purpose the Dutch subcontracting organization Nevat was used in order to contact the potential respondents. This approach was chosen because previous experience indicated that a low response rate could be anticipated if firms were approached in any other way.

The results of the actual empirical research will be presented in the next three empirical chapters which will also draw out the key conclusions. Chapter 6 will establish the background of the firm and will also analyze the production process of the respondents' firms. The type of products manufactured, advanced technology, the use of R & D, involvement in product design and so on are key issues that will determine wether a supplier is a simple jobber in the lowest tier of the subcontracting pyramid; a more advanced specialist supplier; or a mainsupplier in the top of the subcontracting pyramid. Chapter 7 will focus more in detail on the supplier and contractor firms. Some of the important issues are the supplier's dependency on its customers, the structural nature of the subcontracting relationship which is reflected in the duration of the subcontracting relationship and the type of orders and so on. The last empirical chapter (Chapter 8) examines if the Dutch government and the European Union fulfil a supportive role for the respondents and will also asses the influence of the Internal Market of the European Union.

CHAPTER 6

BACKGROUND AND PRODUCTION PROCESS

6.1 Introduction

In the previous chapter the aims and methods of the research were discussed. In this and Chapters 7 and 8, the actual empirical research is analyzed by looking at the answers to the specific questions of the semi-structured questionnaire used for the in-depth interviews for both small and medium-sized suppliers and contractors. The structure of these three empirical chapters closely corresponds with the eight dimensions on which the questionnaire focuses and Chapter 9 concludes with the general findings of the empirical research.

The first part of this chapter analyzes the background of the respondents' firms and also the actual production process. The questionnaire's specific areas of inquiry are as follows:

- a series of questions on firm origins and background (§ 6.2) which examine their legal status, year of establishment, number of employees, turnover and so on;
- the production system (§ 6.3) which tries to establish the nature of the products which are supplied, the markets served in combination with the use of machinery and the implementation of R & D and Just-in-Time;
- the product design (§ 6.4), together with the supplier's involvement in product design, the share of responsibility taken by the supplier and the frequency with which the

producer encounters problems during the production process;

- quality (§ 6.5) with respect to vendor rating, auditing, certification, entry control and check points.

As discussed in Chapter 5, the second part of the chapter will examine the case studies. These pay special attention to the subcontracting relationships as perceived by the contractor and the three different tiers of the subcontracting pyramid, namely the main-supplier, the supplier and the jobber (§ 6.6).

6.2 Background

The analysis of each respondent's origins and background was undertaken to provide a clearer picture of the type of firms (suppliers and contractors) surveyed. All suppliers have to fulfil a number of requirements (question 1 and 2; see Table 6.1)). Firstly, they all have to employ up to 100 employees as this is the SME definition adopted (see § 2.3 and § 5.3.1). Secondly, all SMEs have to belong to one or several of the selected manufacturing sectors 33 to 38 (see Table 5.1 in § 5.3.3). These are the manufacturing sectors with a relatively high concentration of suppliers. Contractors on the other hand, are large firms which tend not to operate plants under 100 employees (as discussed in Chapter 2) and this is certainly true for the major contractors with which the respondent suppliers have subcontracting relationships. All contractors selected, in common with suppliers, also belong to one or several of the selected manufacturing sectors (33 - 38) as it is preferable to investigate characteristics within a sectoral context (see § 5.2). It is in these manufacturing sectors that the main Dutch contractors are concentrated (see § 5.4). The subcontracting relationships in these particular manufacturing sectors are longer-term ones rather than, for instance, possibly one-off contracts to supply products to another firm.

Of all suppliers, the majority of firms (question 3; see Table 6.3) were established in the period 1945-1960 (32% or 22 suppliers) and the period 1960-1980 (33% or 23 suppliers);

smaller numbers were set up both earlier, in the period 1900-1945 (16% or 11 suppliers), and later in the decade the period 1980-1990 (13% or 9 suppliers). Only 6% or 4 suppliers pre-date 1900.

Table 6.1 Year of establishment

Year	Suppliers Abs.	%	Contractors Abs.	%
before 1900	4	6%	-	-
1900-1945	11	16%	3	43%
1945-1960	22	32%	1	14%
1960-1980	23	33%	2	29%
1980-1990	9	9%	2	29%
Total	69	100%	7	100%

Table 6.1 shows that, among the contractors, 43% were established between 1900 and 1945, 14% in the period 1945-1960, 29% between 1960 and 1980, and remaining 29% were founded in the decade 1980-1990. The age of the firm is considered relevant as it is often related to a firm's innovativeness: as a rule of thumb, new firms tend to produce more innovative and new products than older ones. A considerable proportion of suppliers (almost 10% of the supplier respondents) and an even larger proportion of contractors can be considered 'young' which implies that the future looks rather promising with respect to innovation and new products. It should be noted that no statistical correlation could be established between the age of the firms and innovation because advanced statistical analysis could not be implemented (see § 5.5).

Another background question (question 4) inquired about the legal status of the firms. In fact, 99% of suppliers (68 firms) and 86% of contractors (6 firms) are private companies (B.V. or 'Besloten Vennootschap') and only 1% of suppliers (1 firm) and 14% of

contractors (1 firm) are limited liability companies (N.V. or 'Naamloze Vennootschap') in which the members are liable for their debts only to the extent of the capital sum they have supplied.

Question 5 sought to elaborate further on the legal status of the firms researched and inquired whether they are independent or not (see Table 6.2). Of all suppliers, 65% (45 firms) are independent autonomous firms whilst the remainder (24 firms) are subsidiaries or branch plants of a subsidiaries or branch plants of a larger enterprise,

Table 6.2 The independent nature of firms

nature	Supplier		Contractor	
	Abs.	%	Abs.	%
independent	45	65%	-	-
subsidiary	24	35%	7	100%

called the parent company. All the contractors researched turned out to be subsidiaries. Basically, the contractor-firms are part of parent firms which are much larger than the parent-supplier firms.

Most of the suppliers (43%) are located in the Intermediate zone; followed by the Randstad (29%) and the Periphery (27%) (question 6). This pattern is simply the result of the random sampling procedure (see Chapter 5). Most suppliers, do not have a subsidiary abroad (91%) and the ones that do (9%) are either located close to the Dutch border in Belgium and Germany or in France and the United Kingdom (question 7). On the other hand, most contractors (43%) are based in the Randstad and an equal proportion of contractors is based in the Intermediate zone and the Periphery. Of the contractors (43%) that have subsidiaries abroad, some are located close to the Dutch border while others are

located in Italy and the United States.

The question inquiring after the firm's workforce (question 8) aimed at trying to differentiate between production, administrative and technical employees. Chapter 2 has already described how SMEs, with their flat and less hierarchical structure, have a higher proportion of personnel directly involved (blue collar jobs) in the production process whereas various tasks such as R & D and administrative work tend to be performed by just one person. Therefore, it is not surprising that most suppliers only differentiated between the employees who are directly/indirectly involved in the production process and so it was decided to retain the latter differentiation (see Table 6.3). The results of the survey showed that, on average, 75% of all employees in supplier-firms are directly involved in the production process.

This means that of the average (59) total number of employees, 44 are directly involved in the production process while 25% or 15 employees are indirectly involved. Employees who are indirectly involved in the production process are administrative and technical personnel, although this excludes the owner/managing director of the firm

Table 6.3 Number of employees directly/indirectly involved in the production process

employees	Suppliers %	Contractors %
directly involved	75%	67%
indirectly involved	25%	33%

whose task may simultaneously be both a financial and administrative manager and the engineer who introduces innovations to the firm. As seen in Chapter 2, contractors have a more hierarchical structure with a larger number of employees which is not directly involved (white-collar jobs) in the production process. Therefore, it comes as no surprise

that in this research the contractors have only 67% of their personnel directly and 33% indirectly involved in the production process.

Another differentiation made with respect to employees is whether they are employed on a permanent or a temporary basis (question 9; See Table 6.4). Of all small and medium-sized supplier firms in this sample, 93% of the people are employed on a permanent basis, the remainder being employed on a temporary basis. The percentage of temporary employees varies from 0% to 50% of the total workforce. It becomes clear that it is mainly the firms that deal with irregular orders, multiple contractors or contractors with whom they have not done business with for very long that are the ones that employ more temporary staff (cyclical or capacity subcontracting). Other reasons for employing temporary staff are to compensate for illness of employees, peak demand for orders during holiday periods and to cope with special, one-off orders. All these indicate that cyclical or capacity subcontracting is the reason for employing temporary staff.

Table 6.4 The share of permanent/temporary employees

Employees	Suppliers %	Contractors %
permanent	93%	97%
temporary	7%	3%

For some suppliers the employment of temporary staff is on a continuous or structural basis while for others it is only when the situation requires it. Some suppliers stated that they cannot employ temporary staff even if they wanted to because the work requires very specialized (technically qualified or experienced) people.

The pattern for contractors with respect to permanent and temporary staff is slightly different: 97% of their staff is employed on a permanent and only 3% on a temporary basis.

The number of temporary staff varies from as little as 2% to as much as 10%. One may conclude from this, as seen in Chapter 3, that contractors rely on their suppliers to act as a buffer in case of irregular orders or other unforeseen circumstances. This indicates that capacity subcontracting (see § 3.3) is taking place which is an unstable, shortlived form of subcontracting that underlines the subordinate status of the supplier.

The average annual turnover of firms (question 10) was also analyzed. For suppliers the average turnover was Dfl. 10.5 million in 1989. Some 7% of all suppliers (5 firms) refused to answer this question despite the argument that it was not profit figures that were required but merely turnover. The average turnover for contractors was Dfl. 975.5 million in 1990 (the contractors were interviewed later), which reflects the earlier point that contractor firms are generally much larger than the supplier firms.

Absolute figures (question 10) on turnover sometimes proved to be problematic to obtain whereas inquiries about relative changes in sales (question 11) were readily answered. The percentual changes in suppliers' sales revealed a positive growth over the past 5 years for 90% (62 firms); 3% (2 suppliers) showed zero growth; and 7% (5 suppliers) showed a decline. The main reasons given for a decline tended to be the loss of a big contractor, a large contractor placing fewer orders and the lack of new technically qualified or experienced staff. Other reasons included an increase in the costs of materials, the orientation to new products, a recession in the shipbuilding or metal manufacturing industry, or because they experienced problems during the introduction of new production methods. One supplier experienced negative growth because the owner/director of the firm had passed away. Some of these indicate that the suppliers often produce for only a limited number of contractors and/or that just a few contractors take up a large part of a supplier's turnover. This is what often results in a supplier's high dependency on a small number of suppliers and can have disastrous effects. The dependency issue will be elaborated on in

Reasons for positive growth were attributed to the enlargement of the firm, higher value added of products, acquisition, more and/or bigger orders, the positive economic climate, the cooperation with another supplier and finally the impact of new products. The enlargement of the firm, acquisition, and more or bigger orders imply a higher turnover and therefore positive growth in sales. The higher value added of products indicates that a supplier is moving upwards in the subcontracting pyramid: the jobber becomes a specialized supplier and the specialized supplier becomes a main-supplier (see §3.5). The supplier's development into a higher ranked supplier will affect subcontracting relationships with its contractor in the sense that subcontracting may change from capacity to specialized subcontracting as a result of this (see §7.2).

With respect to contractors, 71% (5 firms) showed a positive growth from 1985-1990; for 14% sales stayed static (1 firm); while 14% of the contractors (1 firm) experienced negative growth. Contractors state that it is the economic climate (either positive or negative) on which their business relies and also the political climate which sometimes results in failing to get orders (defense industry). None of them, however, stated that it was a supplier's performance, whether good or bad, that had affected sales.

6.3 Production System

This section tries to identify the type of products made, the markets served, the use of new technology, the application of product and process innovation, the availability of R & D and the implementation of a Just-in-Time system. These are considered because they are important in determining both a firm's position in the production system and its options with respect to subcontracting relationships.

First, the various types of products and/or services supplied by the firms in this research

are established. The most important categories of products for suppliers are

Table 6.5 The main products/services of the respondents (%)

Type of products	Suppliers	Contractors
- single components	65%	29%
- sub-assemblies	17%	57%
- functional units	13%	14%
- applications/services	3%	-
- all	1%	-

single components (for 65% or 45 firms); 17% (12 firms) manufacture sub-assemblies; 13% (9 firms) of functional units (which is an assembled product that can function on its own); and 3% of applications/services (2 firms); while for one firm (1%) supplies all of these categories are equally important. For contractors the most important category of components that are supplied are the sub-assemblies (57% or 4 firms); followed by the single components (25% or 2 firms); and lastly the functional units (1 firm).

Examples of single components include butterfly valves, outlet valves, valve housings for the hydraulic industry, ceiling components, fences, lamps, containers, sideboards, work benches, sheet metal construction parts and components, parts for mechanical engineering, and parts for general automotive engineering. Examples of subassemblies are springs (tension, compression, torsion, leaf, helical and cup springs), housings, panel sheets, fume hoods and prefab chimneys. Lastly, examples of functional units are tanks, cabinets for switching systems, baggage lockers, spraying booths and tool boxes.

The conclusion from this is that the majority of suppliers in this research act primarily as jobbers for their contractors which is the lowest tier in the subcontracting pyramid since they mainly produce since they mainly produce single components; while a minority of the

suppliers produce functional units (see §3.5)

Some 52 firms (75% of suppliers) serve a specialized market with custom-made products; while 13% (9 firms) serve the mass production or standardized market; and another 10% of producers (7 firms) operate in a market niche (question 13). Contractors also mainly operate on the specialized market; while equal number of contractors (both 29% or 2 firms) produce for mass production and for a market niche. In Chapter 2, it was argued that suppliers, more so than contractors, are oriented towards specialized market niches as they can profitably cover market slots in which larger enterprises are not interested. However, the research reveals that this is not necessarily the case.

Table 6.6 The type and number of markets within which respondents operate

	Supplier	Contractor
The type of product market:		
- mass production	13%	29%
- specialized market	75%	43%
- market niche	10%	29%
- missing cases	3%	-
The number of PMCs:		
- 1-2 geographical market areas	9%	29%
- 3-5 geographical market areas	20%	57%
- >5 geographical market areas	70%	14%
- missing cases	1%	-

Table 6.6 shows that the majority (70% or 48 firms) of suppliers operate on more than five different PMCs; 20% (14 suppliers) on three to five PMCs; and the remainder (9% or 6 firms) on one to two PMCs. The picture is rather different for contractors where 57% (4 firms) operate on three to five PMCs; 29% on one to two PMCs; and 14% (1 firm) on more than five PMCs.

Some 58% of all suppliers have increased sales (40 firms); for 38% the market remained stable; while for 4% (3 suppliers) the market has clearly decreased. The majority of

suppliers experienced these changes on their existing market (68%); while for others the changes occurred outside the existing market.

Contractors have experienced both enlargement and reduction of the their market; while some experienced only enlargement (14%) or reduction (14%) of the market. They experienced the changes both on the existing market and in new markets; while for another 29%, the changes occurred on the already existing market.

When asked if they operated any of the new technologies in their production process (question 19), it became clear than the overwhelming majority did not. Technologies that are considered to be of a new generation includes CAD/CAM, CIM, three-dimensional (3D) measuring equipment, laser equipment and welding robots. CAD/CAM makes it cheaper for a firm to adopt a broader product line and update its products more frequently. With short production runs, a firm can economize on inventory costs (such as interest, storage and obsolescence) by scheduling production in a way that is highly responsive to customer demand. This will increase the profitability of technologies. CAD/CAM equipment, flexible manufacturing technologies, shorter production runs, lower inventories, increased data communications, and more frequent product designs are complimentary and support marketing, engineering and the organization of the firm. Exploiting the extensive system of complementarities requires coordinated action between design, engineering, manufacturing and marketing, which have traditionally been separate functions within a firm. CIM which, as seen in Chapter 3, integrates the whole production organization (administrative, management information and production systems) requires a total overhaul of the company's strategy from procurement to Quality Control.

Almost all of the suppliers (86%) work with CNC machines (Computer Numerically Controlled machines) which are no longer considered a new technology as neither NC

machines (Numerically Controlled machines) nor DNC (Direct Numerically Controlled machines) were in use. A large number of suppliers has been working with this type of equipment for over ten years. Only about 3% of suppliers use CIM (Computer Integrated Manufacturing); 20% use a CAD/CAM system; just 4% use CAD (Computer Integrated Design); and a further 4% CAM (Computer Integrated Manufacturing). Another 37% of suppliers use three-dimensional measuring equipment while 10% use laser machines (for 'cutting' material). The majority of contractors do have a production system based on CAD/CAM (71%) or CAM (another 14%); 71% use three-dimensional measuring equipment; 29% use laser equipment; and other equipment used is welding robots (14%) and scanners for assessing material surfaces (14%).

Table 6.7 New technologies used by the respondents

Type of new technology	Suppliers yes	Suppliers no	Contractors yes	Contractors no
CIM	3%	97%	-	-
CAD/CAM	20%	80%	71%	29%
CAD	4%	96%	-	-
CAM	4%	96%	14%	86%
3D measuring equipment	37%	63%	71%	29%
laser equipment	10%	90%	29%	71%
welding robot	-	-	14%	86%
scanner	-	-	14%	86%

Even though new technologies ought to have come within the reach of SMEs in the past decade and a half because they have become cheaper and also because of their flexible nature (see §2.2), most suppliers in this research either can not afford them or can not operate them profitably. Table 6.7 shows that the use of new technologies is rather limited for suppliers but were to be expected (see § 2.4). The argument of many suppliers is that because of the character of their products (custom-made) and the small size of orders, it is not really necessary to have new expensive technologies in-house. As was already argued

in Chapter 2, SMEs have less easy access to finance, they are too small to gain economies of scale, and their capacity-cost ratio often does not permit them to purchase the newest technology.

As expected, the contractors appear to use more new technology which is explained by the fact that large firms are financially more secure and operate at a larger scale (capacity-cost ratio).

Technological innovations are mainly applied by suppliers as process innovations (54% or 37 firms); 39% (27 firms) apply both process and product innovations; 3% (2 firms) of all suppliers apply only product innovations; while 4% (3 suppliers) apply neither process nor product innovations.

Table 6.8 Technological innovations used by the respondents

Type of innovation	Suppliers	Contractors
- product innovations	3%	-
- process innovations	54%	29%
- product and process innovations	39%	71%
- n/a	4%	-

Table 6.8 indicates that for contractors the situation is rather different in that 71% (5 firms) apply both product and process innovations and 29% (2 firms) work just with process innovations. The number of suppliers that apply product innovations (39% and 3%) is rather low but clearly reflects the dominance of contractors in this field. Suppliers made it clear during the interview that they usually only provide applied or substitute product and process innovations but it is really the contractors who generate the basic innovations. As pointed out in Chapter 2 the level of basic innovations increases with firm size as does R & D. The lack of internal R & D departments is, therefore, another defining characteristic of supplier firms.

Only 20% of suppliers (14 firms) have their own R & D department as opposed to 100% of

the contractors; 28% (19 suppliers) have their own Development department; while the majority of firms (52% or 36 firms) has no R & D or Development department. These findings comply with the earlier discussion about the size of firms and R & D: the larger the firm, the better its financial position which results in larger firms being able to use specialized production factors such as R & D. Pure research is a high-risk, high-cost area especially for smaller firms which is why they tend to take a 'follow-the-leader' strategy in contrast to the larger enterprises which opt for pure R & D.

Table 6.9 Number of people employed in R & D by the respondents

Number of employees in R & D	Suppliers
- 0 employees	61%
- 1-7 employees:	38%
- 1	16%
- 2	7%
- 3	3%
- 4	9%
- 5-7	3%

Number of employees in R & D	Contractors
> 100 employees	43%
100 - 950 employees	43%
> 950 employees	14%

Within supplier firms, as Table 6.9 shows, the number of employees in the R & D or Development department is highly variable. The majority of suppliers (61% or 42 firms) do not have an R & D department; while 38% (27 firms) have 1-7 people employed in the R&D or Development department.

For contractors, the number of people in R & D are a multiplication of those employed in supplier firms: 43% (3 firms) of contractors employ less than 100 people in R & D; 43% (3

firms) employ between 100 and 950 people; and 14% (1 firm) employ over 1,000 people in R & D. In smaller supplier firms, the share of people in the R & D department varies from 0% to 9% while in the case of contractors it ranges from as little as 2% to as much as 31% of the total workforce. As discussed in § 2.4.3, large enterprises because of the larger scale on which they operate and their better financial position, can have specialized production factors such as a R & D department. The lack of a R & D department in smaller enterprises limits these firms to involvement in the product design stage and prevents them from contributing a higher proportion of value added to the production process. The consequence of this is that it may prevent these suppliers from moving up the tiers in the subcontracting pyramid.

Finally, the respondents were asked whether they employed a JIT system. The results, presented in Table 6.10, show that 30% of suppliers (21 firms) and 43% of contractors (3 firms) do employ a JIT system; while 70% of suppliers (48 firms) and 57% of contractors (4 firms) admitted to not employing a JIT system at all.
When asked this question the majority of firms would answer positively, then adding 'we always deliver on time'. However, to deliver on time and to deliver on a JIT-basis are two completely different things. To deliver on a JIT-basis means the steady delivery of parts in the right quantity which is small lot sizes, the right/high quality and at exactly the right time straight to the production line rather than for stock. Products should be supplied where and

Table 6.10 Just-in-Time system applied by the respondents

	Supplier	Contractor
- yes	30%	43%
- sometimes	-	43%
- no	70%	14%

as they are needed and should be sent straight to the production line just-in-time for it to be integrated into the production process. It is also important for the firms involved in the Just-in-Time system to maintain a well-attuned and timely correspondence to the market needs. Products that are delivered on a JIT-basis are usually neither standard products nor are they produced on the basis of multiple-product-small-batch manufacture. Rather, they tend to be subassemblies, functional units or in other words, custom-made products to which repetitive manufacturing applies. The contractor will place an order with a supplier on the basis of a master production schedule and will expect the supplier to deliver on call (it is a pull system!): whenever needed, the contractor signals to the supplier to release a small batch of products. It is also feasible to forecast demand, and production and ideally suppliers are located nearby the contractors.

Although quite a few suppliers in the research claim to supply on a JIT basis, they are not doing so. In a nutshell, ideally Just-in-Time should be adopted as a total system and embraces a lot more than just the timely delivery of products.

6.4 Product design

This section now concentrates on the supplier's involvement in product design and related issues such as compliance with (inter)national standards, the supplier's share of responsibility in product design and its involvement in further product development are investigated. The more a supplier is involved in product design, the more likely it is that it will assume responsibility for its input. Whether a supplier can comply with (inter)national standards or not is another factor that will strengthen its position on the road to becoming a co-maker.

The research revealed (see Table 6.11) that a large number of suppliers (48% or 33 firms) do not participate in product design and they perceive it as the sole responsibility of the

contractor; 29% (20 suppliers) develop products in cooperation with the contractor; 14% (10 suppliers) develop the product internally according to the specifications of the contractor; while only 4% (3 suppliers) develop their products internally and independently (question 27). In another 4% of the cases (3 suppliers), products are designed by a third party, that is by a design bureau.

When this question was posed to the contractors, they responded that in 43% of the cases products were developed internally and independently by them; 14% was developed and produced by the supplier but on the basis of the contractor's specifications; none of the contractors had developed their products in cooperation with the supplier; in 29% of the cases products were produced solely on the specifications of the contractor; while 14% had their products developed by a third party (a design bureau). From this, it becomes clear that it is only in a minority of cases that the contractor leaves the product design up to the supplier. This indicates that it is still mainly the contractor which decides upon the product design and the supplier makes a limited contribution. Many suppliers, however, anticipate

Table 6.11 The respondent's involvement in product design

	Suppliers
- developed internally and independently	4%
- developed internally and according to the contractor's specifications	14%
- developed in cooperation with the contractor	29%
- do not participate in product design	48%
- designed by a third party (design bureau)	4%
	Contractors
- developed internally and independently	43%
- developed internally by the supplier and according to the contractor's specifications	14%
- developed in cooperation with the supplier	-
- solely on the contractor's specifications	29%
- designed by a third party (design bureau)	14%

that their contribution in product design will increase in future which implies that their responsibility for product design will increase accordingly. The majority of contractors support the opinion that supplier's involvement in both product design and responsibility will increase in future.

It is also important for suppliers to be able to comply with (inter)national standards as they will be regarded as better qualified and reliable producers by contractors (question 28). With respect to standards, it is ISO-standards in particular, which makes superfluous the enormous amount of independent or country-specific certifications. As the ISO-standards are universal, they are considered increasingly important.

There is only a small minority of suppliers (13%) that produce and supply products according to (inter)national standards. The one most often applied is ISO 9002 which is based on total quality assurance throughout the entire organization from receipt of the order to delivery of the products; while another standard used is the aviation standard (MIL-I-45208).

Of the suppliers which do not work according to (inter)national standards the majority (56%), are actually working on their certification at the moment and hope to acquire it in the next couple of years. Another 7% of suppliers may start working towards certification in the future. Very few suppliers (6%) produce components according to specified standards, but have not acquired official certification. Another 14% do not have any official certification and are not planning to get it either. The reasoning behind this is that most larger contractors apply vendor rating and auditing (see § 6.5) anyway, which makes certification by an independent organization obsolescent. Others argue that if they produce for a well known firms in the Netherlands such as Fokker or Volvo, which are known to be technologically highly advanced, this is often sufficient and convincing enough for other

contractors. This acts as a spin-off for new orders and enables suppliers to improve their international position. There were also suppliers which said they had regular orders with long-term contractors and, therefore, did not need independent certification. As long as their quality rating is high/adequate they did not need to worry about losing customers as this would only occur if they did not need their products any more or wanted to reduce the number of their suppliers. Reduction in the number of suppliers is a recent trend, so there is certainly something for suppliers to worry about and independent certification might just help them survive.

There is also a group of suppliers that produce and supply products according to contractor's standards, these usually being by large firms such as Rank Xerox, KLM, Mercedes, Honda, Daf, British Gas, PTT (of various countries), Fokker, Volvo, Philips, Stork, Holland Signaal, Picanol, Helvoet, ROC, ECN and Agfa Gevaert.

Another aspect along the same line, is whether firms have laid down product specifications in drawings and documentation, in other words whether there is a contract (question 29). This may help to put suppliers in a secure position as they can refer to their contract if, for example, a contractor requires more from them than is laid down in the contract. Some 64% of suppliers (44 firms) say that they have laid down the product requirements in both drawings and documentation; in 30% of the cases (21 suppliers) these are laid down only in drawings; while 6% (4 suppliers) have done neither of these. On the other hand, all the contractors have for 100% laid down the product requirements in both drawings and documentation.

Given the low contribution of suppliers to product design, it is anticipated that suppliers have limited responsibility for product design (question 30). As Table 6.12 indicates, only 29% of suppliers (20 firms) take part or full responsibility for product design, while over

70% (71% of suppliers or 49 firms) take no responsibility at all.

The argument behind this is often that a supplier will only take responsibility according to its input in product design, which in this case implies that a supplier's input is rather low. It follows from this that a contractor's share of responsibility and therefore input is high. Contractors take responsibility for product design in 71% (5 contractors) of the cases; while 14% (1 contractor) said they did not; and an equal number abstained. With only a minority of firms taking responsibility, the conclusion may be that the majority of suppliers

Table 6.12 Responsibility taken for product design by the respondent

responsibility for product design	Suppliers	Contractors
- yes, conform contribution in product design	29%	71%
- no	71%	14%
- missing cases		14%

still act as jobbers. However, as both contractors and suppliers expect suppliers' input in product design to change, the suppliers' share in responsibility is likely to change accordingly.

When asked about the function of their products and actual production process (questions 31 - 34) suppliers said (see Table 6.13) they knew most if not all about the product function and the way in which it works (59% or 41 firms) and often they had produced that particular product (64% or 41 firms) or a similar product before (30% or 21 firms). They did encounter problems during the production process (45% or 31 firms) but they were usually capable of overcoming these. Despite this, 42% of the suppliers (29 firms) said they were not involved in the actual further development of the product but they were

Table 6.13 Has the respondent manufactured the product before

	Supplier	Contractor
- yes	64%	57%
- similar product	30%	14%
- no	6%	14%
- missing cases	-	14%

just involved in the continuous development (incremental changes that would occur during the production process) of the product (30% or 21 suppliers).

Table 6.14 The respondent's knowledge about the final product function

	Supplier	Contractor
- everything (specific application)	59%	71%
- sufficient (general application)	41%	29%
- nothing	0%	0%

What the contractors know about the function of the product towards which they produces is an important question. This is because most suppliers would want to contribute more towards product design. This is definitely essential if a supplier wants to supply subassemblies and functional units rather than single components. As Table 6.14 outlines, 59% of all suppliers (41 firms) claim to know the final product function and also the specific requirements of the final product; 41% of suppliers said they understood the final product function sufficiently, even though quite often they would not know the specific product application. Contractors claim to know even more about the product function: 71% (5 contractors) said they knew the specific requirements of the final product; while 29% (2 contractors) said they knew sufficiently in the sense that they knew the general final product requirements.

Some 64% of suppliers (44 firms) had supplied the product before; 30% (21 suppliers) has

already supplied a similar product; while for 6% (4 suppliers) the product was new to them. Contractors also stated that in the majority of cases (57%) they have produced the product before; others had produced something similar (14%); and some had never produced certain products before (14%) and the remainder abstained (14%).

Some 45% of all suppliers (31 firms) admitted to having had problems in the past. They explained that there were usually some problems in the production process anyway, although they have always been able to solve them, either in cooperation with the contractor or on their own. Sometimes the product design needed to be changed because of these difficulties. This tends to be mainly in the cases where the product design had been the sole responsibility of the contractor. Product requirements were such that they were either not feasible for the supplier or they did not work in favour of an efficient or effective production process. In 38% of the cases (26 suppliers) the production process would

Table 6.15 Problems encountered during the production process

	Suppliers	Contractors
- yes	45%	43%
- sometimes	38%	43%
- no	17%	0%
- missing cases	-	14%

sometimes create problems which were usually of a production technical nature; while 17% (12 suppliers) stated they usually had no problems during the production process whatsoever. Contractors were even more frank about the problems they experienced: none of the contractors never had problems; while 43% (3 contractors) said it was pretty common to have problems; and 43% (3 contractors) acknowledged occasionally having problems during the production process.

Some 61% of suppliers (42 firms) answered that they do not do any product development at all; while 9% (6 suppliers) do contribute to product development and another 30% (21 suppliers) stated that they develop products on a continuous, incremental basis. Therefore, one can say that approximately 39% of suppliers are more or less intensively involved in product development, while 61% are not. The latter being the ones that produce exactly according to the specifications of the contractor and since they have no input whatsoever in product development, act solely as jobbers. The majority of contractors stated that further product development is needed (71%) and some (29%) mentioned that the initiative for product development came solely from the consumers.

It was also asked who usually initiated changes during the production process, the contractor or the supplier (question 35). Most firms will of course avoid a situation where they have to make changes during the production process because it is difficult, time-consuming and costly. Changes can be avoided, particularly where Just-in-Time manufacturing is operated since it is very sensitive to changes in the production plan. The most frequently cited reason why changes had to be made during the production process were because of improvements in the product or because the application of the product had changed. These changes are usually initiated by the contractor. Most suppliers stated that overall, the initiative for changes during the production process were simply in the hands of the contractor except for when there were problems during the production process (production technical reasons) or if the product price could be improved by producing in a different way. There was only a minority of suppliers (10%) who stated that both contractors and suppliers would equally initiate changes.

Contractors concurred with the suppliers by stating that they usually initiated changes during the production process. It is only if production technical problems arise or price reductions were achievable that the supplier normally takes the initiative to make changes

during the production process. There was just one contractor who said that both contractor and supplier initiated changes in equal measure during the production process.

6.5 Quality control in the production process

In the last decade and a half, there have been tremendous changes in the West with respect to the issue of quality. Nowadays, good manufacturing practice requires a number of standards to be adhered to in order to ensure a minimum standard of quality during and after production. It also means that a record is kept and that complaints that previously only appeared when products were put into practice are now dealt in a systematic way: quality is checked on the basis of process control and/or intermediate check point on the basis of either 100% or random quality control which aim to prevent structural product shortcomings.

Quality was originally based on final inspection at the end of the production line by white-collar advisors and specialists, but is nowadays carried out as an integral part of the production process. The new thinking behind quality is that more inspection does not necessarily lead to better quality and therefore, emphasis needs to be placed upon defect prevention rather than detection. Inspection only serves as an aid in detecting problems. In other words, one does not inspect the quality of a product, one builds it into the production process. And before building it in, one must think it in (Chung, 1987). Quality and TQC along, with product innovations need to be nurtured on the shopfloor. And it is also the people on the shopfloor that are best able to deal with production problems on the spot since they are the ones that have the hands-on knowledge needed to act effectively. Rather than addressing how much inspection there should be, the emphasis is on better control of the process and quality. A long history of shortcomings, products that do not work satisfactorily and have to be recalled, reveal a company-wide problem and may provoke corporate-wide research into a company. There are several ways of dealing with quality

control. The producer could operate an adequate quality control system through intermediate check points and final control on the basis of 100% or random quality checks. Quality control can also be carried out by a contractor through entry control.

A system of intermediate check points inspects products all along and production is stopped as soon as a problem is identified. The main idea behind this is that the problem needs to be solved before production is recommenced. This type of quality control complements very well with vendor rating and auditing. Vendor rating is a system operated by the contractor which rates the suppliers according to their performance in comparison with other suppliers' performance. Auditing is a situation where the contractor visits the supplier firm on a continuous basis in order to check whether its production process and products are up to scratch. It represents an evaluation of the organization by way of systematic research which is on the basis of random investigations.

Another way of achieving a continuous and reliable product supply is by selecting suppliers that already have a product or process certification. This can either be done by an independent organization such as Kema or Lloyds or by a contractor. If the supplier can live up to these requirements by obtaining a high vendor rating, surpass the auditing or acquire certification, the supplier will be able to assure a specified level of quality control. Upon arrival at the factory, the contractor may eliminate entry control once a supplier has proved to be able to deliver reliable quality products on a continuous basis.

When asked if their contractor operated a vendor rating system, 59% of suppliers (41 firms) answered positively; while 41% (28 suppliers) stated that no vendor rating took place in their firm (see Table 6.16). When the same question was posed to the contractors, all of them stated that they apply vendor rating to the suppliers of vital or important products.

Table 6.16 Vendor rating and auditing applied by the respondents

	Suppliers	Contractors
Vendor rating:		
- yes	59%	100%
- no	41%	0%
Auditing:		
- yes	80%	100%
- no	20%	0%

Some 80% of suppliers (55 firms) stated that auditing is applied in their firm, which means that the supplier's production process is screened on quality by the contractor; 20% of suppliers (14 firms) say that auditing is not applied by the contractor. However, all contractors (100%) said they apply auditing to their suppliers.

When it comes to certification, only about 20% of suppliers stated that they have either an independent (12% or 8 suppliers) or a contractor's certification (9% or 6 firms). This means that the majority of suppliers (80%) have no certification at all and 89% of suppliers does not have a certification issued by an independent organization. The majority of contractors, however, do have a certification (57% or 4 firms); while 43% (3 contractors) do not have any certification at all. As argued in § 6.4, if vendor rating and auditing is applied to a firm, most contractors and suppliers perceive independent certification as being obsolescent. The high percentage of vendor rating and auditing and the low share of certification therefore emphasize this point.

Table 6.17 sets out the picture with respect to quality control: 80% of suppliers (55 firms) can supply to the contractor without any entry control but the remaining 20% (14 firms) still have to subject their products to entry control at the contractor's site.

About 86% of contractors responded that suppliers' products come to their plant without

entry control; while 14% (1 contractor) stated that the supplier's products occasionally enter their plant without entry control. The omission of entry control at the contractor's site indicates that the supplier's (quality) performance is considered adequate (through vendor rating and/or auditing) by the contractor and in that sense, the supplier is regarded as being reliable. It is usually on the basis of a high vendor rating and auditing and also on the fact that a firm is certified that a customer will decide to omit entry control.

Some 65% of suppliers (45 firms) have intermediate check points on the basis of 100% quality control at specific points in the production process, normally after every application in the production process; for 30% of suppliers (21 firms) quality control at intermediate check points is a random check; while 4% (3 firms) do not have any quality control at all. Of all contractors, 86% conduct a quality check after every application: 57% of all contractors apply it at random and 29% do the check on the basis of 100% quality control.

Table 6.17 Quality control operated by the respondents

	Suppliers	Contractors
Entry control at contractor's:		
- yes	20%	0%
- no	80%	86%
- sometimes	0%	14%
Intermediate check points:		
- yes, 100%	65%	29%
- yes, at random	30%	57%
- no	4%	0%
- missing cases	-	14%
Final quality control:		
- yes, 100%	28%	14%
- yes, at random	64%	57%
- no	8%	0%
- missing cases	-	14%
Inspection report:		
- yes	11%	14%
- yes, if requested	52%	86%
- no	7%	0%

If there are frequent intermediate check points there is less need for a 100% final quality control which is illustrated by the survey results. With respect to the final quality control of products, 64% of the suppliers stated they do apply it but at random; 28% apply it on the basis of 100% quality control; while 8% do not apply it at all. The majority of contractors (86%) apply final quality control: 57% at random; 14% apply it in its entirety and the rest abstained.

Beside quality control, 52% of suppliers will provide the contractor with an inspection report if requested; 11% always supply an inspection report; and 7% do not supply one. The majority of contractors (86%) said they receive an inspection report from their suppliers if requested; and 14% always gets an inspection report anyway. The small share of firms that supply an inspection report because the contractor demands one can be explained by the high percentage of vendor rating and auditing which reduces the need for it.

Supplier firms were asked what usually happens if they cannot fulfil the contractor's requirements with respect to quality or late delivery. Up to 32% said that there were no consequences as their components were very specialized or because the contractor had undertaken major investments, such as in a supplier's quality system. In both cases the contractor is not tempted to turn to another supply since money and time have been invested in equipment. By turning to another supplier, the contractor will lose even more. The contractor, however, does expect suppliers to improve/repair the components or otherwise make new parts. However, for 69% of the suppliers there were consequences if the components were not delivered exactly according to the contractor's requirements in relation to quality and on-time delivery. For the majority of suppliers (51%) the primary consequence is that the contractor will go to another supplier. This is most likely to happen in case of (repeatedly) late deliveries and the contractor being unable to produce as a result. Another 29% of suppliers stated that the contractor may demand a price reduction in case of

repair costs. A supplier may also reduce its price where competition is fierce or because the supplier wants to keep a new contractor and a succession of orders is very likely. One supplier even mentioned that it was prepared to give a price concession because the contractor was known to be going through a difficult period! Other circumstances that would allow for a price increase which is in the supplier's favour are if an order needs to be delivered quickly or if a very big order is made. The remaining 17% of suppliers are held responsible for the consequences of the damage incurred by not supplying according to the stipulations in the contract.

As discussed in the methodological chapter, two data collection methods were employed. In addition to a semi-structured questionnaire, it was decided that four case-studies would also be conducted (3 suppliers and 1 contractor) in order to add depth to the information provided by the semi-structured interviews as presented above. Section 6.6 below therefore examines the results of the four case-studies.

6.6 Case studies

This section will examine four specific case studies for the above-mentioned main issues of firm origins and background; production system; product design; and quality. Firstly, it explores how the three types of suppliers (main-supplier, specialist supplier and jobber), all of which have the same contractor, perceive the subcontracting relationships with their contractor. Secondly, the contractor's perception of its subcontracting relationships with the main-supplier, specialist supplier and jobber is examined. For reasons of confidentiality none of the firms in the case studies are mentioned by name, location or age of the firm (see Chapter 5). Both suppliers and contractor belong to the metal products industry (STIC code 34) and for all firms the broad definition of subcontracting (specified and non-specified products) is applicable (see § 5.3.2).

6.6.1 The main-supplier

Background

Some 72% (44 employees) of the main-supplier's workforce is directly involved in the production process which is very close to the survey average (75%) and indicates that a larger proportion of the workforce is involved in the technical and administrative side of the production process. In addition, 97% (59 employees) of its staff are employed on a permanent basis, which is a touch above the survey average (93%). Since a smaller proportion of the workforce is employed on a temporary basis (fewer peaks and troughs) this indicates a more stable, structural nature of the subcontracting relationships with its contractors than the average supplier in the survey.

The main-supplier's annual turnover was Dfl. 9 million which is somewhat below the survey's average of Dfl. 10.5 million. The main-supplier has experienced serious ups and downs in sales since 1984 ranging from positive growth (of up to 35% per year in 1986) to an annual decrease in sales (of -12% in 1987). This may be indicative of the main-supplier's dependence on a small number of customers or even single sourcing taking place: the main-supplier is one or the only one of a 'selected few' suppliers. If the main-supplier loses one big customer this will immediately be reflected in its sales figures.

Production system

Some 70% of the main-supplier's products are single components and another 30% are sub-assemblies. The main-supplier is 100% oriented to the specialized market with custom-made products and is engaged in the processing of semi-manufactures into end products. More specifically, the products are precision plating made of steelplate, polished steel, zinc-plate steel, stainless steel and aluminium which are used in products such as assembly plates, panels, frames, cupboards, panelling, desks and smaller parts.

The main-supplier operates on more than five different product market combinations

(PMCs) and supplies precision plating to companies that engage in the manufacture of products such as copiers, medical and communications apparatus. There has been an increase in already existing PMCs such as the communications and electronics industry which are both fairly new markets.

The firm, in common with most of the other suppliers in the survey, does not operate any of the new technologies in the production process with the exception of the use of a three-dimensional measuring apparatus. The main-supplier does, however, use CNC, NC and laser machines which are no longer considered to be new technologies.

The only type of technological innovations applied by the main-supplier are process innovations which are implemented with the use of the aforementioned technologies which are flexible and adaptable enough to facilitate these type of innovations. The main-supplier argues that the contractor is the one who carries out product innovations, thus reflecting the latter's domination of basic innovations, which in turn explains the absence of an R & D department. However, there is a development department which employs four people.

The main-supplier does operate a JIT system for the contractor which, in this case, means that the specialized parts are produced on a steady basis in the right quantity and quality; and are delivered straight to the contractor's production line. This reflects the nature of the main-supplier's products which tend to be the more strategic or vital components especially when compared with the products of the suppliers in the lower tiers of the subcontracting pyramid.

The conclusion from the above is that in many respects the main-supplier which is on the top of the subcontracting pyramid does not differ very much from the majority of the survey's suppliers with respect to the market supplied, the use of new technologies and the type of innovations applied. The only way in which the main-supplier differs from the survey is with respect to the application of the JIT system, as the former is one of the few suppliers in the survey that implements such a system for its main contractor.

Product design

The main-supplier develops the product design in cooperation with the contractor and expects a further increase in this type of cooperation in the future, thus reflecting the fact that co-makership is becoming more important. The main-supplier helps in developing the product design but this type of cooperation is still strongly under the contractor's supervision. In addition, the supplier stated that it does not, under any circumstances, accept any responsibility for product design.

The firm produces and supplies products which comply with the ISO 9002 certification and should guarantee their quality and reliability. Although its contractor does not operate a system of vendor rating (the rating of a firm's performance relative to other suppliers), it does apply auditing (regular visits by the contractor in order to check a supplier's production process and products). The contractor visits the main-supplier every 6 months to discuss the achievements in that period and other issues such as delivery, times and price.

The main-supplier's quality control system (ISO 9002) in effect, means total quality assurance throughout the entire organization from receipt of the order right up to the delivery of the products. The firm can deliver its products to the contractor without entry control, which indicates that the contractor perceives its products, its quality control system and in fact its entire organization to be up to scratch.

The main-supplier has only laid down product requirements in drawings and not in a contract. The firm maintains that it knows everything about the function of the product as this is the only way of producing a quality product that is not too expensive. Its production has never come across problems which were unsurmountable; and feels that its products do not need to be developed any further since it does no develop anything on its own accord. Product specifications will only change if the contractor requires so and seldomly takes place on the main-supplier's initiative which is usually only because of production

technical reasons.

The main-supplier differs in a number of ways from the majority of suppliers with respect to the various aspects of product design: unlike the majority of suppliers in the survey, the main-supplier is involved in product design but does not take any responsibility in product design as do most suppliers. The main-supplier is one of the few suppliers in the survey that has an ISO-certification; auditing is applied as it is to the majority of suppliers, however, no vendor rating is applied for the main-supplier whereas it is for the majority of suppliers in the survey.

The main conclusions from the main-supplier's case study is that it differs from the suppliers in the survey with respect to: the application of a JIT system which is required because of the strategic importance of the main-supplier's components; it is involved in product design (early supplier involvement) which is the result of the main-supplier's more intense relationship with its main contractor; it has an ISO-certification; and finally, no vendor rating is applied to the main-supplier since it is a preferred supplier anyway.

On the other hand, the main-supplier does not differ from the majority of suppliers in the survey with respect to: the market supplied (specialized); the lack of use of new technologies; the type of innovations applied (process innovations); the lack of an R & D department; no responsibility is taken in product design; and finally, auditing is applied. The absence of new technologies, product innovations and R & D department together with the fact that the main-supplier does not take responsibility for product design, is different from what was expected from this type of supplier since it is involved in the design stage.

6.6.2 The specialist supplier

Background

Some 88% (38 employees) of the specialist supplier's workforce is directly involved in the production process which is well above the average (75%). This indicates that a small proportion of the workforce is engaged in the technical and administrative work; and 98% (42 employees) of its employees are employed on a permanent basis which is also above the survey average (93%) and is a sign of the stable, structural nature of its subcontracting relationships.

The specialist supplier's annual turnover was Dfl. 4.5 million which is well below the survey's average of Dfl. 10.5 million. During the period 1987-1988 there was no growth in sales which is attributed to the starting up of new projects. There were some initial hick-ups but now the specialist supplier is reaping the benefits of its investments. Sales figures were up by 25% in 1990 when compared with 1989.

Production system

With respect to its production system, some 95% of the specialist supplier's products are single components and another 5% are sub-assemblies. With these products, the specialist supplier is totally oriented towards the specialized market with custom-made products. The specialist supplier is engaged in precision engineering technology and the production of precision according to the principal's drawings. More specifically, its products are parts for copiers, instruments and hydraulic apparatus. The specialist supplier operates on four PMCs, namely apparatus builders, pneumatics, hydraulics and the copier industry and there has been an increase in these in the past few years.

In common with the main-supplier and most other suppliers in the survey, the specialist supplier does not engage in any of the new technologies in the production process. The only exception is its use of a three-dimensional measuring apparatus. The specialist

supplier does, however, use various CNC machines for milling, grinding and turning.
The specialist supplier operates a JIT system for the bigger contractors: products are supplied to the various entrances at the contractor's and are directly used for assembly. This indicates that the supplier produces and delivers straight to the production line (so-called JIT production or JIT management) rather than for stock (so-called JIT delivery or JIT stock control) (see § 3.11).
The only technological innovations applied are process innovations while product innovations are solely the domain of the contractor. It comes as no surprise, therefore, that there is only a small development department - one person is in charge of the innovation of the production process in addition to their other work tasks.

Product design

For 20% of its products, the specialist supplier develops the product design in cooperation with the contractor although it is under close supervision by the contractor and expect this type of cooperation to increase in the future. In the majority of cases, however, the specialist supplier is not involved in product design at all and strictly produces according to the contractor's specifications. The specialist supplier has a 'gentleman's agreement' with the contractor to the extent that they consult each other about responsibility taken for product design.
The specialist supplier is not a certified supplier in any sense (independent or contractor's certification) but produces and supplies according to international standards but the firm hopes to achieve independent ISO 9002 certification in the near future. The main contractor does not operate a system of vendor rating for the specialist supplier, however, auditing is implemented by all the main contractors and by the smaller and more specialized customers. Every month the main contractor reviews product quality and the number of rejected items. The specialist supplier applies frequent quality checks (at the start and during every new job

process) and in addition, there is an inspection report. This report will be sent to the customer just in case there is a new order but it will also stay in the specialist supplier's files for the same reason. The specialist supplier delivers its products to the main contractors and also its smaller customers without entry control. In case of the main contractor, products can be supplied without entry control because they are produced according to the required (not certified!) AQL system; whereas in the case of the smaller customers there is no entry control simply because they have insufficient staff to deal with it.

Although in every case the specialist supplier has laid down the product requirements in drawings, they have not drawn up any contracts. The firm stated that it is knowledgeable about 60-70% of a product's general function and application. Most of the products have been produced before as there are a lot of repeat orders and, in case there are any problems during the production process, the firm will contact its contractor in order to solve them. The specialist supplier only tries to improve the production process in order to achieve a more competitive price. In 95% of the cases, changes during the production process are left to the contractor and only in a small number of cases is it at the specialist supplier's initiative and is solely for production technical reasons.

The main conclusions from the specialist supplier's case study is that it differs from the suppliers in the survey with respect to: the application of a JIT system for its bigger customers; for a small proportion of its products the specialist supplier is involved in product design (early supplier involvement); and finally, no vendor rating is applied to the specialist supplier since it is a preferred supplier anyway.

The specialist supplier does not differ from the majority of suppliers in the survey with respect to: the market supplied (specialized); the lack of use of new technologies; the type of innovations applied (process innovations); no R & D department; it has no ISO-

certification but applies frequent quality checks and also provides an inspection report while no entry control is needed at the contractor's site; responsibility is taken according to input in product design; and finally, auditing is applied.

The mix of the specialist supplier's characteristics reflects its intermediate position in the subcontracting pyramid.

6.6.3 The jobber

Background

Some 90% (26 employees) of the jobber's workforce is directly involved in the production process so it is well above the survey's average (of 75%) and leaves only 10% (3 employees) of the workforce involved in the technical and administrative side of the production process; and 96% (28 employees) of its employees are employed on a permanent basis which is also slightly above the survey average (93%). The high percentage of the workforce employed on a permanent basis may be an indication of the structural nature of the subcontracting relationship.

The jobber abstained from giving information about its annual turnover but did reveal that sales have shown a linear growth over the past few years: an increase of 20% over the past four years which can be explained by the positive cyclical demand.

Production system

The jobber mainly produces single products which are all customized. The firm manufactures precision sheet metal products for the electrotechnical, medical, petrochemical and audio/video industry. Over the past few years there has been an increase in the already existing PMCs due to the cyclical upturn.

This jobber firm operates a CAD/CAM system which is DNC (Direct Numerically Control) linked to various machines. In addition, the firm makes use of an advanced system of

Computer Aided Engineering for product designs. There is also laser cutting apparatus.
The jobber continuously works on its process innovations by improving its machinery but does not carry out any product innovations. This makes the basic innovations the sole preserve of the contractor with the consequence that there is no need for an R & D department.
The jobber stated that it operates a JIT system for some of its bigger customers. For the main contractor it will deliver its products on a JIT basis, that is it will deliver products on specified days directly to the production line without any entry control.

Product design

Despite its advanced Computer Aided Engineering system, the jobber stated that it in the majority of cases (70%) it has no say in product design; while in 30% of the cases it has an advisory role which has become more important in the past few years. Since the jobber does not contribute to a product's design, it takes no responsibility for the products manufactured. Things are only produced if they have the contractor's approval.
The supplier firm manufactures products which comply with DIN, NEN and ISO 9002 standards but is not yet a certified firm, however, it wants to apply for the ISO 9002 certification in the near future.
Some of the jobber's main contractors operate a system of vendor rating albeit with decreasing frequency; all main contractors do apply auditing to the jobber's firm.
The firm's quality control system is grafted on ISO 9002 which, according to the jobber, means that there is a quality check after every stage in the production process. In future this should evolve into complete process control and total quality assurance. The supplier firm delivers its products to the contractor without entry control.
The jobber has laid down product requirements in both drawings and in a contract. In 90% of the cases, the jobber knows everything about the product, as most products stem from a

repeat order. This is also the reason why the jobber in general experiences few problems during the production process. The jobber does not take part in product development since product innovation is totally the contractor's responsibility. Product changes during the production process are mainly (70%) initiated by the contractor; the jobber will only initiate changes on the basis of production technical or price technical reasons.

The conclusion from the above is that the jobber is in many respect as was to be expected. It has no R & D department; no input in and therefore no responsibility taken for product design; no certification; both vendor rating and auditing are applied. The remarkable findings for the jobber in this case study are that it operates a CAD/CAM system and also makes use of Computer Aided Engineering for product design while the main-supplier and the specialist supplier in the case studies (which are higher in the subcontracting pyramid) do operate any of these new technologies. Despite this, however, its contractor does not involve the jobber in a serious way in product design. And in common with the other suppliers in the case studies, the jobber operates a JIT system while in fact only a very small proportion of the suppliers in the survey do.

6.6.4 The contractor

Background

About 63% (600 employees) of the contractor's workforce is directly involved in the production process which is slightly below the average for contractors (67%) which indicates an even higher proportion of technical and administrative staff; while nearly 100% of its employees are employed on a permanent basis. This implies that capacity or cyclical subcontracting relationships (§ 3.3) are virtually absent, and subcontracting relationships predominantly have a structural nature.

The contractor could only provide the annual turnover for the whole organization which is Dfl. 1.9 billion which is more than twice as large as the figure for the average contractor

(Dfl. 975.5 million in 1990). The contractor stated that it has only experienced positive growth in sales over the past few years (1985-1990).

Production system

The main products supplied to this contractor are the single components. Some 95% of the products supplied are custom-made products, the rest being standard components. The contractor operates on only two PMCs (office and design equipment) and has experienced both growth and decline in these two existing PMCs.

The contractor operates a CAD/CAM system which is mainly used for prototype manufacturing and also uses a three-dimensional measuring apparatus (laser). The contractor claims to know more about the latest technology and equipment than any of its suppliers so it is not surprising that it applies both product and process innovations. The contractor will either design its own equipment to be used in the production process or it will buy existing machinery and possibly adapt it to process requirements.

The contractor has its own R & D department in which 25% (1,000 people) of its employees are employed on a full-time basis which rates it among the top in this survey. The contractor also makes use of an independent design bureau on an ad hoc basis.

Ten percent of the contractor's products are supplied on a JIT basis straight to the production line, while the majority of products are supplied in large batches to stock and are delivered on a weekly basis.

Product design

The contractor mainly develops products internally and independently which is very much 'the character of the firm' but some of its products are developed in cooperation with its suppliers, albeit under close supervision. A design bureau is hired on an ad hoc basis which reflects the fact that there is not a lot of early supplier involvement. However, the

contractor stated that it would like to see an increase in supplier involvement in product design in future. Because of this state of affairs, the contractor takes sole responsibility for product design. The contractor itself has no certification at this stage but aims to acquire ISO 9002 certification in a few years' time. Products are manufactured according to a range of international standards such as UL, Tüff, CSA, VDE and safety norms, however, only part of the firm is really certified for its production equipment and materials.

The contractor operates a system of vendor rating for those suppliers that will produce custom-made products (but not for the standard components) and the same applies for auditing.

The contractor conducts a 100% quality check after every stage in the production process (called 'unit quality control') and will also undertake a 100% final quality control before its products leave the premises. Only those suppliers to which vendor rating and auditing are applied and which passed the test can supply their products to the contractor without entry control. In the case of a new product, there will certainly be a full product quality check (0 series). Although the contractor does not require an inspection report from its suppliers, it usually gets one anyway.

The contractor firm has laid down the product requirements in both a contract and in drawings. The firm stated that it knows everything about the function of the products as most have been produced before or will have some specifications in common. The production has never dealt with insurmountable problems; the only times when problems arise are when producing 0-series and carrying out R & D. Product development is an ongoing process for the contractor and it will even bring products on the market before it has fully explored all the potential because of fast-changing consumer demand. Suppliers are only allowed to initiate product specifications during the production process if there are production technical reasons.

The conclusions that can be drawn from the contractor's case study is that it has the advantages which are related to scale, namely new technology, an R & D department and innovations. The contractor only requires a small minority of its suppliers to supply products on a JIT basis; and leaves little room for its suppliers with respect to product design. The contractor is not a certified firm but it does apply vendor rating and auditing to virtually all its suppliers. This contractor is still rather old fashioned and convinced that it knows more in most respects than any of its suppliers but it even expects more supplier involvement in the future.

6.7 Conclusions

Contractors or large firms are on average older firms than the suppliers; more suppliers than contractors are a private company (B.V.) and are also more often independent firms or so-called enterprises ('onderneming') than the contractors which are mainly establishments ('bedrijf'). In small and medium-sized supplier firms, which are characterized by a flat hierarchical structure, a larger share of the employees is firstly, directly involved in the production process and secondly, employed on a temporary basis (see Table 6.18) .

Table 6.18 Employees (%) and turnover in the repondent firms

	Employees				Turnover
Type of firm	direct	indirect	permanent	temporary	
Contractor	63%	27%	100%	0%	Dfl. 1.9 miljard
Main-supplier	72%	28%	97%	3%	Dfl. 9 million
Specialist supplier	88%	12%	98%	2%	Dfl. 4.5 million
Jobber	90%	10%	93%	7%	-

The reason for this is that suppliers function as a buffer for their contractors which means that suppliers have a smaller stable workforce. Because of their larger size (on average) and their position in the top of the subcontracting pyramid, turnover as a consequence is higher for contractors than for suppliers. And finally, suppliers have experienced more growth in sales over the period 1984-1990 than contractors did which accords with the view (§ 2.2) that the former are more adaptable to an economically volatile environment than the latter.

Suppliers tend to concentrate on single components and mainly supply a specialized market while for contractors, the main products are sub-assemblies and their main market is also the specialized market. Suppliers produce on average for more than 5 different PMCs while contractors for 3-5 PMCs.

Regarding the technical side of the production process, the research revealed that suppliers' main innovations are process innovations while for contractors product and process innovations are equally important. The under-representation of product innovations for suppliers indicates that their contribution in early supplier involvement is minimal as is the supplier's R & D. Lastly, only few suppliers employ a Just-in-Time system while this percentage is much higher for contractors.

There are various factors which contribute to the position of a supplier in a subcontracting relationship. Its contribution in production design, compliance with (inter)national standards, responsibility for product design taken, knowledge of and experience with products (to be able to deal with production problems and to take part in the further development of the actual products), are all factors that may strengthen or weaken a supplier's position.

It turned out that the suppliers' participation in product design although less than 50% is still higher than expected. The changes in subcontracting relationships since the early 1980s (less suppliers and more intense subcontracting relationships) (see § 3.1) makes the future

look rather promising in this respect as both suppliers and contractors expect the suppliers' contribution in product design to increase in future. As the suppliers' responsibility usually varies according to the input into product design, it follows that responsibility taken by the suppliers is rather low while it is much higher for contractors. The majority of suppliers also stated that they had produced that same product or something similar before which meant that they will be able to assist the contractor in product design more than they actually do at the moment.

Also, despite the fact that these suppliers have experienced production problems in the past, they were usually able to overcome these but when it comes to changes during the production process, the suppliers' role is reduced to merely dealing with production technical problems. The remainder of initiatives resulting in changes during the production process remain the domain of the contractor. It appears that the majority of suppliers have plenty of knowledge and experience which would greatly benefit the contractor but are not used.

Quality control can be dealt with in several ways. The various quality checks for supplier products used are intermediate check points (100% or random), final control at the suppliers (100% or random) and entry control at the contractor's site.

In addition to that, the contractor can apply both vendor rating and auditing to the supplier's production process and may require an independent or contractor certification.

The majority of suppliers said that their contractors applied both vendor rating and auditing while only a very small percentage have an independent certification or a contractor certification.

Because the supplier's share of intermediate check points and final quality control are high, the entry control at the contractor's can be kept low. Most suppliers are also prepared to provide their supplier with an inspection report and on top of that, the majority of suppliers are willing to accept the consequences (such as re-work and price reductions) if they fail to

live up to the expectations of the contractor (quality, on-time delivery and so on).

The case studies mainly underline what was revealed in the survey. None of the suppliers, except for the jobber have any of the new technologies in-house. The jobber has a Computer Aided Engineering system but this is not put to use through involvement in product design. The contractor on the other hand operates a CAD/CAM system.
None of the suppliers apply product innovations, but the contractor does. This results in the absence of an R & D department at the suppliers, while there is a large R & D department at the contractor's, with 25% of its workforce being employed in it.
All suppliers supply the contractor on a JIT basis whereas the contractor stated that only 10% of its suppliers do. This may be an indication of all suppliers in the case studies supplying vital components to its contractor.

When it comes to involvement in product design, the suppliers' input is disappointing. Both the main-supplier and the specialist supplier stated that in some, not all, cases they cooperate with the contractor in product design, but under close supervision. The jobber has only an advisory role in the product design stage, despite its Computer Aided Engineering system. Not surprisingly, the contractor stated that it mainly develops product design internally and independently which leaves little room for supplier involvement. However, the contractor would like to see this changed in future: the more integrated their production systems, the more each will benefit from the subcontracting relationship.
Therefore, the main-supplier and the specialist supplier will take responsibility according to their input in product design; and the jobber takes no responsibility whatsoever.
Of all suppliers, only the main-supplier has ISO 9002 certification. The contractor does not apply vendor rating; while vendor rating is applied to all three types of suppliers. The main-suppliers' quality control system is based on ISO 9002, while the other two types of

suppliers stated that they have frequent quality checks. All suppliers were able to supply to the contractor's without entry control.

Suppliers seem to be fair and adequate partners in every sense and deserve to take part in a subcontracting relationship on a 'win-win' rather than on a 'quid pro non' basis.

The next chapter will analyze the supplier and contractor firms through such issues as the supplier and customer base, single and multiple sourcing and the types of orders which are indications of a supplier's dependency on its customer base and the structural nature of the subcontracting relationships.

CHAPTER 7

SUPPLIERS AND CONTRACTORS

7.1 Introduction

Having established the general background and production process of the respondents' firms in the previous chapter, the second part of the empirical research will focus on the supplier and contractor firms, covering the following areas of inquiry:

- the supplier firm (§ 7.2): the type of suppliers, the type of products supplied, and their customer/supplier base;
- the contractor firm (§ 7.3): the respondent's major customers/suppliers, the kind of sourcing applied by the customer, the duration of the subcontracting relationship with the biggest contractor/supplier, the main type of orders and the support received from its customers and respectively given to its suppliers.

Using the method applied in the previous chapter, the second part of this chapter will analyze the same case studies for the above-mentioned issues (§ 7.4)

7.2 Type of supplier

On the basis of the questions which have already been analyzed, it seems appropriate at this stage to try to evaluate the type of suppliership which can be linked with the type of

products supplied. It is also important to find out how dependent a supplier is on its customers. There will also be a discussion of whether the customer and supplier base has changed in the past few years and why and finally, this chapter will try to establish whether the firms are supplying or being supplied by different manufacturing sectors now, as compared with five years ago.

Of all suppliers in this research, only 30% identify themselves as main-suppliers; 54% are specialized suppliers; while 16% are jobbers or capacity firms. Of all contractors, 71% (5 contractors) stated that they mainly deal with specialized suppliers; while 14% deal principally with main-suppliers and another 14% with jobbers. As already explained in Chapter 3, the subcontracting pyramid has the main-suppliers at the top, the jobbers at the

Table 7.1 Type of supplier

- main-supplier	30%
- specialized supplier	54%
- jobber	16%

Table 7.2 The main type of supplier the contractor deals with

- main-supplier	14%
- specialized supplier	71%
- jobber	0%
- missing cases	14%

base and specialized suppliers in between. Therefore, main-suppliers tend to have many suppliers below them. The main-suppliers at the top supplies higher value added components, has longer-term contracts and is usually involved in product design. The jobber is there to supply capacity and its contracts tend to be short or one-off. The majority of suppliers in this research are either main-suppliers or specialized suppliers and only a minority are jobbers. The large majority of higher value added suppliers may be partly explained by the fact that all suppliers are Nevat members. Contractors also deal mainly

with main-suppliers and specialized suppliers.

The character of the subcontracting relationship is affected by the type of products that are supplied. The supply of specialized products (specialty subcontracting) tends to require more frequent communication than standardized products (capacity subcontracting). Specialty subcontracting may create mutual dependency, long-term contracts and may eventually result in co-makership. Capacity subcontracting indicates that suppliers are easily replaceable and will result in short or even one-off contracts. As Table 7.3 makes clear, none of the suppliers in this research, whether jobber, specialized supplier or main-supplier, stated that they just supply standard products; 86% of suppliers produce custom-made products which means that they produce according to the specific requirements of the customer; while 14% supply both standard and custom-made products.

Table 7.3 The respondent's main type of products

Type of products	Supplier	Contractor
- standard products	0%	14%
- custom-made products	86%	43%
- both standard and custom-made products	14%	43%

On the other hand, contractors stated that they are mainly supplied with custom-made products (43%) or both standard and custom-made products (43%); another 14% of contractors are mainly supplied with standard products. The conclusion from the above is that the firms in this research are primarily involved in specialty subcontracting which is reflected in the predominantly custom-made nature of the products. This is not unexpected since contractors generally strive for standardization of the in-house production, this being more feasible because of scale economies. The contractor will subcontract more custom-

made products to the supplier, which explains the large amount of custom-made products. The indication, therefore, is that there is mutual dependency, with longer-term contracts and the option of co-makerships and early supplier involvement.

The average supplier in this research deals with 346 customers although the range of customers for all suppliers varies from as few as 7 up to 4,000 contractors. On the other hand, the average number of suppliers per contractor is 777 and in fact varies from a mere 100 to 4,200 firms. What is important is not the number of firms a supplier is dealing with, but the dependence upon them. A supplier's dependence can be expressed in the percentage of large customers and their contribution to a supplier's turnover (Leus, 1989). This is often referred to as the 20/80% rule, that is the situation where 20% of the customers make up 80% of a supplier's turnover, indicating a supplier's high dependency on just a few customers. Some contractors will set an upper limit (20% or 30%) to sourcing to safeguard the continuity of the subcontracting relationship. Table 7.4 shows that the 20/80% rule is applicable for the majority of suppliers in the research sample (65%); for 22% of suppliers (15 firms) this is not the case; while 13% did not know whether the 20/80% rule is applicable. The indication is that the majority of suppliers are very much dependent on just a few big contractors for their turnover. This implies a rather disadvantageous position for the majority of the suppliers.

From the other perspective, it turns out that the majority of contractors (86% or 6 firms) are dependent on just a few suppliers; while for one contractor a 70/30% rule was applicable. Dependency is often related to the size of the firm, a key finding in this PhD is that this is not necessarily the case as the contractors also display signs of high dependency level. The dependency issue will come up again in the next section and also later in this chapter when

Table 7.4 The applicability of the 20/80% rule

20/80% rule	Suppliers	Contractors
- yes	65%	86%
- no	22%	0%
- do not know	12%	0%
- missing cases	1%	-

analyzing the related issue of sourcing.

Suppliers and contractors are often aware of the dangers of high dependency on just a few firms for their turnover (in case of bankruptcy, a dip in the market or simply a better deal to be found elsewhere). For suppliers this is reflected in the fact that 71% (49 firms) saw an increase in their number of contractors in the past five years; for 13% the number of customers has remained stable; while in 17% of the cases there was a decrease in the number of customers (see Table 7.5). This may indicate a positive development as an increase in the number of customers will result in a decrease in

Table 7.5 The change in the share of the firm's customer/supplier base

	suppliers (%)
- increase in customer base	71%
- customer base remained stable	13%
- decrease in customer base	16%
	contractors (%)
- increase in supplier base	57%
- supplier base remained stable	29%
- decrease in supplier base	14%

in the number of customers will result in a decrease in supplier's dependency on a small number of customers which in effect, means that they become less vulnerable. When a supplier relies very much on a small number of customers this may mean that if a large customer or a big order drops out, the supplier may go bankrupt. Also there can be situations where a contractor has very high specifications which the supplier cannot influence for fear that it may lose the order or customer.

The reasons for the change in the number of contractors are numerous. The one most frequently cited for an increase in the number of contractors is because the supplier wants to spread the risk by supplying more contractors. Other reasons are that the supplier is carrying out a more active policy of acquisition (in striving for internationalization) through trade fairs, mailings, being a member of various trade organizations and employing a sales agent. Also, by becoming a specialized supplier or main-supplier many suppliers have gained new customers. Another reason for an increase in the number of contractors is the change that has taken place among the contractors: there are more new contractors, existing contractors want bigger orders (which results in an increase of turnover per contractor), orders have become smaller (and therefore the number of contractors has increased) or simply because the supplier selects contractors with a higher turnover. Other reasons mentioned include improvement of the product quality (possibly as a result of product or process certification), a wider range of products is on offer, production innovation (CNC, laser equipment, CAD/CAM and so on) and an increase in production capacity. Suppliers also mentioned that they have attracted new customers simply because of a change in management which has its own (new) contacts or simply because the firm is still young and is, therefore, likely to attract new customers.

A decrease in the number of contractors is most likely to have taken place because suppliers

have made a strategic choice and as a result have become more selective: they want to supply on a more structural basis (from jobber to specialist supplier and main-supplier) which results in suppliers dealing with fewer contractors in closer subcontracting relationships and higher value added. Other reasons are more mundane such as the loss of contractors to other suppliers (because they were too expensive or quality inadequate) or simply because contractors have gone bankrupt. One firm even mentioned that because of a burglary, they were not in full production at the moment.

For the majority of contractors (57% or 4 firms) the number of suppliers has clearly decreased; for another 29% (2 contractors) the number of suppliers has remained stable; and only 14% of contractors (1 firm) have seen an increase in the number of suppliers (see Table 7.5). As discussed in Chapter 3, contractors make the decision of either make-or-buy because in that way products are made by the real specialists and at a competitive price (cost-efficiency). There is a shift from demand pull to technology push. The decrease in the number of suppliers which was found in this research complies with the trend that contractors want to reduce their number of suppliers and that with the remaining suppliers it wants to intensify the subcontracting relationship with the remaining suppliers and move to a higher level (such as co-makership and early supplier involvement). This makes it possible for contractors to have higher demands such as zero defects, JIT supply and so on. For both the suppliers and the contractors a major finding is that subcontracting is clearly moving from capacity subcontracting to specialty subcontracting.

7.3 Type of contractor

For the majority of suppliers, the most important customers (72%) are located in all three of the Dutch regions (Randstad, Intermediate zone, Periphery); 13% stated that their most

important customers are located in the Intermediate zone; for 9% this contractor is located in the Periphery; while for 6% the most important contractors are located in the Randstad. However, in contrast to what was discussed in § 2.4, the national scale is more dominant than the regional or local scale for the supplier firms. This may reflect the fact that the Netherlands, a small country with a small economy, is equivalent to the regional scale in a larger country. Some 30% of suppliers stated that they do not export any of their products at all, which corresponds with what was argued in Chapter 2 about SMEs operating more on the national, regional and local market, rather than the international one. But of the suppliers that do export, 61% supply markets both in the neighbouring countries (such as Belgium, Germany and the United Kingdom) and in countries that are further away (such as Scandinavia, Ireland, Spain, France, Switzerland, the United States, Canada, Mexico, Brazil, Hong Kong, Korea, Indonesia and elsewhere). For 3% of suppliers it was mainly the neighbouring countries such as Germany, Belgium and France that are important for export; while for another 6%, products end up in a long-distance destination.

For 22% of the contractors, the main suppliers are located in all the Dutch regions; while for other contractors these were mainly concentrated in the Intermediate zone (33%), the Randstad (22%) or the Periphery (22%). Not surprisingly all large contractors without exception have contacts abroad and are much more export-oriented than smaller enterprises (see Chapter 2). The majority of contractors (71%) have dealings with suppliers all over the world while others (29%) are clearly focussed on a key neighbouring country, Germany.

The issue of dependency within a subcontracting relationship is relevant as it tends to greatly influence the character of that relationship (see §3.5.2). As will be explained below, dependency increases if a supplier maintains subcontracting relationships with a limited

number of contractors.

Single or sole sourcing is a situation where a contractor has a permanent supplier for a certain component (a specialty) through which the contractor gains economies of scale (and lower costs) but with the risk of putting all its procurement in the hands of a single firm (Dicken, 1992; Ministry of Economic Affairs, 1988). Single sourcing by a contractor is reinforced through high specialization, the reduction of investments in plants and tools, the necessity of rational manufacturing and the reduction of administrative costs (Ministry of Economic Affairs, 1988). With long-term contracts, the supplier may justify its decisions with respect to investments and people employed and will be committed to the further development of the product. In this way, interdependency will grow. Simultaneously, the supplier risks becoming less flexible, creative and alert to market changes, which will result in a reduction in product quality and also in increased dependency on the contractor (Leurs, 1989a).

Dual sourcing is the situation when there are only two suppliers from which the contractor obtains it components. The effects of dual sourcing on both contractors and suppliers are fairly similar to the ones of single sourcing and, even though dependency is still very high, it will be less than in the case of single sourcing.

When a principal firm buys its (standard) products from multiple suppliers it is referred to as the principal firm operating a system of multiple sourcing (Wissema, 1989). While the contractor strives to operate flexibly, its supplier commits itself to constant rationalizations, productivity rises and is put under constant pressure with respect to price, quality, logistics and so on (Ministry of Economic Affairs, 1988). This pressure is felt particularly in times of cyclical downturns.

When the principal firm operates a system of dual or multiple sourcing networks can

develop as the subcontracting network is spread more widely (Dicken, 1992).

In this thesis just two situations are analyzed, namely single and multiple sourcing. When asked what kind of sourcing their main contractor operates, 45% of suppliers (31 firms) stated that they apply single sourcing; while 54% (37 suppliers) stated that their contractor applies multiple sourcing; and 1% (1 supplier) did not know. This indicates a large number of suppliers only supplying one contractor with the implication, as mentioned above, of becoming less flexible, less creative and highly dependent. Some 71% of all contractors (5 firms) do apply single sourcing to their suppliers; and 29% (2 contractors) apply multiple sourcing for their main product. Single sourcing is more dominant among contractors than suppliers but in both cases the occurrence is high and implies a high dependency of suppliers on contractors.

Table 7.6 Sourcing and maximum sourcing

	Suppliers	Contractors
Sourcing		
- single sourcing	45%	71%
- multiple sourcing	54%	29%
- do not know	1%	-
Is there a maximum percentage for sourcing?		
- yes	26%	86%
- no	38%	14%
- do not know	36%	-

When asked whether the suppliers themselves applied a maximum percentage for sourcing, as Table 7.6 shows, 38% (26 firms) answered this question negatively; 26% (18 suppliers) do have a maximum percentage for sourcing; and 36% (25 suppliers) did not know

whether their firm usually applies a maximum percentage or not.

Often it is also not in the interest of the customer to be supplied on the basis of single sourcing. One supplier will often not have the knowledge or experience in related products and issues, something which may well be the case if there are a variety of suppliers. And just in case an order might drop out and the supplier goes bankrupt, the customer will not be able to place other orders with this same supplier. A contractor will often apply a maximum percentage for sourcing in order to protect not only the supplier but also its own business. The majority of contractors in the research (86% or 6 firms) do apply a maximum percentage for sourcing; and only 14% (1 firm) does not.

The conclusion to be drawn from this may be that contractors are very much aware of the importance of applying a limit to their sourcing. Suppliers on the other hand, seem less aware of it or simply do not act upon it and may end up being very much dependent on their customers.

Virtually all suppliers (99%) have been working together with their main contractors for over two years and of these, the majority of subcontracting relationships were started a

Table 7.7 Duration of subcontracting relationships with most important contractor/supplier

Duration	Suppliers	Contractors
- less than 6 months	-	-
- 6-12 months	1%	-
- 1-2 years	-	14%
- more than 2 years	99%	86%

couple of decades earlier (see Table 7.7). Only 1% of suppliers had started working together with their main contractor between six to twelve months earlier. When asked the

same question, the contractors stated that in the majority of cases (86% or 6 contractors) the subcontracting relationship with their most important supplier is mainly long term; while for the remaining 14%, the relationship was established one to two years previously (see Table 7.6). The conclusion from this is that subcontracting relationships are mainly long-term in character for both contractors and suppliers, which also implies the structural nature of subcontracting taking place.

The communication between a contractor and supplier can be an indication of the type of subcontracting relationship (specialized or standardized supply) and of their dependency on one another. Especially in the case of co-makership and early supplier involvement, with suppliers and contractors planning production jointly, there is constant communication (on a daily or almost daily basis) which allows suppliers to replace inventories of components with JIT-deliveries of needed inputs.

Communication between a supplier and a contractor can take place through meeting each other face-to-face or by telephone discussions (see Table 7.8). The respondents were asked to specify the number of times both personal and telephone contacts were made. The majority of suppliers (28%) indicated that they meet their contractors face-to-face twice a year; 20% see their customers three to four times a year; while 17% meet every month. Only a small minority of suppliers meet more frequently: either every week (6%) or fortnight (6%). Personal contacts tend to be more frequent with new customers, big customers, special series, while the whole quality issue also requires more frequent personal contacts. The majority of contractors stated that they meet their suppliers personally on an annual basis (57%); while others meet their suppliers twice a year (14%), three to four times a year (14%) or bimonthly (14%).

Table 7.8 Personal and telephone contact between the supplier and its contractor

Meetings	Personal	Telephone
daily	-	24%
almost/often daily	-	13%
weekly	6%	41%
fortnightly	6%	4%
monthly	17%	8%
once every 4 - 6 weeks	7%	-
3 - 4 times a year	20%	-
twice a year	28%	-
once a year	11%	-
at (inter)national fairs	3%	-
only if there are problems	-	3%
sometimes	-	1%
never met the customer	1%	3%

Contact by telephone takes place on a more frequent basis with the majority of suppliers being in touch with their contractors on a weekly (41%), daily (24%) or almost daily basis (13%). The majority of contractors stated that they phone their suppliers weekly (43%), while others are in touch daily (14%), fortnightly (14%), monthly (14%) or whenever needed (14%). Daily contact is quite common where Just-in-Time is applied, for the bigger customers, during current orders and also for special applications.

Both suppliers and contractors stated that during the design stage communication takes place more frequently and is often of a personal nature whereas during the production phase, communication is less frequent and is usually by phone. The requirement of frequent communication, especially face-to-face contacts may result in a spatial agglomeration of activities. It is usually the very specialized suppliers that are concentrated around the contractor but on the other hand, modern communication has made it possible for certain suppliers, which need less frequent contact, to be located farther away. The

conclusion from the survey may be that because of the frequency of communication by telephone and/or fax and the infrequency of personal contacts, suppliers do not necessarily have to be located at close proximity to the contractor firm. Frequent contact by telephone and fax also indicates that the type of products in the subcontracting relationships are of a specialized nature; while the daily/almost daily contact between supplier and contractor (37% for suppliers and 14% for contractors) implies JIT supply and co-makership.

The main type of order for suppliers are the repeat orders (74%); followed by the suppliers who stated that new, ad hoc and repeat orders were all equally important to them (14%); thirdly the new orders (7%); and lastly the ad hoc orders (4%). For the contractors the main type of order is also the repeat order (86%); followed by the contractor for which the new, ad hoc and repeat order are all equally important (14%) (see Table 7.8). The repetitive character of orders dominates in this research, and reflects the prevalent structural nature of subcontracting while cyclical subcontracting (ad hoc orders) is much less common (See Table 7.9). As already discussed in § 3.3 and §3.7.2, structural subcontracting will render contractors more flexible since they needs to spend less of their efforts on specialized knowledge, personnel, investments, production capacity and so on. In addition, the division of labour between contractor and supplier will increase a contractor's responsiveness to market demand.

Table 7.9 Main type of order

Type of order	Suppliers	Contractor
- new order	7%	-
- ad hoc order	4%	-
- repeat order	74%	86%
- all types of orders	15%	14%

On the other hand, cyclical supply tends to occur when the contractor tries to cope with strong demand fluctuations. Subcontracting will substantially reduce a contractor's risks. The products involved in cyclical subcontracting tend to be simpler components.

The support a supplier receives from a contractor is an indication of mutual involvement and will usually only take place in the case of structural subcontracting. When asked whether they receive any support from their most important contractor, only 6% of suppliers stated that they do receive financial assistance from their contractor; 39% receive 'know-how' support; 35% is supplied with material by the contractor; 32% receive support from their contractor for business reorganization; and only 4% receive support in other respects. In the last case, the contractor may put pressure on its suppliers to change or adapt its organization in order to meet the customer's requirements through the application of, for example, Total Quality Control, Just-In-Time or by requiring independent product or process certification.

In the case of know-how support, this percentage is probably so high because the supplier carries out applications on the customer's products. There are also various reasons for why a customer would provide a supplier with materials. It may be that the contractor can order materials in larger quantities and thus buy them at a lower price. Another reason is that the contractor can assure itself of getting the material in the right quality.

When the contractors were asked if they supported any of their suppliers, their response was far more positive with the exception of financial support (see Table 7.10). In the case of know-how support, 86% of contractors support their suppliers; 71% provide them with materials; another 71% said they give support whenever their suppliers change their organizational structure; and only 14% give their suppliers financial support.

When seen from the supplier's point of view, the contractor's support is rather

Table 7.10 Support received/given by the contractor

Type of support	Suppliers	Contractors
- Financial support		
- yes	6%	14%
- no	91%	71%
- missing cases	2%	14%
- Know-how support		
- yes	39%	86%
- no	35%	-
- missing cases	26%	14%
- supply of material		
- yes	35%	71%
- no	64%	29%
- missing cases	4%	-
- support for organizational change		
- yes	32%	71%
- no	64%	29%
- missing cases	4%	-
- other issues identified		
- yes	4%	14%
- no	96%	86%
- missing cases	-	-

disappointing while a completely different picture exist with respect to the contractor. When asked whether they wanted to change anything in the relationship with their contractor, the overwhelming majority of suppliers (93%) and all of the contractors (100%) answered positively. The issues most often cited by suppliers are discussed next. More open communication between contractors and suppliers is high on the priority list. Another complaint is that contractors are more demanding of their suppliers with respect to such factors as higher value added, better quality and so on, but are not prepared to pay higher prices. This is largely the result of a contractor's commercial spirit and its lack of

technological knowledge. This accords with the analysis in Chapters 2 and 3 which illustrated that it is the small and medium-sized suppliers which are put under pressure by the contractor. Also, for new orders, it is usually the supplier which does the cost calculations, while the contractor does not contribute in any way. In addition, the contractor is often not willing to work with open cost calculations which could give the supplier an insight in the contractor's total expenses, including what is paid to the supplier and which margin is feasible for subcontracting work. Some suppliers do appreciate that in certain manufacturing sectors such as the defense industry, prices are under constant pressure and do not leave room even for a marginal price increase in favour of the suppliers.

Another issue that the supplier would like to have changed in the subcontracting relationship is forecasting, something which is especially important in case of Just-in-Time supply. The main complaint is that contractors often do not plan well in advance and thus fail to give suppliers ample notice in order to be able to deliver products in time, but on the other hand, the contractor itself often does not know what is needed and by when. But sometimes it is also the case that the delivery schedules planned by the contractor are simply not realistic. Also, more suppliers would like to be involved in the design stage (early supplier involvement) as they have (technical) knowledge inhouse which is not used but which could benefit the product. Another issue that suppliers are often unhappy about is payment conditions because contractors pay either too late; pay too little before or during the production process; or payments are simply delayed for months.

Suppliers would also like to have more open communications with their contractors. There should be more consultation without the fear that the supplier will pass on sensitive information to competitors. Although this is perfectly feasible, it will cost time according to a lot of suppliers. Contractors also need to give clearer product specifications which will

prevent mistakes being addressed to suppliers unnecessarily. Frequent alterations in orders, number of products, drawings and so on are another source of problems. It is also maintained by suppliers that contractors have certain requirements from their suppliers which contractors themselves cannot live up to such as product specifications (where the measurements are too fine) and Just-in-Time supply (while the contractor itself does not produce according to a Just-in-Time production and delivery system). And finally, contractors will sometimes place a first order with a supplier in which the supplier has to invest a lot of money and time. Quite often this first order is not followed up by other orders, meaning that the contractor benefits from the supplier's investments and knowledge but will then turn to a cheaper supplier.

The contractor's complaints often refer to the supplier not being able to deliver on time, let alone on a Just-in-Time basis. Also, the supplier's contribution to the production process is often rather disappointing while, in fact, contractors would want their supplier's early involvement. Another issue is the exchange of information which needs to be streamlined and the need for a supplier to learn to point out what it can and cannot produce. This latter issue is one of the reasons why the contractor prefers to deal with main-suppliers as in this type of subcontracting relationship, communication can be more open, they also have more on offer and it also requires less coordination. Lastly, with respect to prices, contractors are reluctant to lower product prices and often use the excuse that they too are under pressure and, therefore, cannot change the price margins.

7.4 Case studies

This section will examine the four specific case studies once again, but with respect to the above-mentioned main issues. It begins with the three types of suppliers' (main-supplier,

specialist supplier and jobber) perceptions of subcontracting relationships with their contractor. This is followed by the contractor's perspective on its subcontracting relationships with the different types of suppliers.

7.4.1 The main-supplier

Type of contractor

The main-supplier's customer base is made up of 80 contractors, of which 20 firms are the most important ones. The fact that the main-supplier's total number of customers is well below the survey's average (of 346) clearly reflects the supplier's status of main-supplier. Such firms tend to deal with fewer customers in recognition of the fact that this type of subcontracting relationship is generally more demanding (higher value added products, more involvement in product design and so on). The 20/80% rule is applicable here and underlines the above statement regarding the main-suppliers' dependency on a limited number of contractors.

The main-supplier's number of customers has increased in the past five years and is the result of a conscious effort not to become too dependent on a small number of contractors by increasing the width of its product range. Even though the main-supplier's customers are located both in the Netherlands and abroad, the client base is dominated by a Dutch region because of the presence of a particular contractor.

The main-supplier stated that this contractor operates a system of multiple sourcing but the main-supplier is one of its preferred suppliers (see §3.5.2) to the contractor. This indicates that the main-supplier provides the principal firm with 'strategic' products which are directly related to the customer's main activities. The main-supplier itself makes a conscious effort to limit dependency on one supplier by imposing a maximum to the

percentage (20%) of its turnover supplied to one customer.

Communication between the main-supplier and its main contractor is on a daily basis, by telephone which is quite common for strategic components and in case of JIT supply. Issues that are discussed include work preparation and planning but in addition, the main-supplier and contractor will meet on a personal basis about three to four times a year. The main-supplier has been supplying the contractor on a long-term basis and the main type of orders are repeat orders, both elements imply that structural (specialty) subcontracting is taking place.

When asked whether the main-supplier receives any support from its main contractor, the former responded in the negative, except for material supply. The main-supplier stresses that it does not expect or want any support from its contractor and will only occasionally accept the provision of specific material.

The main-supplier did not want to change anything in its relationship with the contractor however, it suggested that it is very important for both to realize that a subcontracting relationship is not a one way street: it is not just the contractor which decides upon the price, quality control and so on. The only way to achieve a win-win environment is for all decisions to be made in mutual agreement.

Some conclusions can be drawn from the case study. The main-supplier is one of the contractor's 'vital few' suppliers (multiple sourcing) of strategic components which are directly linked to the contractor's main activities. This type of intense subcontracting relationships usually implies JIT and requires frequent, in this case daily, communication because of the customized nature and strategic character of its products. This is reflected in this case study as one of the preferred suppliers, the main-supplier is involved in a contractor's more intense, limited number of subcontracting relationships. Simultaneously,

the main-supplier has a small number of core contractors and the 20/80% rule is applicable which is also the case for the majority of suppliers in the survey. Nevertheless, the contractor is aware of this potential problem and makes a conscious effort to reduce its dependency, as does the majority of the suppliers in the survey. The main-supplier tries to achieve this by increasing the number of its contractors by broadening its product range rather than becoming too specialized as its contractor want it to be (§ 3.5.2). In addition, the main-supplier applies a maximum to the share of turnover supplied to one customer.

The structural character of the main-supplier's subcontracting relationship with its main contractor in this case study, the predominant type of subcontracting in the survey, is reflected in the fact that the former is a preferred supplier (since it takes a long time to elicit trust); but also in the long-term character of the subcontracting relationship; and the repetitive character of its orders.

Despite its status of preferred supplier, the main-supplier, in common with most suppliers in the survey, does not receive any support from its main contractor. And even though the former states that it does not want any support from its contractor, this may well be an indication of an unequal relationship.

7.4.2 The specialist supplier

Type of contractor

The specialist supplier's customer base is made up of 25 contractors which is well below the survey's average (346) and is most likely to be the result of the highly specialized nature of the products manufactured. The firm stated that the 20/80% rule is definitely applicable and thus acknowledges its dependency on a small number of contractors. There has, however, been an increase in its number of contractors because of an increase in

demand.

In contrast to the majority of suppliers in the survey, which mainly supply at the national level, the specialist supplier's key customers are mainly based at the regional level, namely the Intermediate zone and the Periphery, while neighbouring countries are also important. The salience of the main contractor highlights the dominance of one Dutch region as the geographical location of its customers.

The specialist supplier's main contractor operates a system of multiple sourcing, which is also the case for the majority of suppliers in the survey, and the specialist supplier is rated as one of the contractor's top ten preferred suppliers. And like most suppliers' customers in the survey, the contractor does not apply a maximum percentage to its sourcing and in fact only wants the specialist supplier to provide it with more products. The reasoning behind this is that the contractor wants to reduce the number of its suppliers in the Japanese fashion, and with the remaining suppliers, it wants to develop a more intense relationship (early supplier involvement).

In accordance with the survey findings, the character of the specialist supplier's subcontracting relationships is of a structural nature. This is reflected in the frequent communication between the specialist supplier and its main contractors: there is weekly communication between the specialist supplier and its main contractor by telephone or fax; personal meetings take place every month; and a structural discussion of issues takes place on a yearly basis. Further indications of the structural nature of subcontracting are its long-term duration, namely thirty years, and the predominantly repetitive character of orders (80% repeat orders and 20% new orders).

Different from what the majority of suppliers in the survey have experienced, the specialist supplier has received support from its main contractor with respect to know-how as well as

assistance in setting up its quality system.

The specialist supplier is perfectly happy with the subcontracting relationship with its main contractor which it perceives as a true co-makership relationship. It also appreciates that the know-how and service it supplies are included in the product's price.

The conclusion from this is that the specialist supplier is very dependent on a small number of contractors while its main contractor is also dependent on the specialist supplier since it is one of the contractor's preferred suppliers; the subcontracting relationship is of a structural nature which is reflected in the frequent communication, the long-term duration of the relationship and the repetitive character of the orders; and it has received support from its contractor with respect to know-how and the quality issue.

7.4.3 The jobber

Type of contractor

The jobber's customer base is made up of approximately 30 contractors and is, therefore, also well below the survey's average of 346. The 20/80% rule is applicable, as is the case for the majority of suppliers in the survey, and reflects the jobber's dependency on just a few contractors. The jobber's customers have increased as a result of the growth in subcontracting activity due to the cyclical upturn.

The firm's main customers are based in the west and south of the Netherlands and also in the neighbouring countries Belgium and Germany. This finding of the predominance of the regional level for the customer base accords with the discussion in § 2.4 but is at odds with the survey findings where the national level is most important.

The jobber argues that the contractor in this particular case study does not use it as a single source for its products even though some of its other customers do. As single sourcing is

reinforced through high specialization, this may be an indication that the products the jobber supplies to the contractor in this case study are not highly specialized which is quite common for jobbers anyway. The supplier itself, in common with a large number of suppliers in the survey, does not apply a maximum percentage to its orders for the customer in terms of turnover.

Communication between jobber and contractor is on an almost daily basis, mainly by fax but also by telephone. Structural issues are discussed during personal meetings which take place two to three times a year. The jobber has supplied the contractor on a long-term basis and orders can mainly be characterized as repeat orders, but there are also new and ad hoc orders. In future, the jobber prefers to no longer manufacture any products on an ad hoc basis as these are disruptive and unprofitable. Like most suppliers in the survey, the jobber does not receive any support from its contractor in any respect but in general, the jobber is happy with its subcontracting relationship. The only thing it would like to see changed is earlier order forecasts and it would also like to become more involved in the design stage.

The conclusion from the above is that the jobber is highly dependent on a limited number of contractors whereas the main supplier is not very dependent on the jobber since it applies multiple sourcing; the subcontracting relationship is of a structural nature which is reflected in the frequent communication, the long-term character of the relationship and the repetitive character of the orders; and finally, the jobber does not receive any support from its main contractor.

7.4.4 The contractor

Type of contractor

The contractor's customer base is made up of 400 suppliers, which is almost half the

survey's average of 777. In common with the survey finding, the 20/80% rule is applicable here and reflects the contractor's dependency on a limited number of its suppliers. The contractor's supplier base has remained unchanged in the past few years.

Even though the contractor's suppliers are located both in the Netherlands and abroad, the majority of its suppliers are located in one Dutch region.

Like the majority of contractors in the survey, the contractor stated that it applies a maximum percentage (20%) to its sourcing. The contractor, however, would prefer to apply a maximum percentage of 15% but there are also cases when this is as high as 25%.

Communication between the contactor and its JIT suppliers takes place every fortnight when they will discuss when the suppliers have to deliver on call. The contractor will meet the remainder of the top 30 suppliers once every two months. This is well below the survey average where the large majority (78%) of contractors meet on a daily, almost daily or weekly basis.

In common with the survey findings, the contractor has mostly been in long-term subcontracting relationships with its suppliers; the most common order is the repeat order while the other types of orders (new, ad hoc) are also occasionally given to suppliers. Both point to the structural nature of its subcontracting relationships.

The contractor gives support to its suppliers with respect to know-how and in case of a change in the firm's organization. In the latter example the contractor will send somebody to the supplier firm to give a seminar, most often about issues in relation to quality control. Most contractors in the survey, however, do not support their suppliers in any way.

There are a few thing that the contractor would like to see changed in the relationship with its suppliers, the most important of which is that the supplier should feel free to say what it

can and can not do. Suppliers tend to be unaware of their capabilities and are also not alert to the opportunities available. The result is that the contractor perceives the input of suppliers to be rather disappointing. Also, delivery reliability is not adequate which in effect means that 20% of orders are delivered too late. A final point was also made about certification. According to the contractor, suppliers overestimate the value of certification since in the end, certification is only a means to achieving a particular goal. Product certification is far more important than the certification of the entire organization in the contractor's views. Certification of the whole organization is no guarantee for product quality whereas product certification is.

The conclusion from this is that the contractor is dependent on a small number of suppliers; the structural nature of the subcontracting relationship is reflected in the long-term duration of its order and the repeat orders but not so much in the frequency of communication; and finally, its suppliers receive support with respect to know-how and organizational changes.

7.5 Conclusions

There are various indications in the research that lead to the conclusion that structural subcontracting tends to prevail. The first indicator is the duration of subcontracting relationships which, for both suppliers and contractors, are long-term in nature. The second indicator is the predominantly repetitive character of the main type of orders. Thirdly, communication between supplier and contractor is a useful indicator since a high frequency of communication is usually required in the case of structural subcontracting. Both suppliers and contractors score highly with respect to communication by phone (78% and 85% respectively). Fourthly, there is the support given by a contractor to the supplier. It is only on this indicator that the firms in this research do not score very well. The support

given to suppliers although not overwhelming, does take place. The majority of contractors stated that they do provide support with respect to know-how, material and business re-organization; but financial support was very limited. The majority of suppliers is this thesis are either main-suppliers or specialized suppliers, while contractors mainly deal with main-suppliers and specialized suppliers.

The research also concludes that there are clear indications that specialty subcontracting prevails: the majority of suppliers are main-suppliers and specialized suppliers; while contractors also mainly deal with main-suppliers and specialized suppliers. The type of products supplied are custom-made products while for contractors, custom-made products and standardized products are equally important. The frequency of communication is also an indicator of the specialized nature of subcontracting and as seen above, communication between suppliers and contractors is very high.

Another important issue is the degree of dependency of the supplier on the contractor. There are various reasons as to why a supplier might want to reduce its dependency on one or just a few contractors such as the loss of flexibility, creativity, economic vitality while the loss of a big contractor will have disastrous effects.

Sourcing is usually the indicator used for dependency (De Leus, 1989a; Van Eck, 1989)(§ 3.5.2). Contractors in this research apply single sourcing more often than it is applied to the suppliers, but in both cases, occurrence is high and thus dependency of suppliers on contractors is high. More contractors than suppliers are aware of the problems related to single sourcing, which is reflected in the large number of contractors that apply a maximum percentage to sourcing. The number of suppliers that have an active policy of limiting the percentage of sourcing is rather small. In the past few years, suppliers have witnessed an increase in their number of contractors which acts to reduce their dependency; while

contractors have seen a reduction in the number of suppliers, which corresponds with the trend of back-to-the-basics.

A remarkable finding in this research is that smaller firms mainly supply at the national scale and the regional/local scale is not nearly as important. This is different from what was to be expected from the analysis in § 2.4, namely that SMEs are predominantly oriented towards the regional and local market. Suppliers are, however, less export oriented than the contractors which does comply with the expectations (§ 2.4.1).

Both suppliers and contractors would like to change something in the subcontracting relationship and the issues raised are numerous such as more open communication, higher prices for more services, better forecasting, early supplier involvement and better payment conditions.

The case studies mainly underline the survey results in the sense that the 20/80% rule is applicable to all firms, including the contractor. All suppliers stated that the contractor applies multiple sourcing but the main-supplier and specialist supplier rate among a limited number of preferred suppliers for the contractor. The main-supplier does apply a maximum to what it would supply to one contractor; the specialist supplier abstained from giving information; while the jobber does not apply a maximum. The contractor would prefer not to see a maximum applied to sourcing as it wants to intensify the relationship with its preferred suppliers. As discussed in § 3.5.2, longer term subcontracting relationships tend to result in more intense and a reduced number of relationships. If a maximum percentage is applied to sourcing, it may prevent closer (higher value added) subcontracting relationships.

For all parties involved their main subcontracting relationships are long-term ones, principally involve repeat orders and all suppliers receive support from the contractor in

some way.

All suppliers in the case studies professed to be happy with the subcontracting relationship which differs from what was to be expected and also differs from the survey findings. The contractor, however, would like to see some changes in the performance of the suppliers with respect to supplier involvement in product design and better delivery reliability.

The next and last empirical chapter will analyze whether the respondents perceive the Dutch government and the European Union to be supportive with respect to the provision of know-how, financial and other assistance. It will also examine how the respondents perceive the Internal Market and what they expect their future business strategies to be.

CHAPTER 8

SUBCONTRACTING: GOVERNMENT AND EUROPEAN UNION POLICY SUPPORT

8.1 Introduction

In the previous empirical chapters the background of the firm, the production process and the type of suppliers and contractors were analyzed. In the remaining empirical chapter, the research will focus its attention on:

- the support of the Dutch government and the European Union (§ 8.2) with respect to finance, know-how and information as perceived by the respondents; and
- 1992: The Internal Market of the European Union (§ 8.3) which tries to establish where the respondents' main customers or suppliers are within the European Union; whether they expect subcontracting relationships to change as a result of '1992'; and how they perceive their own competitive position relative to neighbouring countries with respect to factors such as know-how, marketing, price and quality.

The final section (§ 8.3) draws together the results and will also point out the most notable findings of the empirical research.

8.2 The support of the Dutch government and other organizations

When looking at the external support both suppliers and contractors receive there are a few major points to illustrate (question 60 - 66; See Table 8.1). From the research it becomes clear that contractors systematically receive far more support from the Dutch government than suppliers do, not only with respect to finance (100% as opposed to 41%), but also when it comes to know how (71% as opposed to 22%) and the provision of information on European Union support (86% as opposed to 49%). Secondly, contractors also receive more support from the European Union with respect to finance (43% as opposed to 10%) and know-how (57% as opposed to 1%) than suppliers.

Table 8.1 External support to firms

Type of support	Suppliers		Contractors	
Dutch Government support:	yes	no	yes	no
- Finance	41%	59%	100%	0%
- Know-how	22%	78%	71%	29%
- Info EU-subsidies	49%	51%	86%	14%
European Union support:				
- Finance	43%	57%	57%	43%
- Know-how	57%	43%	43%	57%

When one examines more carefully the financial support suppliers receive from the Dutch government, it can be seen that it ranges widely: subsidies for process control, automization (for CAD/CAM), innovation stimulation (INSTIR or Innovatiestimuleringsregeling), investment projects, development credits (PIR), for advice and labour legislation, Programmatic Stimulation of Technology in firms (PBTS or Programmatische Bedrijfsgerichte Technologie Stimulering), management support (SMO

or Subsidieregeling Management Ondersteuning) for the introduction of a quality handbook and quality design (external design costs) (K & L or 'kwaliteit' and 'logistiek'), small scale allowances (KST or 'kleinschaligheidstoeslag'), training (SSWB or 'Subsidieregeling Scholing Werkenden in het bedrijfsleven'), for the attendance of (inter)national fairs and for environmental issues. The main subsidies that most smaller firms used to receive in the past but which have since been abolished are the WIR-subsidy on investments ('Wet Investerings Rekening', abolished in 1988) and the IPR, an investment premium for regional projects ('Investeringspremieregeling Regionale Projecten'). On the other hand contractors receive subsidies from the Dutch government mainly for training, development projects for innovations, new products, certain product lines and also subsidies as loans. Suppliers' support with respect to know-how comes mainly from TNO, which is the institute for applied manufacturing research, the Chambers of Commerce, regional Innovation Centres and Quality Circles, universities, polytechnics, Kema (the institute for certification of electrotechnical materials) and certain industrial organizations such as PKM (the productivity centre for metal manufacturing), the Union for the Metal Industry ('Metaalunie'), the Dutch Institute for Welding Technique and so on. Support for contractors with respect to know-how is fairly similar, this being mainly from TNO, universities and polytechnics.

Suppliers receive information on the availability of subsidies from the European Union from all sorts of sources: the Ministry of Economic Affairs (through their export bulletins), the Chambers of Commerce (which have a subsidy newspaper), Innovation Centres, Quality Circles and industrial and employers' organizations. Other sources are independent 'subsidiologists' (which is true for 13% of the suppliers in this research) and of course

accountants. Often Chambers of Commerce, Innovation Centres and Quality Circles which are all regionally based, play an important role for suppliers. They are physically closer to what often results in more personal contacts or, in other words, they are easier to visit.
When looking at contractors it becomes clear that they get their information on EU-subsidies from the Ministry of Economic Affairs through their newsletter but their main sources are their own subsidiologists and/or their accountants.

The financial support from the European Union for suppliers comes from the ESF (European Social Fund), the ERDF (European Regional Development Fund), the EDF (European Development Fund), the ECSC (European Coal and Steel Community) and subsidies to support quality development. Know-how support is received through the BRITE (Basic Research Industrial Technologies for Europe), EUREKA (EUropean REsearch Cooperation Agency) and ESPRIT (European Strategic Program for R & D in Information Technology) programs. Know-how support also proved to be available for environmental investments. For contractors financial and know-how support came through the EDF, BRITE, EUREKA and ESPRIT.
The majority of suppliers expressed the view that subsidies were obsolescent for the functioning of the business and that they distort competition and thus the free market system, such as the subsidies that stimulate export. Some of the suppliers who expressed this view often felt that it was far easier for multinationals to get subsidies because they have more time and personnel - they often have a special legal department solely for this purpose. This corresponds with the findings in Chapter 2. Two contractors also stated that they thought subsidies were not really necessary and not very useful indeed, as firms ought to be able to cope on their own without any government support.

Others voiced the opinion that they were not able to receive subsidies for reasons such as the fact that they are tied to secrecy for their product development, which would not allow for the openness required to obtain subsidies; because their products are not innovative; the lack of 'channels' (knowing the right people); and not least because of the lack of time, money and personnel (see Chapter 2).

Some respondents thought that subsidies were indeed useful but only if awarded with great care. A frequently expressed view was that in principle, every firm, large or small, and irrespective of the manufacturing branch (not just protected branches!) should be eligible for subsidy in order to prevent (positive) discrimination and in order to avoid the adulteration of competition as much as possible. Also, before applying for subsidy, a firm should look at what is really beneficial for itself and which equipment it really requires. Firms should not let the conduct of business be dependent on the acquisition of government subsidies. Some suppliers also supported the view that subsidies should be provided on a temporary rather than on a continuous basis since subsidies should not be perceived either as yet another or the sole source of income! Subsidies can, however, be useful in the case of innovation, in the development phase as it can act as a catalyst to rapidly develop certain technologies, in case of unemployment, training of personnel, the start of a new project, it can help firms to enter the new Internal Market of the European Union and help to explore other international markets.

However, the bottom line for many firms is that a firm needs to be strong and sound in order to survive and in that sense, subsidies can and should only contribute partly to the development of the firm.

The conclusion that can be drawn from the discussion above is that the closer the

organization is geographically to a firm, the easier it is for smaller firms to take the step to contact them. The greater the physical distance, the more difficult it gets for smaller firms to really know what is available with respect to subsidies. This in turn implies that there is not sufficient simply to provide an on-line computer information system that can be accessed remotely. This may be a policy worth pursuing by the Dutch government or the EU.

8.3 1992: The Internal Market of the European Union

The last part of the empirical research tries to explore how important the Internal Market of the European Union is, by asking firms where their main contractors or suppliers are within the European Union; whether they expect subcontracting relationships to change because of '1992'; how they perceive their own competitive position in comparison with neighbouring countries with respect to various factors such as know-how, marketing, price, quality and Just-in-Time; and what future business strategies they expect to pursue as a result. Lastly, all firms were asked how they had prepared themselves for the Internal Market of the European Union. All of these are important issues as the competitive position of Dutch firms vis-à-vis other Member States of the European Union will determine upon their future.

For the majority of suppliers, the most important customers are at the national level (60%); for a smaller proportion these are at the regional level (20%); closely followed by the international level (19%); while for a very small minority (1%) the most important contacts are at the local level. For the contractors the most important suppliers are at the international level (44%); for 33% these are the regional level; and the remainder (22%) is at the national level.

One conclusion that can be drawn from this is, as expected, that contractors are mainly

internationally oriented for their supplies. It is remarkable that for the contractors in the research, the regional level is more important than was expected. This may indicate the existence of regional networks caused by JIT supply which requires close proximity of suppliers.

To summarize, for the majority of suppliers, subcontracting relationships are within the national border (81%); while for contractors the subcontracting relationships within the national borders are only slightly more pre-dominant that the ones which operate at the international level. From the discussion in Chapter 2 it was expected that SMEs would mainly operate on the local and regional market, however, it turns out that the majority of Dutch SMEs operate at the national level. On the international scale, in effect the combination of the small firm size and the high density of business activity concentrated in the core zone mean that the Dutch economy is a regional one. This may be explained by the fact that the small and medium-sized suppliers, which are all Nevat members, tend to be more specialized than the average Dutch small and medium-sized supplier and, therefore, operate at the national level and even export directly, rather than indirectly via the contractor. It is generally acknowledged that the previously non-integrated EU-market, with its varying national standards, has long inhibited export. The opening up of the internal EU-borders and the convergence of the various national standards will serve to boost export even further and will generate more opportunities for economies of scale to be achieved. As a result, nothing should prevent firms from operating on the international market any longer.

The first question investigated the effect that the creation of the Internal Market was

expected to have on firms' position as a supplier or contractor respectively within the subcontracting relationships (see Table 8.2). The majority of suppliers (76%) and contractors (57%) do expect changes to take place as a result of '1992'. Contractors expect there to be more opportunities for them because of the intensified competition among suppliers. There will also be an opportunity for them to increase production and thus they expect to be able to reap the benefits of economies of scale because of standardization. Also a large number of suppliers (52%) state that they see the opening up of the Internal Market as an opportunity for increasing their export because of the physical disappearance of internal borders, the conformation of national and product standards, and lastly because they will be able to export directly rather than via the contractor.

Table 8.2 Whether your position as a supplier/contractor will change because of '1992'

	Supplier		Contractor	
Yes:	76%		57%	
- increase in export		52%		-
- increased competition		35%		75%
- increase in scale		-		25%
- specialization		3%		-
- cooperation between suppliers		1%		-
- but is prepared (ISO 9002)		4%		-
- less independent small firms		1%		-
- limited influence of '1992'		3%		-
- remainder		1%		-
No:	24%		43%	
	100%	100%	100%	100%

In the past, the internal borders impeded export by smaller firms which were unable to deal with all the paperwork involved. Another consequence of '1992' is the increase in

competition which is expected by 35% of suppliers. Some suppliers, however, fear more from the competition from Japan than from any other country in the European Union: when establishing a firm in the European Union Japanese contractors tend to bring along their own suppliers rather than place orders with existing European suppliers. Other consequences of the Internal Market expected by the suppliers are increased cooperation between suppliers and increasing specialization of the suppliers (from jobber to specialized supplier and main-supplier). Others expect changes because of increased competition and opportunities but say they are prepared because of their ISO-certification which makes them qualified suppliers for all countries within the European Union. One supplier expressed the opinion that it expects a decrease in the number of small, independent firms simply because they are being squeezed out of the market by more competitive firms that have more on offer with respect to value added and input in product design (early supplier involvement).

There are also suppliers which expressed the opinion that they do not expect any changes in their position as a supplier (31% of all suppliers) as a result of '1992', their reasoning being that export opportunities will increase as will competition and that these two factors should balance one another. Others stated that nothing will change because even though the Internal Market will open up, people's mentality will not (national chauvinism). Contractors were slightly less optimistic than the suppliers. Some 43% expect no changes because of '1992', which may be attributed to the fact that suppliers generally are much more adaptable to market changes than contractors.

Both types of firms were asked if they expected their subcontracting relationships to change because of '1992' (see Table 8.3). The majority of suppliers (71%) and contractors (86%)

answered in the negative. Suppliers did so because they do not expect smaller contractors to change their subcontracting relationships, while others state that suppliers, especially the ones that are main-suppliers do not have to worry because of '1992'. Main-suppliers tend to be involved in subcontracting relationships with contractors which are limited in number and more intense in nature, while they are also longer-term and have a higher value added. They can therefore be described as structural or specialty subcontracting relationships (§ 3.3 and § 3.5.2).

Table 8.3 Whether subcontracting relationships will change because of '1992'

	Supplier	Contractor
Yes	29%	14%
No	71%	86%

There were various reasons why the suppliers (29%) and contractors (14%) expect changes in subcontracting relationship. The majority of these suppliers expect the relationship with their contractors to become more intense (30%); it will come under pressure because of increased competition (25%); and the whole quality concept will become more important within the subcontracting relationship (15%). All these clearly point in the direction of the contractor seeking to reduce its suppliers and expecting an even higher level of performance from the remainder. This chimes with the findings in Chapter 3 of Back-to-the-Basics and increased subcontracting with fewer direct suppliers. There are also suppliers who think that subcontracting relationships will become less personal because of the increase in physical distance, while some think that this will occur because Just-in-Time contractors will stick to suppliers that are located nearby as more personal contact is possible.

Firms were also asked how their performance compared with neighbouring and other EU-countries with respect to know-how, marketing, price, quality and JIT supply (question 70 - 75) (see Table 8.4). In other words: should the suppliers have anything to fear as a result of the disappearance of the internal EU-borders and the creation of the Single European Market? Some 54% of all suppliers and 86% of all contractors believe that their know-how is strong in comparison with other countries; 32% of all suppliers say their know-how is equal to that of other countries; 14% of suppliers admit their know-how compares unfavourably with other countries; and the remainder (14%) abstained from answering this question. The conclusion from this may be that the level of know-how at least equals those of the surrounding countries. Know-how is a strong point.

With respect to marketing, 23% of all suppliers and 29% of contractors say their marketing rates well in comparison with other countries; 22% of suppliers and 43% of contractors say their marketing scores equally well; while 55% of suppliers and just 14% of contractors admit to their marketing being rather weak. The majority of firms (both suppliers and contractors) acknowledged that their marketing was not a particularly strong point. For a majority of suppliers and only a minority of the contractors, marketing scores rather low when compared with other countries but this was especially the case for suppliers.

On price, the opinion between suppliers and contractors differs significantly. While 45% of suppliers says their price scores favourably in comparison with other countries, only 14% of the contractors would concur with this; for 26% of suppliers and 29% of the contractors, price scores equally in comparison with the competition abroad; and 29% of suppliers and 57% of contractors admit to this being an area of weakness. For the majority of suppliers price is a strong point while the majority of contractors stated that this is rather a weak area.

The answers show that quality is another strength: 74% of suppliers and 57% of contractors say they score favourably at the international market; 22% and 29% say they score equally well; 4% of suppliers see it as a negative point. For almost all suppliers and contractors, quality rates well when compared with other countries.

Table 8.4 The competitive position of suppliers and contractors on the international market

Issues		Suppliers	Competitors
Know how	strong	54%	86%
	equal	32%	-
	weak	14%	-
	n/a	-	14%
Marketing	strong	23%	29%
	equal	22%	43%
	weak	55%	14%
	n/a	-	-
Price	strong	45%	14%
	equal	26%	14%
	weak	29%	57%
	n/a	-	14%
Quality	strong	74%	57%
	equal	22%	29%
	weak	4%	-
	n/a	-	14%
JIT supply	strong	22%	-
	equal	19%	14%
	weak	59%	57%
	n/a	-	14%
Other issues	strong	61%	57%
	equal	6%	14%
	weak	1%	14%
	n/a	32%	14%

However, Just-in-Time supply appears to be a very weak point: 22% of suppliers and 0%

of contractors say they score favourably with the competition abroad; 19% and 14% say they score equally on the international market; 59% and 57% say it definitely is a weak point. For the majority of suppliers and contractors, JIT does not score well when compared with other countries.

When asked if there were any other issues on which they would score positively, flexibility scored high among suppliers (57%) and contractors (43%), while other strong points of suppliers are quick delivery time, favourable location (which for some other suppliers was actually a weak point, especially with respect to international supply), product capacity, product range and lastly the supplier's ability to speak several languages which helped greatly in communicating.

The conclusion from the above is that know-how, quality and also price may be perceived as the key strengths of Dutch firms; marketing, price and JIT supply remain rather weak; while there are mixed feelings about the price. Since know-how and quality are strong points it appears that the future strategy for suppliers ought to be to move up the subcontracting pyramid. However, JIT supply still needs some dramatic improvements. The Dutch government and the EU can perhaps help develop this a little bit more, while they could also help firms set up a better marketing system. Price differentials are not necessarily a problem, provided they are compensated by a high quality, early supplier involvement and so on.

Another set of questions refers to the respondents' business strategy and whether it was likely to be influenced by the Internal Market (question 76 - 82) (See Table 8.5). Both suppliers (88%) and contractors (57%) expect an increase in production in the next few years; 12% of suppliers and 29% of contractors think it will remain stable; while none of

the suppliers and only 14% of the contractors predict a decrease in production. Demand for products will mainly increase according to suppliers (86%) and contractors (57%); while

Table 8.5 Future business strategies for suppliers and contractors

Business strategy		Suppliers	Contractors
Production	increase	88%	57%
	stable	12%	29%
	decrease	0%	14%
Demand	increase	86%	57%
	stable	13%	43%
	decrease	1%	0%
New products	increase	84%	100%
	stable	14%	0%
	decrease	1%	0%
New production processes	increase	72%	86%
	stable	28%	14%
	decrease	0%	0%
New markets	increase	68%	71%
	stable	32%	29%
	decrease	0%	0%
New establishments	increase	36%	57%
	stable	64%	43%
	decrease	0%	0%
Other initiatives	increase	49%	43%
	stable	49%	14%
	decrease	1%	43%

13% of suppliers and 43% of contractors believe that it will stay stable; and neither expect demand to decrease (suppliers 1%, contractors 0%). The majority of firms expect that they

will develop new products in the foreseeable future (84% of suppliers and 100% of contractors); and just 15% of suppliers do not expect to produce any new products. New production processes are also on the agenda for 72% of suppliers and 86% of contractors, as are new markets for 68% of suppliers and 71% of contractors. Finally, new subsidiaries are only expected by 36% of suppliers and 57% of contractors. The conclusion that can be drawn from this is that suppliers feel more confident about future business strategies, especially increases in production and demand, than contractors. This may be the result of their resilience in an economically volatile environment (see § 2.2).

'Other' business strategies are expected by 49% of suppliers and 43% of contractors. These include sales outlets abroad (in other words, more export) of which Germany, Belgium, France and Eastern Europe are most often cited followed by the United Kingdom, Spain, Turkey, the United States and Asia; quality is also high on the priority list, certainly in preparation for the Internal Market; participation at (inter)national trade fairs; expansion of the existing firm through acquisition; to augment cooperation with other firms; to become a real co-maker and expand engineering activities; to produce a new or own product; while other issues mentioned are automization and the development of marketing strategies. All these future business strategies indicate that firms strive to increase their turnover (sales outlets; trade fairs; acquisition) and/or increase value added (through quality improvement; cooperation; co-makership and so on). The latter implies the supplier's intention to move up in the subcontracting pyramid.

The final question asked if firms had prepared in any way for the opening up of the Internal Market (See Table 8.6). Suppliers answered with a firm yes (63%) and contractors with a resounding no (71%). The suppliers which said they had or were still at the time preparing

for '1992', did so mainly by working on their ISO-certification (28%); by taking part in (inter)national trade fairs (26%), by establishing production firms and sales outlets

Table 8.6 Did you prepare for '1992'

	Supplier	Contractor
Yes:	63%	29%
- is working on ISO-certification	28%	
- takes part in international trade fairs	26%	
- has production firms, representatives and sales outlets abroad	18%	
- internal courses on '1992'	6%	
- may cooperate with international suppliers	6%	
- marketing	6%	
- other reasons	10%	
No:	37%	71%

abroad and also by employing sales representatives (18%). Others had prepared by taking internal courses on '1992', some are seeking cooperation with other suppliers abroad and marketing was also actively pursued. Suppliers, more so than contractors, feel the need to improve their performance in order to be able to survive in the Internal Market of the European Union which is also part and parcel of their more dependent position within the subcontracting pyramid.

8.4 Conclusions

Both suppliers and contractors receive support from both the Dutch government and the European Union. However, as expected, suppliers receive far less support from the Dutch government than contractors in all respects (financial, know-how, EU-information and so

on) and the same can be said for support given by the European Union. The reason for this seems to be that larger firms have more time, people and money available to explore carefully the opportunities to receive subsidies. It does seem, however, that physical proximity to organization that provide subsidies and information helps SMEs to overcome the initial barriers.

The importance of the Internal Market of the European Union is reflected in the location of firms. For suppliers the most important contractors are within the national borders while contractors state that their suppliers are important at both the national and the international level. A key finding of this thesis is that for suppliers, the most important customers are to be found at the national, rather than at the regional or local level. This may be explained by the fact that the respondents, which are all Nevat members, tend to be more advanced and specialized that the average Dutch small and medium-sized supplier.

A large majority of suppliers expect their position as a supplier to change because of '1992' while a smaller majority of contractors expect the same. Suppliers expect a lot of exports in this context, but also believe that there will be increased competition. Contractors explain the change mainly in terms of increased competition and the opportunity for scale economies. However, the majority of suppliers and contractors do not expect subcontracting relationships to change because of '1992' as they anticipate that increased business opportunities and increased competition provided by the Internal Market will balance each other.

Compared with other countries suppliers perceive their know-how, quality and flexibility as their strong points whereas price and particularly marketing and Just-in-Time supply, are perceived as their weak or very weak points. Contractors also perceive know-how and quality as their strong points; and marketing, price and JIT supply as the weak ones.

However, suppliers generally perceive their price more positively than do contractors and this can be explained by the fact that suppliers often still have to compete for orders on the basis of price (price competition).

With respect to future strategies, suppliers expect a future increase in production, demand, new products, new production processes and new markets while they are less optimistic when it comes to new establishments and other initiatives. Contractors anticipate major future increases in new products, new production processes and new markets; while a small minority expect an increase in production, demand and new establishments. Suppliers are generally more positive about future business strategies which may be related to the SMEs characteristic of coping well in economically volatile situations.

The majority of suppliers were preparing for the opening up of the Internal Market mainly by working on their ISO-certification, by taking part in (inter)national trade fairs more frequently, by establishing production firms and sales outlets abroad and also employing more sales representatives. There was only a minority of contractors which stated that they are preparing for the Internal Market. Suppliers, more so than contractors, feel the need to improve their performance in order to cope effectively with increased competition. It is also because of their more dependent position within the subcontracting pyramid that suppliers feel this need for performance improvement.

The last chapter summarizes the research, draws together the overall conclusions and makes some policy recommendations.

PART 3

SUMMARY AND CONCLUSIONS

CHAPTER 9

SUMMARY AND CONCLUSIONS

9.1 Introduction

The major changes that have taken place in the manufacturing industry in the Western hemisphere in the last couple of decades have not only resulted in a rapid expansion in the number of SMEs but also in an evolution of their position in the production chain. The aim of this thesis was to analyze various components of subcontracting relationships in certain, specified business groups of the Dutch manufacturing industry. It has mainly emphasized the supplier's position but contractors were also a critical component of the empirical research.

From the 1920s until roughly the 1970s, large enterprises were the pre-eminent form of industrialization. This Fordist mode of accumulation was characterized by mass production and scale economies and involved the use of special purpose machinery, semi-skilled workers and standardized goods. The position of large enterprises was heavily influenced by the oil crisis of 1973 and the subsequent years of recession. While large enterprises were particularly hard-hit, SMEs fared much better and, in fact, acted as an important stabilizing influence. The changes in the market during the 1970s and early 1980s, together with the developments in technology and logistics in the early 1980s, have resulted in a

crisis in Fordism and the resurgence of flexible specialization.

The developments in technology and logistics which ensued in globalization, specialization and cooperation in the manufacturing industry, have worked in favour of smaller enterprises. Beside new technologies being cheaper to acquire, they also enable smaller enterprises to operate an efficient, smaller batch production with economies of scope. The developments in logistics have resulted in an internationalization of markets, more global competition and a shortening of the product life cycle and, therefore, manufacturers are expected to respond quickly and flexibly to market changes. SMEs increasingly fulfil a necessary complimentary function to the large enterprises in subcontracting relationships. The opening up of the Internal Market of the European Union ('1992') is the latest development which is likely to affect subcontracting relationships and the position of SMEs as it provides not only increased market opportunities but also increased competition.

In the present economically volatile environment, large firms stick to their core competencies and rely on smaller firms for the remaining components. Because smaller firms increasingly fulfil a necessary complementary function to the large enterprises, subcontracting has evolved from cyclical to structural supply. But beside relying more on subcontracting, contractors at the same time want to improve the quality of the subcontracting relationship and they generally seek to do so by cutting the number of suppliers. These so-called main-suppliers are referred to as the 'vital few'. Their subcontracting relationships are characterized by more complex components, involvement by the supplier in product design and longer-term contracts. This indicates a clear move away from capacity subcontracting which is of a more cyclical nature, to specialty subcontracting which is more structural in character. The main-supplier in turn subcontracts

simpler components to its suppliers and so down the line. This results in a hierarchical structure of suppliers which tend to develop into networks.

9.2 The empirical research

Actual empirical research was carried out among 70 small and medium-sized suppliers and 7 contractors in the Dutch manufacturing industry by way of in-depth semi-structured interviews. The firms were selected from the directory of the Dutch subcontracting organization Nevat. Small and medium-sized suppliers are defined as firms which employ up to 100 employees while there is no limit to the number of employees for the contractors; subcontracting is defined in the broad sense which covers both custom-made and standard products; and the business groups chosen (STIC 34-38) are the metal products industry, machinery, electrotechnical, transport equipment and the instrument and optical industry. The selected business groups do contain a relatively high concentration of suppliers while the most important contractors are also mainly to be found in these groups. The business groups which have been selected are known for the customized nature of their components, which makes close coordination of the production process between suppliers and customers a common concern.

The empirical research has presented a wealth of information on such issues as production system, product design, quality, the type of suppliers and contractors, the support of the Dutch government and the European Union, and the influence of the Internal Market of the European Union. These are discussed in more detail below.

9.2.1 Background and production process

Background of the respondent firms

The research which explored the background and the production process of small and medium-sized suppliers and contractors, tends to correspond with the general characteristics of SMEs and large enterprises, as discussed in the literature. The small and medium-sized suppliers employ fewer people of whom a larger share are directly involved in the production process; and more employees are employed on a temporary basis than in the large contractor firms (since the supplier acts as a 'buffer'). Average turnover in sales is higher in contractor firms. Smaller suppliers displayed more stable and positive sales figures over a period of five years which corresponds with the general consensus that small and medium-sized enterprises tend to fare better in an economic volatile environment. Only the main-supplier case study differed in this respect from what was to be expected based on the literature since it experienced serious ups and downs in sales. This generally reflects the main-supplier's dependency on a small number of customers. The explanation for this may be that contractors prefer to have subcontracting relationships with a small number of main-suppliers with which they have a more intense relationships.

In general, it can be said that the survey and case study findings on the background of small and medium-sized suppliers comply with what is discussed in the wider literature on the topic.

The production system

The majority of suppliers provide their contractors with single components and also mainly serve a specialized market, as do the majority of contractors. The conclusion that can be drawn from this is that the majority of respondent firms act either as jobbers or specialist

suppliers.

A point which is different from what might have been expected, is that the suppliers are not overwhelmingly oriented around market niches. The suppliers produce a wider range of product market combinations than the contractors. This can work in favour of the suppliers. For example if certain manufacturing sectors face recession, as happened in the shipbuilding and the metals manufacturing industry, at least it will not have such a devastating effect.

Even though new technologies ought to have come more within the reach of smaller enterprises, because of lower prices and their higher versatility and flexibility since the early 1980s, their use is rather limited among suppliers compared with the far greater use among contractors. This is the principal reason why the suppliers' contribution to process innovations is lower than for contractors. The capacity to innovate is closely linked with firm size, as is R&D. The figures show that only a small minority of suppliers have an R&D department, as opposed to 100% of the contractors which in turn can be attributed to the stronger financial position of the latter. The fact that pure research is considered a high risk area and is the reason why small and medium-sized suppliers have a 'follow-the-leader' type of strategy.

The economically volatile environment requires manufacturers to respond quickly and flexibly to market changes. The Just-in-Time production and delivery system helps manufacturers to achieve this goal, however, the research demonstrates that the majority of suppliers do not operate on a JIT-basis, unlike most contractors. As discussed in § 3.11 and § 6.3 JIT is an important issue, especially when it concerns vital components, and therefore these findings illustrate a major weakness as far as the suppliers are concerned. This is a clear area where the Dutch government or the EU can step in to help improve JIT

production and supply (see § 9.3). JIT should be made one of the major issues in the Subcontracting Programme's model projects (see § 4.3.5), thus setting an example for other suppliers.

Product design

The supplier's position in a subcontracting relationship is determined by a number of different factors. Its contribution in production design, the compliance with (inter)national standards, responsibility taken for product design, knowledge of and experience with products, ability to deal with production problems and take part in the further development of the actual products, are all factors that may either strengthen or weaken a supplier's position.

The research revealed that the supplier's level of participation in product design is about 50%. This is better than anticipated so the future looks promising in this respect since both suppliers and contractors expect suppliers' contribution in product design to increase in future. Since suppliers' responsibility usually varies according to input in product design, it follows that the responsibility assumed by the suppliers is rather low relative to the contractors. The majority of suppliers also stated that they have either manufactured that same product before or something similar. They should therefore be in a position to be able to assist the contractor in product design much more than they actually do at the moment.

Despite the fact that these suppliers have experienced production problems in the past, they were usually able to overcome them. But when it comes to changes during the production process, the supplier's role is reduced to merely dealing with production technical problems while the remainder of initiatives resulting in changes during the production process remain the domain of the contractor.

It appears that the majority of suppliers have plenty of knowledge and experience on offer which would greatly assist the contractor but are simply not used. By increasing a supplier's contribution and subsequently in responsibility for product design, the final product will benefit. The supplier's specialized knowledge will be brought to bear and the contractor will be able to concentrate on other issues.

Quality

Quality control can be dealt with in several ways. The quality checks used for suppliers' products are intermediate check points (100% or at random), final control at the suppliers' end (100% or at random) and entry control at the contractor's site. In addition, the contractor can apply both vendor rating and auditing to the supplier's production process and may require independent or contractor certification.

The majority of suppliers said that their contractors applied both vendor rating and auditing while only a very small percentage have independent certification or contractor certification. Because the share of intermediate check points and final quality control at the suppliers' end are high, the share of entry control at the contractors' can be reduced. Most suppliers are also willing to provide their supplier with an inspection report. Lastly, the majority of suppliers are willing to accept the consequences (such as re-work or price reductions) if they fail to live up to the expectations of the contractor (with respect to quality and on-time delivery). In every sense suppliers seem to be fair and adequate partners: their quality is rated highly, they are open to comments by the contractor and they will do the best they can if something goes wrong during production. Thus, not only do these suppliers deserve to take part in a subcontracting relationship on a win-win rather than on a quid pro non basis; contractors will also benefit, in money and time spent on checking their suppliers' quality

performance once they enter in a more trusting subcontracting relationship.

9.2.2 Type of suppliers and contractors

The suppliers mainly deliver custom-made products while for contractors, it can be both custom-made and standard products. The average number of contractors per supplier is much lower.

Most suppliers stated that they are indeed dependent for their turnover on just a few contractors; and contractors also tend to be dependent on a small number of suppliers.

For the majority of suppliers, the number of contractors has increased in the past five years and one of the main reasons is related to the desire to reduce or prevent dependency. Contractors on the other hand, stated that their quantum of suppliers has decreased as they are striving to deal with fewer suppliers with which they have more intense relationships.

A large number of suppliers maintain that their main contractor applies single sourcing; whereas only a minority of suppliers apply a maximum percentage to sourcing themselves! The majority of contractors apply single sourcing for their main components and, at the same time, state that they apply a maximum percentage to sourcing for other products. This implies that both suppliers and contractors are either not aware of the dependency issue (the loss of the contractor will have disastrous effects, while other effects are loss of flexibility, creativity, economic vitality and so) or simply that they do not act upon it. Even contractors which strive to reduce the number of their suppliers with which they have more intense relationships, do not benefit from a dependent subcontracting relationship: if the supplier goes bankrupt it will have devastating effects. Too much dependency in a subcontracting relationship is risky and undesirable for both parties.

The majority of both suppliers and contractors have dealt with their main contractor on a long-term basis and in both cases the dominant type of order is the repeat order. This reflects the structural, specialty nature of subcontracting relationships in the research.
The majority of suppliers do not receive any support from their contractors with respect to finance, know-how, material supply, organizational structure or in any other way. This indicates that subcontracting relationships are still very much a one way system: where the supplier mainly gives and the contractor receives.

9.2.3 The external environment

Suppliers receive less support from the Dutch government than contractors in all respects (financial, know-how, EU-information and otherwise); and the same can be said for support given by the European Union. Larger firms have more time, people and money available to explore to the fullest the opportunities to obtain support from either the Dutch government or the European Union. What is important for small and medium-sized suppliers, is that application procedures are simplified, the time between application and implementation is shortened and that on-line computer information is also available in order to facilitate their access to the availability of subsidies.
For suppliers, the most important contractors are within the national borders, while contractors state that their suppliers are important at both the national and the international level. The latter finding corresponds with what was discussed in the literature; whereas the former differs from what was expected. This probably reflects the more specialized nature of the suppliers which were researched.
Most suppliers do not expect either their position as a supplier to change because of 1992 or their relationship with the contractor as a result. They tend to think that somehow the

increased opportunities and increased competition will balance one another.

Compared with other countries, suppliers perceive their know-how, quality and flexibility as their strong points; while price but particularly marketing and Just-in-Time supply, are perceived as weak issues. The issues on which the suppliers score high are also the major issues for suppliers in the higher tiers of the subcontracting pyramid. This would indicate that suppliers should develop into more specialized suppliers or main-suppliers (specialty subcontracting) for which the issue of price is less important than for jobbers (capacity subcontracting). Marketing and JIT supply, however, need to be improved, possibly with the help of the Dutch government and the EU. As mentioned earlier, JIT should become one of the main planks of the Subcontracting Programme's model projects; while the marketing issue can best be handled by the regional Chambers of Commerce because of closer proximity to firms.

Suppliers expect a future increase in production, demand, new products, new production processes and new markets but are less optimistic when it comes to new establishments and other initiatives. This reflects the smaller enterprises' nature as survivors in an economically volatile environment. They are always looking for ways to innovate and survive while at the same time sticking to a manageable size of firm.

The majority of firms are preparing for the opening up of the Internal Market principally by working on their ISO-certification, by taking (more) part in (inter)national trade fairs and by establishing production firms and sales outlets abroad while also employing more sales representatives. The ISO-certification is a very important issue since it establishes them as better qualified and reliable suppliers. And at this point in time, with the opening up of the Internal Market of the European Union, ISO-certification is even more important because of increased competition while it also renders the plethora of other certifications obsolescent.

The conclusion that can be drawn from the empirical work is discussed next. The resurgence of flexible specialization in the 1970s and 1980s has worked in favour of SMEs and the Dutch manufacturing industry is dominated by this type of firm. SMEs, more so than before, are being offered the opportunity to fulfil an important, if not essential, complimentary part to the larger enterprises in subcontracting relationships.

Large contractors as a result of their strategy of Back-to-the-Basics, are striving for more intense subcontracting relationships with fewer suppliers or main-suppliers. The latter will subsequently subcontract work to smaller, less specialized suppliers and so down the line (specialist suppliers and jobbers) - the subcontracting pyramid. Suppliers in the top of the pyramid supply higher value added and more complex components; they are involved in product design and; have longer-term contracts. A great deal is demanded from main-suppliers with respect to know-how, quality, JIT supply, while it also requires longer-term commitment and thus trust.

The outcome of the empirical work is that the suppliers in this research are strongly placed with respect to the basic requirements of the new type of subcontracting relationships, namely know-how, quality and flexibility. In addition, they are already predominantly in long-term subcontracting relationships. Therefore, these suppliers are in a position to move upwards in the subcontracting pyramid and supply and support the contractor in a much more direct way. However, there are some barriers that may prevent suppliers to make this move at this stage: the majority of suppliers in the survey do not produce and supply on a JIT basis; and even although their quality is rated highly, most of them do not have independent certification. The opening up of the Internal Market has rendered both issues increasingly important, if not essential, in order to compete and survive. The issue of certification, and in particular ISO certification, is so important as only independently

certified suppliers are considered qualified and reliable by contractors and it makes independent and country-specific certification superfluous. The particularly open character of the Dutch economy ensures that it is impossible to turn a blind eye to these issues. The opening up of the Internal Market greatly emphasizes this point.

The following section will discuss what this research perceives as being essential for policy to support in order to encourage small and medium-sized suppliers to seize the opportunities arising from the new type of subcontracting relationships.

9.3 Conclusions and policy suggestions

It was not until the late 1970s that policy makers in the Netherlands, in common with the ones in other countries in the West, caught up with the developments that had taken place in the manufacturing industry since the early 1970s. However, the interest in these issues was only translated into real policy in the early 1980s when activities began to be geared towards re-industrialization and there was a re–orientation towards small and medium-sized enterprises.

This time around, the Dutch government and the European Union ought act upon the opportunities for SMEs and subcontracting much more quickly than they did in the 1970s. Subcontracting in the 1990s has clearly moved away from cyclical subcontracting to structural subcontracting, something which stems from the contractor's strategy of Back-to-the-Basics and which refers to the situation where the contractor concentrates on its core competencies and subcontracts the rest to suppliers. There is also a trend from capacity subcontracting to specialty subcontracting which became feasible because of the emergence

of new technologies. This has enabled flexible, small batch equipment to appear within the reach of the supplier. Also, the contractor is, at this point in time, willing to increase the suppliers' involvement and contribution in its own production process (co-makership, early supplier involvement) and is, therefore, prepared to make use of the supplier's technology push. A distinction, however, needs to be made between suppliers: only the suppliers that manufacture strategic or higher value added components which command amongst others know-how and quality, are able and willing to make the move upwards in the subcontracting pyramid (structural subcontracting); while the remainder will concentrate on their tasks as capacity suppliers or jobbers. And as will be concluded below, it its the former type of supplier which has to receive support from the Dutch government or the EU in order to be able to make the move upwards.

Even though subcontracting is not moving at the same level in the Netherlands as in Japan, it is essential for suppliers to evolve from being jobbers to specialized suppliers and main-suppliers, as this is the only way of strengthening their position. The main reasons for this are that Dutch suppliers score very well with respect to know-how, quality and flexibility; but prices also tend to be rather high. Suppliers on the apex of the subcontracting pyramid tend to have more intense, longer-term and higher value added subcontracting relationships with their customers. The issues of quality control, quality assurance, certification and JIT production and delivery are important issues that need to be improved in order to enable them climb upwards.

Policy can play a major role in improving the suppliers' position. First and foremost, policy geared towards SMEs and subcontracting should acknowledge the diversity of this

type of firm (traditional/modern, autonomous/branch plant, local market/export), as discussed in Chapter 2. Equally, it should be recognized that thus far it is, as illustrated by the empirical research, the contractors or larger firms that acquire subsidies from the Dutch government and the European Union most easily.

Changes are taking place in subcontracting relationships which should work out in favour of small and medium-sized suppliers this time around, but only if policy adapts quickly. This represents an opportunity for smaller suppliers and this research has argued that policy can and should help small and medium-sized suppliers, but only in respect to those elements that are linked to size. Most suppliers in the research support this view. So far, Dutch policy assistance for suppliers concentrates on technology, innovations, training, quality, environmental issues and trade fairs, all of which are important issues. However, this research demonstrates very clearly that policy should also be geared towards the scale related problem issues of new technologies, JIT supply, marketing and certification as these are considered the weakest points in suppliers' performance. These need to become major issues within the Dutch Subcontracting Programme, otherwise suppliers will not as easily or at all be to seize the opportunity to climb upwards in the subcontracting pyramid. In addition, the widespread availability of on-line computers for electronic data interchange (EDI) would also greatly benefit smaller suppliers, as it is the access to policy information that impedes them from applying for subsidies.

European policy for SMEs and subcontracting concentrates solely on the framework for subcontracting, such as cooperation between contractors and suppliers, on legal aspects of subcontracting and cross-border cooperation. The EU's framework approach is indispensable, however, it does not aim to improve suppliers' performance, as Dutch and other national policies do.

In conclusion, the Dutch government and the European Union could and should support wholeheartedly the view that products can best be manufactured by the specialists in the field. This does not necessarily imply a policy of 'picking winners' but merely that smaller suppliers which increasingly perform a complimentary role to larger contractors in subcontracting relationships should be supported. Contractors have already acknowledged, by adopting the strategy of Back-to-the-Basics, that small and medium-sized suppliers have a major role to play in subcontracting relationships. In addition, contractors have also admitted that small and medium-sized suppliers are no longer the 'weak link' in subcontracting relationships. Therefore, it is basically up to the smaller suppliers to seize the opportunity and move upwards in the subcontracting pyramid.

The opening up of the Internal Market of the EU ('1992') has given an extra spur to international subcontracting. Since Dutch subcontracting policy is mainly nationally oriented, namely only applicable to firms based in the Netherlands, a European approach is essential to stimulate cross-border subcontracting.

The Dutch government and the European Union have a major role to play to the extent to which they can minimize some of the disadvantages related to scale that remain for certain smaller suppliers. This is the only way of making products more competitive (globally) with respect to know-how, quality and price and ultimately all will gain from this: the contractor, the supplier and the consumer.

APPENDIX A

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QUESTIONNAIRE

This questionnaire is designed to evaluate the qualitative change in subcontracting relationships in preparation for the Internal Market of the EU (1992).

Background

Company name:

Business group:

Year of establishment:

Ownership:

Company structure: single / multi plant

Location: • Domestic: Randstad / Intermediate zone / Periphery

• Abroad: Neighbouring regions / farther away

Number of employees: A • directly involved in the production process:

• indirectly involved in the production process:

B • permanent employees:

• temporary employees:

Turnover per year:

Sales (% per year) over the past 3 -5 years:

Production system

What do you mainly supply (in % turnover):
- single components
- subassemblies
- functional units

Which market do you mainly supply:
- mass production market
- specialized market
- market niche

How many product market combinations (PMCs) do you supply with your products:
- 1 - 2 PMCs
- 3 - 5 PMCs
- > 5 PMCs

Did the sales of products increase / decrease within the same markets / new markets?

Do you use any new technologies? which ones:

Which technological innovations do you apply:
- product innovations
- process innovations

Do you have your own R & D department? yes / no

Location:

Number of employees:

Do you operate a JIT system? yes / no

Product design

Involvement in product design in the past 5 years:

- Designed internally and autonomously
- Designed internally according to the contractor's specifications
- Designed in cooperation with the subcontractor
- Manufactured exactly according to the contractor's specifications
- Designed by a third party (design co.)

What national / international standards are applied to these products?

Are technical specifications fully laid down in drawings and a legal contract?

Do you take any responsibility for product design?

Have you previously manufactured these products?

How much do you know about the product function?

Have you encountered any particular technical difficulties during the production process?

Does you need to develop the products any further?

Who initiates changes in product specifications during the production process?

Quality

Does your contractor apply vendor rating?

Does your contractor apply auditing?

Do you have any certification?

Can you supply your products to the contractor without entry control?

Do you apply intermediate and / or final quality control?

Supplier

What kind of supplier are you (in %) : • main-supplier

• specialist supplier

• jobber

How many contractors (customer base) do you supply with your products? core:

Has the number of contractors increased / decreased over the past 5 years?

Why did this change (increase / decrease) occur?

Are you supplying different sectors now in comparison with 5 years ago?

Contractor

Where is the contractor located: Domestic: Randstad / Intermediate zone / Periphery

Abroad: neighbouring regions / farther away

Does your contractor use: • single sourcing (exclusive supply)

• multiple sourcing dominant source:

Do you apply a maximum percentage of turnover for one customer? yes / no

maximum percentage:

How often do you communicate with your contractor: • personally:

• by phone:

How long have you worked together with the main contractor:

• short term: less than 6 months / 6 - 12 months / 1 - 2 years

• long term: 2 - 5 years (continuous)

Main type of orders: • new

• ad hoc

• repeat

Do you receive any support from your contractor:
- financially
- know-how
- material supply
- otherwise .....

What would you like to see changed in the relationship with you contractor?

Role of the government and external organizations

Do you receive any support from the Dutch government:
- financially
- know-how
- information on EU support
- otherwise .....

Do you receive any support from the EU:
- financially
- know-how
- otherwise .....

1992: the internal market

At which level are your contractors mainly: local / regional / national / international level

How do you think 1992 will change your position as a supplier?

What are your strong / weak points as a Dutch supplier within the internal market:

- know how
- marketing skills
- price
- quality
- JIT supply
- otherwise .....

What are your future business strategies:

• output	increase / stable / decrease	
• demand	increase / stable / decrease	
• new products	yes / no	
• new production processes	yes / no	
• new markets	yes / no	
• new plants	yes / no	where?
• other initiatives	yes / no	where?

In what way have you prepared yourself for the Internal Market ('1992')?

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