Small Businesses in a changing global economy. A case study of the electronics industry of South Africa.

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Abstract

In this thesis I argue that with the move to postfordism and the adoption of postfordist production techniques, small businesses have become important components in an economy. I look specifically at Japan and the Third Italy where the small business sector has thrived in order to provide a comparative framework for the South Africa case study. The fieldwork component of the research looks into a specific subsector in the South African economy - that of the electronics industry, with a specific focus on the manufacture of security equipment. This subsector was evaluated in terms of how it relates to the ideal types of Japan and Italy, and whether postfordism is in any way present in this industry. The findings have been mixed. The subsector under consideration is dynamic and is moving into international markets where it is able to compete successfully. There are, however, several aspects that are lacking; most notable is the lack of coherent networks and industrial districts. Institutions that could play a role in assisting firms and facilitating the growth of networks are either still being set up, unable to assist the sector because of lack of knowledge or are focused on larger corporations. However, the growth of small businesses in the electronics industry, particularly the security equipment manufacturing, with very little support indicates that there are tremendous opportunities for this sector in the future.

Declaration

I declare that this thesis is my own unaided work. It is submitted for the degree of Master of Arts in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any other degree or examination in any other university.

Saul Levin

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List of Abbreviations

DPM	Defect Rate per Million
EDP	Electronic Data Processing
EIF	Electronic Industry Federation
IDC	Industrial Development Corporation
NIC's	Newly Industrialised Countries
NGO's	Non Governmental Organisations
SBDC	Small Business Development Corporation
SMD	Surface Mount Device
SME's	Small and Medium Enterprises
SMME's	Small, Medium and Micro Enterprises
SMED	Single Minute Exchange of Dies
SMT	Surface Mount Technology

Chapter One: Introduction

Small and medium enterprises have been recognised as a strategic part of the South African economy and represent a potential path to future growth and development for the country. The level of research conducted on small and medium enterprises has been limited for many years. There has been a tendency in South Africa to focus on the larger corporations. Small business has not received the priority needed both in terms of research and in terms of policy interventions by government. The shift in the international environment has prompted academics, business people, policy makers, labour organisations among others to shift their thinking toward the concept of the small business.

The international shift in thinking has been prompted by the decline in the international trade regime in the 1970's and 1980's (Hirst and Zeitlin:1991) and the concomitant success of those countries that have vibrant small business sectors. The most successful of these countries are Italy and Japan (Best 1990). For South Africa small businesses have been promulgated as a way forward for the economy by progressive forces particularly in the post 1990 era (ANC:1994). The culmination of these ideas was in the 1995 Presidential Conference on Small, Medium and Micro Enterprises (DTI:1995). From this conference action was taken to set up institutions to support the promotion of small and medium enterprises in South Africa. The role of small businesses in the South African economy is something that is now being taken seriously and there are many moves to create an 'enabling environment' in which to foster the growth of the sector (DTI:1995 and RSA:1996).

In understanding the growth of small businesses one needs to consider the mode of production. In a fordist mode of production regime bigger firms are considered better and more efficient. With the rise of an alternative to the large fordist factories there has been a search for a new way to define the mode of production - fordism and all that it stands for does not capture the new environment. The idea of postfordism has come to represent the changes to the production regime.

The postfordist production regime, it has been argued, includes the features of flexibility, flexible specialisation, networking or collaboration between firms, a focus on quality, and industrial districts. While many of these features have been present in pockets of the capitalist economy since its inception, it is the coming together of these features, the positive environment that they create for small firms, and the complete differentiation from previous modes of production that prompts the move to define a new mode of production. (Hirst and Zeitlin:1991)

As with fordism, postfordism has institutional support; this support comes in the form of government policy, state agencies, financial institutions, labour unions and business associations. In understanding the small business one needs to consider the role that all these institutions have played.

Analysing and examining the central tenants of postfordism and exploring the extent to which the electronics industry in South Africa has moved toward adopting the features of postfordism is the purpose of this thesis. In considering the latter issue the dynamics of the industry are explored, particularly the problems that the sector faces and the type of institutional support that it receives. This study forms part of the broader framework of economic sociology, it is an attempt to understand society and economics as inextricably linked (Martinelli and Smelser:1990). Sociological tools of analysis are promoted as a better means to understand small and medium enterprises. This approach is used in favour of neo-classical economic concepts which tends to isolate the business from the society in which it operates. One of the key ideas promoting the success of those countries or regions where postfordism has taken root is the integration of the small business into the broader functions of society.

Defining Small Businesses

Several methods are used to define small and medium enterprises. These include qualitative and quantitative measures. Quantitative factors could be the number of employees, the value of the capital, sales turnover, value added, or labour intensity. Qualitative factors could include: managerial characteristics, such as close link

between the management and the ownership of the enterprise or the legal status of the firm, independent decision making and personalised management.

Defining a small business is particularly important when one is considering policy and support mechanisms to assist the small firm. Definitions would help set limits on who to support.

For South Africa, the SBDC, has defined a small business as employing less than 50 workers, a firm employing less than 5 employees as a micro-enterprise. In Europe, a small business is defined as having less than 100 employees (Prodder:1994). The Government's White Paper (DTI:1995) on SMME's attempted to define small business, however, this was to broad and it did not take into consideration certain quantitative criteria. The most comprehensive definition on small and medium enterprises to date in South Africa is that in the National Small Business Act (RSA:1996).

For the purposes of this thesis I have drawn on the National Small Business Act (RSA:1996) and supporting documentation (Ntsika:1996) to define a small business. The criterion used is in terms of the number of people employed by the firm as well as the ownership structure of the business. The firm should be a sole trader, partnership or a private company. The owners or at least some of the major shareholders should be actively participating in the firm. The legal status of these types of company is that they do not raise funds from the public (i.e. through the stock exchange). This legal status also means that the firms are more likely to be owner managed. The number of employees should be greater than ten and less than 50 people for a small firm and between 50 and 200 for a medium sized firm. Firms with less than ten employees would be considered micro or very small enterprises and firms with greater than 200 employees would be large enterprises. (Ntsika 1996:15 - 22)

Value of capital and labour intensity[1] are not included in the definition of small and medium enterprises used in this thesis. This is not, however, to exclude them as important characteristics. There is a danger in using the number of employees in a

[1] A measure of labour intensity would be to gauge the employment creating potential of small firms.

firm to measure if a business is small as some very highly technical firms may employ few workers yet because the machinery is capital intensive, the turnover and asset value could be extremely high. If one were to include a value of capital measure in defining small businesses, then many firms that have few employees would not be considered small enterprises. Such quantitative data is included in the definition of small and medium enterprises in National Small Business Act.[2]

Outline of the thesis

Chapter two looks at the research methodology that was used in the field work. Chapter three will firstly discuss fordism and the problems inherent in this system. In order to fully understand the concept of postfordism and what it represents we need to briefly consider the inadequacies of fordism and how postfordism, through a variety of methods, is able to capture markets that were once dominated by fordist mass producers. The second section of this chapter looks at postfordism, and some of the debates and issues that surround the use of this term. Chapter four is a discussion of the different aspects of post-fordism, looking at inter-firm co-operation and intra-firm organisation. The discussion draws on examples from Italy and Japan. Chapter five is a discussion of the subsector in which the research was conducted and is based on field work. It includes an analysis of how postfordism relates to the South African electronics industry.

[2] The Act was only promulgated after the completion of the primary research and the quantitative definition included in the Act could therefor not be used as a criterion to select firms.

Chapter 2: Methodology

Interviews were conducted with a total of seven firms in the electronics industry[3]. The firms were located in several geographical areas within the Gauteng province. Further interviews were conducted with people in organisations such as the Small Business Development Corporation (SBDC) and the Industrial Development Corporation (IDC). In total, over thirty formal and informal interviews were conducted. The primary source of research was conducted in three small and medium enterprises where several employees were interviewed and the processes of the firms observed[4], these firms are all located in the electronics security industry. Further research was conducted in four other enterprises in the industry, these were single interviews with the managers of two contract assembly firms who are downstream from the core firms, and two with suppliers of products to the industry who are upstream - one of them is a component supplier and the other is a supplier of machinery.[5]

In addition to the interviews, documentary research and the attendance of conferences and trade fair's were used as a research technique. The strategy of using a number of different methods to conduct research has enhanced the quality of information about the electronics industry and the small and medium enterprise sector.

The firms studied are not a representative sample of small and medium enterprises. To obtain a representative or random sample would not have been possible because of problems with access to firms and limited information regarding the small firms in the sector. Most of the available information on the electronics subsector focuses on the large firms which dominate the industry.

[3] The electronics industry is a subsector in the South African economy and falls under the manufacturing sector.
[4] These three firms are referred to as the 'core' firms or 'intensive research' firms.
[5] These four firms are referred to as the 'single' interview firms.

In-depth / intensive research

The strategy of intensive research involved conducting research in the three core enterprises over a period of one to two weeks. At each site a series of unstructured and semi-structured interviews were conducted with directors, management, administrative staff and workers. How the firms operate and the production process was observed as part of the research.

Race, ethnicity and gender have been mentioned by most authors of social science as an important issue to factor in when conducting research. Davidson and Lytle (1982) highlight the serious biases that can occur when people from different races conduct research. Oakley (1981) and Finch (1984) make similar points about doing research across gender lines. On the other hand, authors such as Edwards (1990) suggest that it is possible to overcome race and ethnic barriers in research, for example, by drawing on another common link. Respondents from all racial groups, both male and female, were encountered in the course of the research and these problems were taken into consideration.

Burgess (1993:103) through a summation of the ideas of several authors, outlines some of these features for a person conducting research. They include: "the researcher is a friend and a confidant who shows interest, understanding and sympathy in the life of the person" and " ... it is vital to develop the trust and confidence of those with whom interviews are used". Throughout the research these techniques were used, particularly in the context of interviewing respondents of a different race and gender.

The setting for conducting the interview is important, this is to ensure that the subject feels comfortable in the interview environment. It is also suggested that if the interview is not specifically a group interview, then it would be best if there was no one else in the room and there should be no disturbances. This ensures that the subject can respond as freely as possible. Thus, interviews with management or administrative staff were conducted in their offices. An office would not have been an appropriate environment to interview workers so they were interviewed in their tea room or at their workstation. Only on one occasion was someone interviewed in

public - it was a worker who was on the production line who preferred to be interviewed in this setting - the end result was a group interview as many other workers participated in the discussion.

In most of the interviews a semi-structured format was followed. A list of topics or an agenda of the issues to be covered was used instead of a questionnaire and through the course of the interview these topics were covered. This strategy was followed to allow for the flexibility of discussion in the interview while at the same time ensuring that none of the issues were left untouched. A common list of topic allows one to make comparisons between the firms.[6] Interviews were recorded by either tape recorder or hand-written notes.

The observation process was useful in two regards; it helped develop an understanding of the production process and it helped with the development of a relationship with the staff. Interaction with the workers made them feel comfortable with me sitting in on their working environment and after some initial tension, most workers were put at ease and continued with their normal activities. Spending several days at the firms enabled me to build rapport with the workers which enhanced the quality of the interviews. Through observation, several of the problems in the firm were assessed.

Problems in the research

One of the problems faced was finding firms who did not object to being researched. Thompson (206) recognises that "(i)t will always be much easier if you can say that somebody else in the informant's own social network has recommended them". In the initial stages of the research there was no access through an insider who was able to give me credibility or provide an introduction.

Problems were also encountered with gender and racial barriers particularly with black female workers. I attempted to overcome these barriers by drawing on my knowledge of the industry and the conditions that the workers face. The development of a relationship with the workers prior to the interview through the observation

[6] The agenda followed is included as appendix A.

process and informal discussions also proved to be a useful strategy in overcoming the barriers.

Single Interviews

Once the in-depth studies had been completed, further interviews were conducted with four other firms. These interviews were to try and determine if there are common problems that all small and medium enterprises in the industry might face, as well as to look at the subcontracting and supply aspects of the industry.

These firms came to my attention by having either been mentioned in previous interviews or found in the electronics industry directory. Access to these firms was substantially easier than in the intensive research firms as I already had knowledge of the industry and often a referral. The shorter length of the research also facilitated easier access. The interviews were between forty five minutes and one hour. The interview schedule was based on the one drawn up for the intensive research and is included in appendix A. All the people in these interviews were either owners or managing directors and were involved in the day to day running of the firm. Three out of the four firms in these single interviews were small enterprises.

Conferences / Trade Fair's

In March 1995 I attended the P~sidential conference on Small, Medium and Micro Enterprises. This four day conference was extremely comprehensive in the issues that were covered. International and local speakers looked at the main problems that faced small and med .1 enterprises and the support that could be given to them. Eight issues were discussed: business support through local service centres, access to markets and tenders, access to finance, improving the physical environment, developing human resources, developing local economic partnerships, building institutions and capacities, and targeted support. In addition support agencies, financial institutions and other organisations had set up information stalls to inform people of the work that was being done to assist small and medium enterprises. This

conference proved to be useful as many of the problems facing small and medium enterprises in South Africa were discussed.

In May 1995 I attended a trade fair on the electronics industry. Although no firms were found which met my criterion for the research, I acquired information and knowledge about the electronics industry.

Confidentiality

There is, as in most industries in South Africa, a high level of competition in the electronics industry. Several firms in the industry are reputed to be dishonest and have copied the products of their local competitors. In granting me access to research their firms, the managing directors requested that confidentially be maintained, specifically that of product specifications and certain individuals also requested confidentiality. I therefore only use quotes without revealing the names of companies and individuals. Workers in particular were given the assurance that whatever they told me would not go back to management. This was to ensure that no worker felt they would be victimised by what was discussed in the interview.

Chapter 3: Developing a theoretical framework

> We will win and you will lose. You cannot do anything about it because your failure is an internal disease. Your companies are based on Taylor's principles. Worse, your heads are Taylorised too. You firmly believe that sound management means executives on the one side and workers on the other, on the one side men who think and on the other side men who can only work. For you, management is the art of smoothly transferring the executives idea to the workers' hands.
>
> We have passed the Taylor stage. We are aware that business has become terribly complex. Survival is very uncertain in an environment filled with risk, the unexpected, and competition ... We know that the intelligence of a few technocrats - even very bright ones - has become totally inadequate to face these challenges. Only the intellects of all employees can permit a company to live with the ups and downs and the requirements of a new environment. Yes we will win and you will lose. For you are not able to rid your minds of the obsolete Taylorisms that we never had. (Konosuke Matsushita, 1988, founder of the Matsushita Electrical Industrial Company; cited in Best, 1990:1)

Fordism

Fordism has been described as the era of mass production and mass consumption, with the regulation of the economy to ensure a market for the goods produced. Mass production under fordism has been promoted by organisational and technological methods that allow for the development of economies of scale. The technology has come in the form of moving assembly lines to speed up the production time and specialised machinery which standardises the parts being manufactured. Goods produced in this way reduce the cost per unit because of the greater number that can be produced in a short period of time. The lower cost of manufactured goods and the greater quantities produced has resulted in a lower selling price of the products.

Prior to the mass production system developed under fordism, skilled craftsman made each product uniquely. Fordism has thus seen the decline of the craftsman and the proliferation of unskilled or semi-skilled mass labour who do routine tasks. The deskilling of labour is identified closely with Taylorism and the move to continually

increase the productivity of workers on the assembly line and in the workplace in general.

With the dramatic increase in the number of goods produced it is important to create an environment where all the mass produced goods are consumed. A very important component in fordist mode of regulation is the promotion of mass consumption of goods through higher wages for the ordinary worker, lower unemployment levels and a welfare economic system that acts as a safety net. The 'New Deal' in America in the 1930's after the depression and the adoption of Keynesianism in most first world countries has been linked to fordism (Williamson 1994).

The institutions of fordism include the rise of large scale industrial unions and the growth of monopolies. Mass production, the conditions of work and the large number of workers under one roof have facilitated the growth of unions. These unions have not challenged the fordist system; rather they have played an important role in the regulation of the economy by ensuring, in part, that there is mass consumption by well paid workers.

Firms under fordism feel that there may be some benefits in trying to create economies of scale in other areas for example by creating large business and organisational structures. Fordism, in the countries where it is most developed, has witnessed an unprecedented concentration of capital in spite of the anti trust laws which aimed to prevent it.

> Thus "the term 'regulation' refers to more than the labour process of the lead sectors of growth in an economy, and moves beyond the strictly economic to include both political and cultural considerations. ... some of the more central political considerations ... particular[ly] the kind of policy interventions made by national governments in their attempts to balance mass production and mass consumption, and thus underpin long term growth." (Allen 1992:238).

Fordism is not, however, standardised and there are different ways of organising production and different types of labour that exist within this broad framework.

Fordism is often ascribed to the period immediately after the Second World War until the early 1970's. This period saw tremendous growth: "Industrial output across the advanced economies virtually trebled between 1950 and 1973, with more being produced in that period than in the whole of the previous seventy five years - itself not a period of inconsiderable growth" (IBID.).

From 1973 fordism suffered severe setbacks that prompted theorists to argue that this mode of regulation was in decline. Setbacks to the fordist system were the oil price shocks of 1973 and 1979; the removal of fixed exchange rates, the breakdown of the Bretton Woods system, the simultaneous occurrence of depression and inflation (what is referred to as stagflation), and unemployment. These crises could not be dealt with by the Keynsian demand management system resulting in a move towards different macro-economic policies by the leading international economies. An additional problem that fordism faced was the rise of successful alternatives that were able to take over markets that had traditionally belonged to the fordist mass producers[7]. From the late 1960's and early 1970's profits rates of the fordist producers fell. The regulatory institutions of fordism were no longer viable as they could not keep the system growing at the same rate.

The decline of firms in the 1970's is often blamed on concepts such as productivity decline. Best (1990: 22) sees the problems as being rooted in the old way of thinking - the result is an attempt to solve the problem in an outdated fashion, which merely exacerbates the problem. Best argues that the competitive disadvantage where countries experience decline is not through 'distributional' problems (distributional in this sense refers to high wages or high profits causing high prices) nor does he see the problem as the practices of powerful unions, but rather the problem lies in the way that production is organised. He argues that "production is organized according to

[7] What Best refers to as the "New Competition".

outdated principles which results in an incapacity to respond strategically to the New Competition" (Ibid).

Post-Fordism

> "There is widespread agreement that something dramatic is happening to the international economy over the past two decades: rapid restructuring of world markets and consequent large-scale changes in the policies of economic management at the international, national and regional levels." (Hirst and Zeitlin 1991:1).

There is, however, less agreement over what to call this change. Desctiptions of this change are similar, yet the current nature of these changes has meant that there is still insufficient and inadequate literature on the subject. It is on this basis that Sayer (1989) has critiqued postfordism: "... the literature on postfordism is confused in its arguments, long on speculation and hype, and based on selected examples whose limited sectoral, spatial and temporal range is rarely acknowledged." (page 221). Hirst and Zeitlin (1991) analyse the different interpretations of the postfordist literature. They find three different approaches in this framework: flexible specialisation, regulation theory and postfordism.[8] They also find that the literature is inadequate in its dealing with the concepts.

While recognising these debates, it is impossible for this thesis to explore them in detail. The use of the term postfordism in this thesis incorporates a number of different aspects in the literature, but falls broadly into the regulation camp of the debate.

[8] Postfordism is often conflated with flexible specialisation in the literature, I have not explored the differences between the two approaches.

The regulation position that is adopted in this thesis does not assume the existence of what Alain Lipietz[9] (1982) refers to as 'global fordism'[10]. It does, however, argue that the crisis of fordism during the 1970's has led to the emergence of an alternative labour process and mode of production, which is referred to as postfordism. This argument implies that there does not need to be a crisis of fordism, let alone the existence of fordism, in a particular country in order for that country or firms within that country to move toward postfordism.

According to Jessop (1992) postfordism could either be seen as arising directly from the fordist production line - i.e. a firm that was mass producing changes it production process to come in line with postfordism, or postfordism could arise from firms responding to the crisis in fordism. Thus firms that were not mass producers, produce and compete in line with postfordist production techniques. In the latter case, fordism does not have to be in place for the firms to become postfordist, rather the firms have adopted postfordist techniques because it is the most effective way of operating.

Furthermore, one sees that with postfordism, small firms are able to compete with the larger mass producers[11]; this is because the postfordist production processes are flexible and can be extended to produce small batches. One of the challenges posed by postfordism is that it is able to compete more effectively than fordism on international markets. The success of postfordism creates a further crisis for fordism and pushes it further down the path of decline. Thus countries and companies still rooted in the fordist paradigm are declining. Contrary to the comments made by Sayer[12], there are sufficient countries and regions that have moved to this new mode

[9] Lipietz is a prominent member of the regulation school. Adaptation of his work by Gelb (1991) to the situation in South Africa as racial fordism, has been critiqued by Bethlehem (1994) and Maller and Dwolatsky (1993).

[10] Global fordism refers to the world-wide extension of fordism. According to Lipietz, fordism also exists in the third world, albeit in different forms - what he refers to as 'peripheral fordism' and 'bloody taylorization'.

[11] This is not to imply that there is no successful mass production under postfordism. One finds that mass production is incorporated in the postfordist system.

[12] That "postfordism is ... based on selected examples whose limited sectoral, spatial and temporal range is rarely acknowledged." cited above.

of regulation to illustrate what is meant by postfordism[13]. This thesis, however, only focuses on two countries.

It is the combination of policies by governments and the strategies pursued by firms that shape both fordism and postfordism. Jessop (1992:26) identifies four different social relations of postfordism and fordism: the labour process; macro-economic regimes; modes of regulation of the macro-economic regimes; and the effects of the previous three social relations on the social order as a whole. The bulk of this thesis looks at the labour process and the dynamics of the firm at a micro level. The mode of regulation is also considered.

Small businesses

Small businesses are potentially more flexible and dynamic than the large bulky fordist mass producers and are thus an important component of postfordism. In the past, small business particularly those involved in manufacturing could not produce their products as cheaply as the larger firms. Changes in technology, a demand for quality products and a shift to smaller batch sizes have given the small firm the competitive edge.

The two countries that this thesis draws part of its framework from - Japan and Italy, both have a large number of vibrant and dynamic small businesses. These countries were selected for this study because of their overwhelming success in international markets, their differentiation from fordism, and their successful integration of small businesses into the mainstream economy.

> "The Third Italy and Japan offer two approaches to the promotion of small and medium sized enterprises; both depend upon a combination of cooperation and competition. The Third Italy approach is rooted in the institutions of

[13] For example, Pyke and Sengenberger (1992) include studies from Italy, Spain, Germany, Denmark, Canada, and Cyprus, in their book. The IDS bulletin (vol 24 no 2) looks at these issues in relation to Third world countries such as Zimbabwe, India, Brazil, Argentina and Mexico.

> community established at the level of municipality; the Japanese approach is anchored in Laws ... and carried out by a plethora of central government industrial policy agencies. A common prerequisite for cooperation is trust, and industrial policy in both Japan and the Third Italy is geared to promoting trust by collective incentives." (Best 1990:250)

Italy, between the early 1970's and the mid-1980's, had the fastest rate of growth of the big four European economies. It passed Britain and France to become the fourth-largest capitalist economy in terms of gross national output. In the period between 1972 and 1980, the share of national output produced by firms employing between 20 and 100 workers increased from 31 percent to 34 percent.

Emilia-Romagna is the fastest growing of Italy's 20 regions and it has the highest per capita income. The region has a large number of small businesses, in 1980 it had 325 000 registered firms and an economically active population of 1.7 million people. Ninety percent of the manufacturing firms are small, employing less than 100 people. These small firms account for 58% of the workforce. Emilia-Romagna accounts for 10 percent of Italy's exports and 4 percent of the country's imports. [14]

In 1982 Japan's[15] small and medium enterprises accounted for 99.4 percent of all manufacturing establishments and employed 81.4 percent of all workers. The definition of small and medium enterprises in Japan are those firms that have less than 300 employees and less than 100 million yen in capital. McMillian (1984, cited in Sayer 1989) found that 58 percent of workers were employed in firms of less than 100 employees and 30 percent of the labour force worked in micro enterprises of 1 - 4 employees.

Small and medium enterprises in Japan are closely linked up with parent companies. The history of the relationship between parent companies and subcontractors in the

[14] Figures on Italy are from Storey and Johnson (1987:145), cited in Best (1990:204).
[15] Figures on Japan are from Murata (1986:221), cited in Best (1990:161).

immediate post war period was exploitative, with subcontractors being used as "buffers against recession and as sources of cheap labour" (Best 1990:162).

In the 1970's there was a shift toward improved relationships with subcontractors - from price orientation to quality and time orientations. As the strength of the Japanese industry grew, the relationships between large parent firms and small firm subcontractors changed so that parent firms supported the advancement of the capabilities of subcontractors. In recent years the use of small subcontractors or supply firms in Japan as 'shock absorbers' in times of economic downturn is not a common feature. Because of the orientation of big Japanese firms, they have an interest in maintaining stable relations.

The differences in the type of small firm in Japan and Italy are generally that the small firms in Japan are linked to a larger firm and are involved in a subcontracting relationship with that firm, while the small firms in the Italian industrial district are linked to each other as equals or through consortia and work together in some way, for example, in the production or marketing of a product.

The lead or parent firms in Japan often play a dominant role in the assembly and / or retailing while the subcontractor would play a smaller role in the production process and might not have their own design and marketing capabilities. However firms who are able to design or shape their own (or other firms products) such as in the Third Italy, may have greater power and flexibility in shaping their own future.

South Africa

The Small Business Development Corporation (Prodder;1994) estimates that there are more than 800 000 formal businesses in South Africa, 91 percent of which are classified as small and medium enterprises. The estimated share of gross domestic

product of small and medium enterprises is about 45 percent (excluding the informal sector), with 2.4 million people being employed by these firms.[16]

Prior to 1994, small enterprises in South Africa did not receive any significant attention from the government as incentives, legislation and regulations were focused on providing benefits to the larger firms. The corporate structure of South Africa is such that the major conglomerates wheeled enormous power, and in the past were able to influence government policies. Small businesses also faced difficulty in terms of access to finance particularly as financial institutions did not place any priority on small firms. (DTI 1995:12)

In the pre-1994 period, the SBDC was one of the few institutions that gave support to small enterprises. The support came in the form of financing, low rentals, training and backup. The assistance provided was limited and it often focused on retailing and not manufacturing enterprises. While some non - governmental organisations (NGO's) provided assistance to small businesses, many were located in the rural areas with a focus on micro-enterprises. These micro-enterprises were often set up as survival strategies for the rural poor. Unions also began developing capacity to support small businesses by providing assistance and training to workers who had been retrenched. In the former homelands support agencies such as Transido were set up to assist small businesses. These support mechanisms did not, according to the Department of Trade and Industry (DTI 1995:13), make an effective impact.

After the election of the first democratic government in April 1994, a new impetus was given to the support of small and medium enterprises. The Presidential Conference on Small, Medium and Micro Enterprises was held in February 1995 and a White Paper on a National Strategy For The Development and Promotion of Small Businesses in South Africa was tabled in Parliament on 20 March 1995 and was gazetted on 28 March 1995. National support agencies, such as Ntsika Enterprise Promotion Agency and Khula Enterprise Finance were set up by the government and

[16] The number of firms in South Africa has recently been questioned by Ntsika (1996;14) and is placed at a maximum of 600 000.

work in conjunction with the Department of Trade and Industry's Centre for Small Business Promotion. These organisations work to provide support to small businesses in a number of different areas with Ntsika focusing on non-financial support mechanisms and Khula working in the area of financial support. The National Small Business Act provides "for the establishment of the National Small Business Council and the Ntsika Enterprise Promotion Agency; and ... provide[s] guidelines for the organs of state in order to promote small business in the Republic" (RSA 1996:2).

Further support has come from the financial sector who have introduced special packages and deals for small firms. For example, the Nedcor banking group has set up a division called Ned Enterprise which deals with financing and providing assistance to small firms. Management consultancy's such as Coopers & Lybrand have also involved themselves in the small business sector. The number of NGOs offering business services have also expanded, for example, the Beehive Entrepreneurial Development Centre. This centre operates in the Lydenburg area and provides community members with training, financing and support services such as bookkeeping, administration and marketing.

Conclusion

This chapter has discussed the move away from fordism as a mode of production to 'a new way of doing things'. The new mode of production put forward is postfordism. This chapter has suggested the Third Italy and Japan as regions that have moved beyond fordism and the following chapter draws on the experience of these two countries in attempting to highlight the features of postfordism. The integration of postfordism and small businesses has been mentioned in this chapter and forms part of the discussion that follows.

Chapter 4: Inter-Firm Collaboration and Intra-Firm Organisation

Inter-firm Collaboration

Firms, particularly small firms, have become aware that they cannot operate in isolation. According to Pyke and Sengenberger (1992) it is isolation, and not 'smallness' that is the key problem with small firms. Efficiency, responsiveness and competitiveness can often be improved when working in collaboration with other firms or in a network or industrial district. In this section the different types of collaboration (either horizontal or vertical) are explored. Networking and industrial districts are then looked at as two (not necessarily competing) mechanisms of inter-firm collaboration. Lastly, inter-firm collaboration in the Third Italy and Japan are explored. How firms work together in these countries are, in many ways, different.

Before moving on to discussing the aspects of inter firm collaboration, it is important to explain the difference between economies of scale and economies of scope as they both affect inter-firm collaboration and intra-firm organisation.

Economies of scale may be defined as the result of the increase in size of a single operating unit producing a single product so that the unit cost of production is reduced. Economies of scope result from the use of processes within a single operating unit to produce more than one product. The cost advantage in economies of scope comes from "making a number of products in the same production unit from much the same raw and semi-finished materials and by the same intermediate process." (Chandler 1990:17-24). The motivation behind the proliferation of economies of scope is that consumer purchases do not come in batches that match large scale production runs (i.e. economies of scale). Instead, we find that consumers are simultaneously purchasing the whole range of a company's products.

Small firms often benefit from economies of scope, and fail to achieve economies of scale because of their small size. Pyke argues that economies of scale can be achieved by small firms working together while still retaining the beneficial aspects of flexibility arising from the economies of scope.

These economies of scale may be achieved by:
(1) Individual small firms specialising, even investing in expensive equipment, in the full knowledge that a large sectoral market is assured. While it would be uneconomical for a small firm to retain a specialist piece of equipment that it uses occasionally on its own behalf, that same piece of equipment can be used efficiently when employed on behalf of, or by, a large number of other small firms.
(2) All the services that the individual large firm can call upon internally - design, market research, advertising, sales and distribution, finance, staff training, purchasing - can also be provided externally and collectively on behalf of groups or networks of small firms by associations of employers or trade unions, or by local government. (Pyke 1992:2; Lichtenstein & Hoeveler 1996:5&6)

Forms of Collaboration between Firms

Inter-firm collaboration could involve either horizontal collaboration or vertical collaboration. The former involves collaboration between firms making similar products. They could share services such as design intelligence and marketing or expensive equipment. This form of collaboration allows participating firms to maximise the flexibility and innovativeness associated with small scale operations without suffering from the penalties arising from their small size.

The latter, vertical collaboration, involves chains of collaboration between assemblers and component suppliers. This involves collaboration in design and with close co-operation in production scheduling. The makers of machines, for example, would cooperate with those who use the machines. This co-operation ensures that the problems with machines that have been picked up by the user, as well as new ideas about how to make the machine operate more effectively, are incorporated into the new products that the machine manufacturer produces. These inter-firm relations

would involve more than issues relating to price. If an assembler and supplier have developed a working relationship over a number of years then neither one would move to dealing with a new firm solely on the basis of a better price.

Pyke finds a third kind of inter-firm co-operation between small businesses. It is neither horizontal or vertical but diagonal. It is between "specialists who are not producing for exactly the same market and are not therefore potential direct lateral competitors. ... This diagonal co-operation might range from the sharing of research costs and expertise between two firms for the purpose of producing a commonly owned new product to which both producers contribute their specialized inputs to simply the sharing of common facilities, or an agreement to participate in the production of a complementary range of goods..." (1992:6)

A fourth kind of co-operation is periodic co-operation. Firms producing the same product, and who would normally be in competition, may find situations where they can cooperate at certain times or in certain circumstances. If a large order comes in for a firm it may want to share the load or subcontract part of it, as it cannot handle the order in its entirety. Firms might also engage in periodic lending of things such labour or machines.

The existence of collaboration and co-operation among firms does not preclude competition from taking place. Pyke (1992) finds that in Italy, there is strong competition between many small firms producing the same product - i.e. firms who are at the same stage of the production process, while co-operation tends to occur between firms at a different stage of the production process. Competition is important, for example in stimulating new ideas and products though competition can also be very destructive.

Best (1990) argues that:

> "Beneath the apparent paradox of cooperation and growth is a real paradox of competition. Intense local price competition can reduce global competitiveness, particularly in high fixed cost industries, by limiting the capacity of the sector to invest in its future; the result is a diminished capacity

> to compete against rival sectors located elsewhere. ... inter-corporate regulation of the market is predicated upon the common interest of all firms in precluding privately rational actions which undermine collective rationality." (Page 18)

Institutions such as banks, worker unions, trade associations and the state can play a key role in the negotiation of a well-defined purpose for co-operation. The result of these negotiations could be the formation of a sector strategy as well as a means of monitoring and enforcing enterprise actions to counter the free-rider.

The collaboration of firms could occur in networks that have developed over time or though industrial districts.

Networking

Networks are informal relationships between essentially equal social agents and agencies who operate on the basis of friendship, gender, ethnic, community or family relationships. Many networks are highly exclusive of outsiders. Because networks are informal, Thompson et al (1991:14) argue that there could be hesitancy and concern about how networks work and their impact.

> "Networks can be highly positive in the way that they lubricate social relations and help coordinate political and economic life. In some areas they can be all pervasive. They tend to exist within the interstices of social relations, sometimes hidden, usually operating on a small scale modest in their purview and range but nonetheless important and central to a good deal of the real coordination that contributes to running a country. For those people close to networks operating at this level, they may constitute a more important contribution to the richness of their social existence than the rather anonymous operation of the market or hierarchy." (Thompson et al 1991:15)

Important attributes of networks are co-operation and loyalty as well as the formation and sustaining of trust within networks. If trust no longer exists within a network,

then the foundation of the network has broken down, and firms (or players) that form part of the network would be reluctant to cooperate with one another.

Big businesses have beg n to disintegrate and networks of small and medium enterprises have emerged as subcontractors to the main business. The outcome is that there is "an internal reorganization of the big corporation to allow a renewed flexibility and less bureaucratic style of operation, with semi-autonomous departments and divisions contracting amongst themselves in a network framework; ... (and) a re-emphasis on external flexibility with respect to supply contracting associated again with network - type structures." (Ibid).

Networks and the disintegration of big business does not mean a return to market relationships based on price competition nor do networks imply bureaucratic organisational forms. The nature of networks is that they are relationships that are built up between firms on the basis of some identity. Firms in a network would not go to the 'market' and look for someone to supply a contract, they would rather use a firm or person in their network. As a result, it is often not the cheapest supplier who would get a contract with a firm. The relationships that are built up in a network are ones of trust and mutual co-operation. Thus in hard times these firms would 'stick together' to ensure that they all survive.

The existence of network relations does not mean that price competition no longer exists. Price competition exists within the framework of a network. For example, small firms in Japan face continuous pressure from lead manufacturers to lower prices and costs. This price pressure, however, occurs within the context of a long term relationship.

Networking and Inter-firm Co-operation in Japan

Sayer (1989:683-6) identifies four main types of industrial formations in Japan. They consist of: Gurupu, Keiretsu, industry associations of major firms in the same industry, and co-operation groups or kyoryokukai.

Gurupu are remnants of the Zaibatsu, and are groups of major firms from different sectors. For example, Dore (cited in Sayer 1989) finds that each group would have a bank, a trading company, a steel firm, an automobile firm, a major chemicals firm, a shipbuilding and plant engineering firm. The members of the group give one another preferential treatment in trade and there may be some overlapping ownership.

Keiretsu consist of major firms and their supplier or subcontractor firms. The keiretsu are organised into three or four tiers as a form of hierarchy. Those firms at the top of the hierarchy would have longer and more stable relations. The supplier or subcontractor firms, i.e. those from the second tier downwards, are generally dominated by the firm directly above them. They sometimes, however, sell to firms outside the keiretsu. The firm directly above them, or 'parental' companies, often support or assist the subcontractors with funds, guaranteeing credits, lending production tools and machinery, as well as giving technical advice for managerial improvements. This assistance does not translate into direct management by the 'parental' company and subcontractor firms have a large amount of autonomy. The close relationship that is built up by the firms in the keiretsu over time minimises price competition.

Sayer cites an example of the extent of this decentralisation that takes place in a keiretsu:

> In 1987 General Motors had some 6000 'buyers' managing on average 1500 suppliers per plant ... Toyota in 1985 had only 337 people in its centrally controlled Purchasing Department. The contrast becomes even more striking when one learns that Toyota's outsourcing percentage of manufacturing costs is 70% whereas GM's is 25%. (Nishiguchi 1987:1 -5; cited in Sayer 1989:685)

Industry associations of major firms in the same industry tend to emerge when an industry is either relatively new or is facing a decline. The Ministry of International Trade and Industry (MITI) often intervenes in these industry to arrange collaboration. Collaboration could take the form of collective research and development, a division of labour in production of products, restricting competition and targeting particular products.

Co-operation groups or kyoryokukai are organisations linking large numbers of subcontractors operating in the same 'tier' of the keiretsu hierarchy. The co-operation groups would co-ordinate the design and improvement of products. An example given by Sayer (1989:686) is that the design of television components can be co-ordinated with that of the television chassis so as to facilitate both the performance of the final product and the efficiency with which it can be assembled. Because the product development process from the planning stages through designing and engineering to manufacturing, overlaps, it helps cut down the time that it would take to launch a new product. Sayer finds that it also "helps to anticipate and resolve problems before they occur." (1989:687)

The benefits of having these different groupings is that it lowers the cost structure of firms. Firstly, because of "the long-term, almost permanent relationship between subcontractors and finished product manufacturers, subcontractors feel no need to establish sales and other non-productive divisions." (Ikedia 1987:6; cited in Sayer 1989:687). And secondly, because "the relative stability of the system results in lower transaction costs incurred in information search and marketing than are experienced by the more open, flexible and unorganized inter firm relationships common in the west." (Sayer 1989:687).

Japanese industry is characterised by rigidities between firms such as 'obligated trading relationships'. These rigidities could impede flexibility; however the reverse is true and Japanese companies have proved to be competitive and nimble in restructuring and innovating.

Industrial Districts:

Industrial districts are a cluster of geographically concentrated firms, with firms specialising in different but complimentary spheres. A very high proportion of these firms are small or very small. The firms work together in a decentralised fashion to produce a final product. The clustering of small firms in an industrial district is not just an aggregate of the units, it is the organisation of the firms in the confined

geographical area that make it an industrial district. The industrial district should be conceived as a social and economic whole.

Pyke and Sengenberger (1990) find that there are close inter-relationships between the different social, political and economic spheres and that the functioning of one of these spheres is shaped by the functioning and organisation of the others. The success of the districts, according to them, lies not just in the realm of the 'economic' but that broader social and institutional aspects are just as important. The institutions are able to co-ordinate competition and co-operation as well as provide support, and develop skills in the district. Such institutions could be local government, trade associations, trade unions or local chambers of commerce and industry. Price as an instrument to co-ordinate economic activity would be substantially reduced in an industrial district because of the other mechanisms and institutions for co-ordination.

Industrial districts have been extremely successful in many regions, not only in Italy, but also in Germany, Denmark, Canada and Brazil. They are argued to be successful because of a strong capacity to meet market changes and to resist economic downturns in times of crises. Measures of success would be their ability to maintain high levels of employment and retain market position despite the wide fluctuations in manufacturing activity. The success of firms would not be based on a single firm doing well but rather on the basis of the success of all the firms in the network. Pyke and Sengenberger (1992:3) argue, however, that the economic success for the industrial district has come not so much through advantageous access to low cost factors - cheap labour, land or capital - as from a particularly effective social and economic organisation based on small firms. There have been industrial districts that have not succeeded.

Individual actors need to contribute to the collective good of the industrial district and not follow their own narrow self interested path. The collective good is in relation to aspects like training and research. These aspects would have a long term benefit in keeping the industrial district successful so that it will be able to compete effectively on international markets in the future.

Industrial districts place an emphasis on innovation through maintaining a high level of skill and technology within the district. The district's adaptability also depends on a flexible labour force. "A basic requirement in industrial districts is the presence of a pool of local labour and expertise versed in the various functions and processes associated with the main product of the community... The widespread expertise might be handed down 'through the community', from father to son, mother to daughter, and from colleague to colleague, such that it forms part of a long - standing cultural heritage of the area. Alternatively, or additionally, the expertise might be provided by technical schools and craft colleges." (Pyke and Sengenberger 1992:22). Best argues that the creation of new small firms is important for the dynamism in an industrial district and increases the districts' flexibility.

The social structures in Italian industrial districts according to Pyke and Sengenberger (1990) are well suited to the flexible co-ordination of resources. For example, they find that the extended family and a sense of community provides the conditions for workers to adapt to flexible labour requirements and for employers to have access to flexible labour. Furthermore, community or family members can provide assistance in times of need or funds for the establishment of a new business. A new firm, in most cases within Emilia-Romagna, will be headed by a family member or trusted previous employee who wishes to establish an independent firm. The firm may receive aid from family or community members in the form of equity or debt finance, loan of machinery, sharing of orders, or long term contracts.

Industrial districts in Italy are mainly found in the central and north-eastern regions of the country or the Third Italy. There are about 50 industrial districts in this area. Different districts in Italy specialise in different products, Pyke and Sengenberger (1990:2) give examples: in the Emilia- Romagna area the Sassuolo district specialises in ceramic tiles and the Cento district in mechanical engineering. Prato in the Toscana region is known for textiles, shoes are made at Montegranaro in the Marche region, Nogara in Veneto specialises in wooden furniture whilst Canneto sull'Oglio in Lombardia makes toys.

The ceramic tile industry of the Sassuolo area in Emilia - Romagna in 1987 accounted for about 30 percent of the world production and almost 60 percent of world exports. The industry grew from 14 companies in 1955 to 102 in 1962 and by the 1980's there were several hundred. Sassuolo also has a large share of the market in the production of equipment. Ceramic manufacturers in other countries buy the most up-to-date equipment from Sassuolo in order to try and catch up with it. Firms in Sassuolo are, however, always working on new and better machinery.

Trade Unions in Italian industrial districts are often strong with the result that wage rates in particular districts are often higher than nationally agreed standards although there are districts that have lower than average wages. The situation in Italy, as with many other countries, is that wage rates are not necessarily dependent on working in an industrial district but rather on the level and strength of unionisation. Thus in regions where there is poor union organisation the wage rate in industrial districts, as well as the large firms in the region, are low. It is not only the poor unionisation of a region that could affect the wage rates, it is also the dynamic nature of a particular industrial district. It should be emphasised that the conditions (and wage rates) in an industrial district can change over time.

Homogeneous value systems:

> "Culture ... implies the existence of mutual understandings that allow individuals to transcend the individualism of economic man, where self interest is pursued by individual actions alone. ... Culture is also the basis for collective identity or a sense of self that derives from membership of a group, team, community, or nation. It expands the source of meaning in life from 'I' to 'we' and the notion of community from the summation of private interests to the establishment of the common good." (Best 1990:145)

Close knit communities with common value systems are important in binding a region or a sector to a common goal. In Italy, the Communist party and the Catholic Church have attempted to unite communities in order to achieve both social and economic goals. In the Third Italy the Communist and Socialist parties form a majority at the

local government level, in the labour unions, and in the organisation of artisans. The Communist Party has been able to successfully unite owners, artisans and workers into working together. One of the reasons it succeeded is because of the role that the organisation played in the creation and sustenance of small businesses and in the assistance to salaried workers to become independent contractors. The party also supplies social service support to the people of the region, this includes: low cost housing, day care centres for children, and public transport.

The sense of community created by a common ideology helps reduce conflict and promotes communication, co-operation and trust, among groups of small firm as well as between workers and management.

Pyke argues that the pervasiveness of a certain value system prevents members of a community from transgressing the code of behaviour. Thus he finds that, "sensitive information can be shared; work carried out quickly and simply on the basis of somebody's word; contractors can be sure that costs, or changes in costs, will be fairly estimated without the need for long and expensive checking." (Pyke 1992:9)

Japan is often cited as having a particularly strong culture and the development of a company culture that has enabled workers to give a strong commitment to the workplace.

These issues beg the question as to what the relationship is between culture or a homogenous value system and the success of an economy or region. Best argues that while culture is often used as a means to explain things where economic theory fails, he finds that it falls short in its attempt to explain the success of Japanese competitiveness, particularly because it fails to explain the failures that have occurred in Japanese business, and the poor performance of Japanese firms before the 1950's.

One could attempt to answer the question by arguing that it is how the culture or shared beliefs are used at enterprise, district, regional or national level that will lead to success or failure. Some countries have greater potential for mobilising workers and management around the issue of culture and value systems. In both Japan and Italy,

they have been used successfully from the 1950's in the development of their economies.

Institutions:

Institution can play an important role in the facilitation of inter-firm co-operation; such institutions could include agencies, employers' associations, trade unions, and government bodies. Agencies could include labour education facilities, joint marketing arrangements, and regulatory commissions.

Being part of a large employer association for a small business is useful because it gives the business a political voice and potential power. A strong voice is useful when competing against other interest groups such as large firms who are often well organised. Pyke (1992) highlights the point that in Third World countries, government often favour large firms and small firms, which are not organised, "are left to wallow while the large enterprises are given every assistance the public authorities can afford" (Maldonado 1989:66, Cited in Pyke 1992:29). Employer associations can disseminate information to its member firms. This information could relate to technology, finance or even training. Employer associations could also provide services, such as book keeping. The CNA, an employers association in Italy, which is discussed in greater detail below, provides a number of services to its member firms.

Trade unions can become involved in organising workers in small firms and still play an important role in maintaining the flexibility of the system. For example one role that has been proposed by Kern and Sabel is for trade unions to assume responsibility for the training and provision of skilled labour. Unions would have the resources and the motivation to engage in long term training for their members, while small firms on the other hand, may not be able to afford training for their workers. Another role that trade unions can play is to work with employers organisations to influence policy in a particular region.

According to Pyke (1992:10) the government may intervene through: regulations, appropriate macro-economic policies, provision of basic infrastructure such as roads, land, buildings and energy, the establishment of service agencies as well as the creation of a consensual environment among the main interest groups. The consensual environment can be created by government bringing together different interest groups, for example, trade unions and employers organisations. These interest groups would develop commonly agreed programmes of action. Pyke argues that strategies for growth work best when there is consensus among the main interest groups.

According to Späth (1992) it is important that government intervention assist small firms, but the policy that governments choose need to be wary of several factors that could in fact be detrimental to small firms. She cites examples of cases where intervention in the form of exemption from taxes or labour legislation, induced medium sized and large businesses to 'downsize' and subcontract part of their production in order to receive benefits. Other problems with government intervention could be the excessive bureaucratic 'red tape'. The red tape could hinder the start up of small firms or small firms may not have the capacity to deal with the bureaucracy of having to apply for benefits supposedly intended for them - an example being the application for export incentives.

Trigilia (1992) argues that incentives for firms should not be targeted at individual small firms as it "tends to encourage initiatives of doubtful efficiency, based more on political protection than on hard-headed business calculation." (page 45). Incentives, according to Trigilia, should rather be for the collective good and focused on initiatives that would encourage inter-firm co-operation.

Institutional support, if it is to be effective, should be flexible and able to change over time. Thus institutions need to be aware of the context that the firms are operating in. Furthermore, institutions should not be bureaucratic and thereby make it difficult for people to access the resources that the institutions have available. Institutions should also be able to interact with firms on a continual basis to ensure the continued dynamism of the sector. It is also important, particularly if institutions are moving in

to an area where they do not have a great deal of experience, that they find out the needs of the sector; a bottom up approach would be preferred to top down implementation. Best (1990:18) argues that it is preferable for firms to work together through a variety of institutions - identifying common interests and collectively pursuing them, than for the government to impose its decisions on firms.

Institutions could also be used as a means to enforce individual or business responsibility to a common interest. While homogenous value systems are one mechanism to enforce the 'code of behaviour' of an area or region, the institutions that bring the firms together can also enforce firms to adhere to a particular way of doing things. Recourse to legal mechanisms would be an additional, although undesirable means of enforcing rules. The success of institutions often relies on the existence of a homogenous value system and the cohesion of a community.

Institutions in Italy

Inter-firm associations - the CNA: The Confederazione Nazionale dell' Artigianato (CNA) [National Confederation of Artisans] is the largest business association in Italy. It has 340 000 member firms, 7000 staff and 2300 branch offices and represents small businesses across the country. In Emilia Romagna it has 65 000 member firms and 223 offices spread throughout the region. The CNA is organised vertically into trade federations representing 27 sectors of the economy. A percentage of the executive committees and the councils must be artisans who are actively engaged in business.

The CNA is associated with the political left and was largely created by the Italian Communist and Socialist parties. Another association in Italy is the CGIA, which is politically aligned to the Christian Democratic Party.

There are several benefits that a firm can get from being a member of the CNA. These include the following:

- Accounting services: the CNA does bookkeeping, income statements, tax returns, and payslips. In Emilia Romagna the CNA does the books of 40 000 firms and it does about 70 000 pay packets per month.

- Financial services: the CNA helps to organise financial consortiums.
- The CNA has assisted with the development of property facilities such as industrial parks.
- The CNA has assisted in the creation of business service centres.
- The CNA has assisted in establishing of co-operatives.
- It provides education programmes for company owners and employees.
- The CNA in Emilia Romagna also negotiates with local and regional authorities over economic policy.

(From Best 1990:210/211 & Pyke 1992:31/32)

Financial /Credit Consortia: A financial consortium is an association of producers that assists small firm in their application for credit from banks. The consortiums are made up of firms that are involved in a similar line of work and they are therefore able to give an assessment of the ideas for which the credit application is made. Credit consortia also have a loan guarantee fund which could cover a default in payment. By having this coverage small firms applying through the credit consortia would receive a lower interest charge because of the decrease in risk. There is also a social pressure applied to firms not to default on their loans, and as a result there has been an extremely low default rate. For example, between 1975 and 1985, $70 000 out of $40 million was lost by banks making loans to credit or financial consortia. The loan guarantee fund is made up of contributions from the municipal, regional and national governments as well as a membership fee which each member pays.

Marketing Consortia. A marketing consortium is made up of a number of small firms in a common sector and geographical location. A consortium would employ several people who would handle the international marketing for the member firms and it may also maintain particular quality standards among the member firms. Some of the features of a marketing consortia are described by Best.

> "National and regional governments subsidize up to 50 percent of the running costs of consortia. By law, the consortia cannot make profits; any net revenue must be reinvested and cannot be returned to member firms. The concept is to reward private collective action as opposed to subsidizing individual firms." (Best 1990:217)

Some of the services that a marketing consortia can offer include:

- Export promotion,
- trade fair and exhibit organisation,
- sales missions to foreign markets,
- contacts with government bodies that promote trade,
- market research,
- an export office with translation facilities,
- files on financial soundness of existing and potential clients,
- bulk buying and warehousing of raw materials,
- a range of business services including computer and fax facilities, advice on compiling budgets and tax returns, job advertisements, and information on exchange rate movements,
- employment of specialist technicians or specialist machinery
- delivery of products (for the export market)
- monitoring of quality standards among member firms
- training facilities, and
- links to technical training colleges or schools, and universities.

(from Best 1990:216 - 7; & Pyke 1992:31)

Collective Service Centres: One of the requirements for flexibility is that small firms need to keep up to date with the latest in technological development. Small firms on their own would face difficulty in accessing the latest information because of the expense involved. The service centres offer services, particularly that of information. "The fundamental notion was that firms must maintain and nurture design and entrepreneurial independence and not become dependent upon external sources of creativity or become clients of public agencies. Thus the collective service centers would provide information; the application of the information would be up to the companies themselves." (Best 1990:219). The service centres are set up by the government in already existing industrial districts, with the centres being sector specific. Sector specific centres are important because of the different requirements, needs and problems in each sector.

Conclusion

It is not only the existence of networks and collaboratory institutions that lead to postfordist success, the other side of this success is intra-firm organisation which discussed in the next section. Intra-firm organisation considers the changes that have happened internally to the firm or the way in which the firm is organised. Like inter-firm collaboration, intra-firm organisation includes among other things the social aspects of the small business. It should be recognised that the institutional framework provided by inter-firm collaboration and networking facilitates the intra-firm organisation seen under postfordism.

Intra-firm organisation

Introduction

The organisation of the small business is in many respects different from the large fordist mass producers. For example, the small nature of the firm allows for a different relationship between owner/manager and employees to develop. Even the larger firms that operate under postfordism have a different strategy with regard to how employees are viewed and utilised. The technology and production strategies are also significantly different. The success of the postfordist intra-firm organisation has seen many fordist mass producers attempting to reorganise their firms along these lines. The consequence of these attempts is a move to subcontracting, downsizing and a reskilling of labour by firms in many countries.

One of the characteristics of intra-firm organisation is a focus on flexibility. Flexibility is thus more important than specialisation in areas such as the nature of work, the scheduling of production, the design of the product and the continual improvement of the production process. One effect of this flexibility is that economies of scale are no longer one of the aims of production - the size of inventories, the location of machinery and production runs are different to fordist mass producers whose aims were large economies of scale. Another effect of the flexibility is that inventories and lot sizes are reduced so that production goes according to what is ordered by customers (i.e. just in time) rather than keeping large amounts of stock (i.e. just in case). In terms of the layout, factories have been altered and are laid out on the basis of manufacturing cells involving families of parts, rather than on functional lines.

These flexible changes greatly reduce throughput time, save on indirect labour[17] and allow substantial capital sav ngs in both working and fixed capital. Another important characteristic is quality which becomes a primary objective in production rather than one of the factors constraining the maximisation of output. Aspects of firms operations that detract from quality or involve a waste of resources must be put right as quickly as possible. Preventative maintenance of machinery is also emphasised, it

[17] Indirect labourers are those not directly involved in the production process.

is a means to enhance the productivity of the machinery. The last characteristic involves a change in the way that direct workers are used - group and teamwork are emphasised, it also promotes new forms of co-operation and communication between staff and workforce with the removal of intermediate management.

Labour in this approach is seen as a resource not as a cost. The workforce is given training to upgrade skill levels to allow them to perform a wider range of functions such as multi- machine operation, maintenance and quality control. Multi-skilling is an important component of workforce flexibility.

The strategies pursued by firms, particularly in Japan and Italy, are spreading to companies all over the globe. They involve: continuous improvement and innovation, just-in-time (JIT), time competition, technology, quality and labour.

Continuous Improvement and Innovation

Guiliana Benetton commented that 'you never discover a new design, you merely make small changes in the old one' (Labich 1983:115, cited in Best 1990:12). Innovation is not about abrupt changes, rather it is about marginal adjustments in product, process and organisation. Best argues that innovation is not restricted to the insight of the specialist engineer but is an ongoing social process in which problems are solved and new problems are identified: "improvement is always possible and ideas for improvement can come from everyone, including consumers, workers, suppliers, staff, and mangers. As a social process, innovation involves the interaction of people engaged in functionally distinct activities." (Best 1990:13)

By incorporating all staff into the process, improvement in design of machinery can also be undertaken. Workers who are engaged in the actual production know what a machine is doing wrong. By taking into consideration their insights, machines can be altered to perform better. The idea of continual improvement is not only restricted to equipment and products, it has also been applied to the organisation of production. For Japanese firms continuous improvement is an important strategy.

Just-in-Time (JIT)

'Thorough elimination of wasteful practices' is, according to Taiichi Ohno, the creator of the Toyota production system, the basic concept of the just - in - time (JIT) system.

The JIT system works in the following way: workers at a particular stage of production communicate to the previous stage the amount of goods needed. The previous stage of production could be internal or external (from a subcontractor). This system is different to the fordist producer, in that instead of middle management co-ordinating millions of downstream decisions about when and what to produce, the process is internalised by each unit of production placing an order with the previous unit.

> "The inspiration behind JIT, the idea that inventories can be virtually eradicated in the production process, came from Kiichiro Toyoda, the founder of Toyota Motor Works ... His idea was that the assembly line should be modelled after the American supermarket. The idea of a supermarket is that production orders for replacement supplies are governed by purchases off the shelf, the last stage of the production system. Thus instead of planned coordination by a material resource planning staff to assure that each stage in the production process was supplied with the requisite materials at the right time, coordination would be spontaneous. That is, suppliers would produce ex post, to sales figures, and not ex ante, to preplanned production orders." (Best 1990:149)

Time Competition

The time that it takes a firm to produce a product determines the firms output, it affects the cost structure and determines competitiveness. The reduction in time is therefore a very important component in running a successful business.

Japanese firms have been able to reduce the throughput of time of products from days to hours without increasing the speed of work or machines. This 'time reduction strategy' is related to a quicker change over time for machines, which involves a

strategy to minimise the shut down time of machinery.[18] It does not involve speeding up workers tasks.

Two examples of strategies that have been pursued by Japanese firms to reduce time are the single minute exchange of dies (SMED) and improving process efficiency.

The reduction in the time that it takes to change the parts of a machine so that it can produce another product is the key idea promoting SMED. The premise behind SMED is to minimise the time that the machine is shut down, thus a distinction is drawn between set-up activities that can be done while the machine is still operating (external) and activities that require the machine to be shut down (internal). The success of SMED is to convert activities of an internal nature, to external. For example, transporting old dies to storage is external, whereas mounting dies is an internal set-up activity. SMED does not necessarily mean new or sophisticated machines, often it requires an alteration in a die, or adding a special fixture which is specially designed to facilitate faster set-ups.

An example of the success of the Japanese reduction of time in changing to small batch production is the General Motors - Toyota joint venture in Fremont, California, where a typical die change was reduced from 12 hours to 15 minutes.

With SMED a single product will not be run for a great length of time. By using this process Japanese firms are able to achieve greater economies of scope. Short runs in fordist mass production firms cannot be undertaken because of the long time required to change over the configuration and settings of the machinery from product to product. Shut down time is an expense for companies because machines are not producing and workers are not working.

The problem with the long runs in the fordist firm is that they generate high non-production costs. A non-production cost would include storage of other products. Japanese producers have realised that storage of stock that is not being used is

[18] Through inter-firm collaboration firms are able to increase the speed of implementing new products designs and respond to new consumer requirements and changes in market demand. These are also very important aspects of time competition.

wasteful. The shorter runs enabled by SMED make the process more efficient by reducing the time that materials are stored.

Unproductive time, for Japanese producers', is the time materials spend in inventory or other non-operational activities such as handling, moving, inspecting, reworking, recording, batching, chasing, counting and repacking. Productive time is the time during which material is being transformed by machining operations - this is known as operation time.

Process time would include both productive and unproductive time. In order to measure efficiency, ratios have been developed to measure process efficiency and operational efficiency. Operational efficiency is a measure of labour or machine productivity and focuses the attention of management on increasing the productivity of workers and machines. Process efficiency, on the other hand, is the ratio of the time a product is being manufactured to the time it is in the factory.

Process activities are longer because the flow of the product from the entry to the exit point of the plant is more time consuming than the time that the product is being manufactured. Process efficiency requires focusing on reducing the unproductive time so that firms can make substantial time savings without increasing the pressure on workers to work faster.

Technology and Quality

> "Improved quality leads to lower costs because of less rework, fewer mistakes, fewer delays and snags, and better use of machines and materials. But most of the costs of poor quality are hidden costs such as consumers that do not purchase again, the deterioration in a company's reputation, or workers that are not motivated to produce high quality products." (Best 1990:160)

Quality is an important component of post-fordism. It is important for a number of reasons both to the consumer and producer. Shifts in the attitudes of consumers have resulted in less of an emphasis on low price and a greater emphasis on quality. The

knowledge that the purchase of a quality product will not mean a fault occurring in the near future is important for a consumer. For the producer, improvements in the quality of the product - right first time, would result in less time being spent on fixing errors at a later stage of production. Thus, quality improvements result in the elimination of waste which reduces costs dramatically and also increases customer satisfaction.

Quality Control

Information under a Taylorist system is used, in part, to minimise the cost of direct labour and increase worker productivity. Workers, for example, would be monitored to see where they could increase their speed. In Taylor's own example, he monitored the speed of a person who carried pig iron from one point to another. Taylor broke down the process into component parts and each part had to be completed within a certain time. Through this process, Taylor increased the productivity of the worker threefold. In the prime of Taylorism, whole departments were devoted to finding mechanisms to cut down the time that it would take for a task to be completed. By pursuing this strategy it increasingly removed skills from the worker because it cut down each job into smaller and smaller units.

The Japanese pursued a different path to Taylorism, opting instead for a system called 'statistical quality control'. The person who developed this system was W Edwards Deming. Deming was opposed to Taylorism as he argued that quality and productivity have a positive relationship. The Taylorist approach to mass production finds that there is a trade-off between the two.

Deming, through the Japanese Union of Scientists and Engineers, promoted the use of statistical quality control in Japan. It was accepted by top management in Japanese industry and promoted to the extent that "statistical symbols and methods became in Japan a second language for everybody, including hourly workers" (Deming 1982:105, cited in Best 1990:159). The purpose of quality control in Japan is to build it into the job, not like in America, where specialised quality control departments were created to inspect the workers.

Statistical quality control is based on the premise that defective products are often caused by poor systems and not workers. Therefore, firms need procedures for identifying systematic problems in production rather than disciplining workers. The purpose of statistical quality control is to provide a basis for the continuous upgrading of product quality.

Deming emphasises the role that the hourly paid worker can make on quality given the chance 'to do good work and be proud of himself'. Deming's argument is that people seek identity and meaning in work and that work arrangements in which people have no input in decision making undermine trust, teamwork, and the opportunities that work offers humans to develop their creative, problem solving, and co-operative capabilities. (Deming 1982:66 from Best 1990:161).

Deming argued that labour relations in the West are counterproductive because the threat of being fired instilled fear which inhibited learning and systematic improvement. Deming also argued that incentive, quota, and piecework systems of pay promote competition rather than teamwork among workers and these systems undermine moral because of their inherently arbitrary nature.

One of the problems that Deming found with managers in America is that they pursue profit maximisation and not 'excellence of product'. Related to this problem is these managers do not know how to incorporate 'invisibilities' into their analysis: "How does one measure the competitive advantage from a reputation for reliability, schedule dependability, learning effects of different work arrangements, the adaptiveness that comes from 'driving the fear out of the workplace', or product flexibility?" (Best 1990:160).

Best (1990: 161) argues against the idea that Japanese companies have been successful because of cultural characteristics peculiar to the Japanese but rather sees their success as the result of organisational characteristics that have tapped human energies presumed by scientific management not to exist in workers.

Technology

Technology does not make postfordism flexible, rather it is postfordists who make technology flexible. In a study of flexible manufacturing systems (FMS) in Japan and the USA, Ramchandran Jaikumar (1986) comes to the conclusion that:

> "the flexible manufacturing systems installed in the United States show an astonishing lack of flexibility ... The average number of parts made by an FMS in the United States was 10; in Japan it was 93 ... The U.S. companies used the FMS's in the wrong way - for high volume production of a few parts rather than for high variety production of many parts at low cost per unit. Thus the annual volume per part in the United States was 1,727; in Japan, only 258. Nor have U.S. installations exploited opportunities to introduce new products. For every new part introduced into a U.S. system, 22 parts were introduced in Japan. (Jaikumar 1986:69, cited in Best 1990:157)

An example of how changes in technology can increase labour productivity is the 'self-working' machine. This machine is designed so that it is able to detect abnormalities and stop automatically before the production of any defective units. These machines are laid out in a U-shape so that a machine operator can oversee several machines simultaneously as opposed to a straight line with one person per machine. Thus productivity is increased not necessarily by workers working faster or harder, but through technical and organisational innovation.

How machines are used is of great importance. It is the relationship between technology and the ordinary worker that is important - they are directly involved in operations and often have the knowledge of how to use the new technology to its full potential. Jaikumar (1986) finds that operators who are on the factory floor are able make continual programming changes as well as being responsible for writing new programmes. This system is in contrast to the Taylorist firms that removes planning from the functions of the production worker.

Labour

> "Workers became problem solvers as opposed to merely machine minders. ... The worker, instead of being perceived as merely a factor of production, became an active force in the continuous upgrading of the productive system." (Best 1990:154).

Labour; how it is used, its level of skill, knowledge and competence is an important part of postfordism and it is also a factor that is crucial to the success of small and medium enterprises. In terms of the above discussion, for a firm to succeed under postfordism it needs to have "a highly skilled labour force, capable of adjusting flexibly to new demands and with a strong ethos - and opportunity - for constantly upgrading of technical abilities" (Pyke 1992:13). The treatment of labour under post fordism should be distinguished from approaches that see labour in terms of its relative cheapness.

Pyke (1992:14) identifies several factors that facilitate the optimal use of labour under this approach. These include: trust in the workplace, training and career opportunities, labour market regulation that combines economic efficiency and flexibility with security and individual advancement; the institutionalisation of a social ethos and a working environment that focuses primarily on achieving competitive advantage through constant upgrading rather than through sweated labour. Sengenberger argues that countries in Asia are moving away from the sweated labour approach of low wage, labour intensive production toward a skill-intensive technology.

In Italy, Pyke (1992:25) argues, the introduction in the 1950's and 1960's of laws pushing up wage and social benefits as well as imposing restrictions on 'hire and fire' policies, induced Italian firms to move away from a cheap-labour, low priced strategy into sophisticated and higher priced industry segments. The effects of the legislation and the move towards new industry segments are still felt and Pyke argues that they are still a significant factor lying behind attempts at technological upgrading and a movement to greater quality and innovation. In addition to the legislation, the existence of strong national unions and national associations of artisans does not allow firms to compete on the basis of forcing down wages.

Best argues that, "the fact that a standard wage for small firms is public information shifts the burden of argument in low wage companies: managers must explain why wages are lower than the standard. Equally important is the pressure that high wages put on artisanal companies to adjust productivity upwards rather than the pressure in a competitive wage environment to adjust wages downwards to match low productivity levels." (1990:222)

There is not necessarily a direct connection between high wages and industrial success. How companies and regions react to increased international competition and whether they are able to maintain a high level of technological development are also factors that impact on the continued industrial success of a region and of particular firms. It should be noted that recession also affects the Third Italy and despite the legislation and strong unions, dismissal of workers also occurs.

Japan's notion of lifetime employment is where workers are guaranteed jobs, high salaries, and good working conditions in their companies. Lifetime employment covers about 20% of the workforce and the workers covered are mainly male. Companies that have this guarantee are the large corporations. Sayer (1989: 683) argues that in "the long run the effect of the lifetime employment commitment, combined with the high degree of insulation from short term profit pressures, is to discourage firms from simply cutting back employment in the face of adversity and to encourage them to diversify and innovate their way out of trouble".

Part of the of the success of the Japanese system is attributed to labour flexibility. The core workers are extremely flexible, particularly in terms of working overtime and being multi-skilled. The security of tenure offered by Japanese core firms may promote rigidities and lethargy but Sayer finds this is not the case. One reason is because workers in the core would not expect to find employment of the same quality in another core firm[19]. The only alternative employment would be the insecurity and inferior pay of the secondary labour market.

[19] For example Nissan would not employ a Toyota manager.

The other part of the flexible system in Japan are the firms on the periphery. The firms that form part of this market are small and are often linked to the larger corporation in some way, usually through a subcontracting relationship. Labour conditions in this secondary labour market are less secure than the core. Wage and working hours differentials exist between workers in the parent and subcontracting firms. Murata, in 1983, found that wages in firms with less than 29 employees were less than 60 percent of wages in large enterprises and that workers in small enterprises worked 1.6 times as many hours as those in large enterprises (Murata 1986:237, cited in Best 1990:163).

The peripheral or subcontracting firms often use part time or contract workers to complement their full time staff when they have a large order. This aspect gives the secondary market a flexibility to expand or contract depending on the demand.

Female workers in Japan form a significant part of the part-time secondary labour market. Almost twenty three percent of women and only five percent of men in Japan work part time. Women are the biggest category of workers not on permanent, direct, full time contracts. Fujita (1991) finds that there are increases in part-time employment for women in the economic downturn years. The use of female workers in this way has raised debate over the existence of patriarchy in Japan. One of the effects from women being pushed to the periphery and part time work is that their average earnings are only 52 percent of men's. Women are often forced to leave full time employment, particularly if they are employed in the core, when they are pregnant. Once a person, male or female, has left the core workforce, they can only work for firms in the periphery in the future.

Sayer argues that for the core male worker 50 - 60 hour work weeks are common and that these long working weeks reinforce the patriarchal relations because they relieve married male workers of any obligations to do anything in the home.

Fujita (1991) disagrees with the trend to link part - time work for women to the effects of flexible specialisation. Fujita takes this line of reasoning because in Japan, flexible specialisation has been around the longest and it has the lowest number of female part

time workers as a percentage of all employed females. In Britain it is over 40 percent, while in Japan it is less than 25 percent. Thus, if there was a link between flexibility and part - time work for females, then one would witness a larger percentage of women in part - time employment in Japan. Fujita says that women are not passive recipients of the patriarchy of Japanese society and resist it in a number of ways. Furthermore, women are also fighting for rights such as day care facilities in the workplace and maternity leave . Fujita comes to the conclusion that: "Flexible specialization does not necessarily bring more oppression to women workers ... Flexible specialization leads both to new forms of opportunities and oppression." (1991:276).

The flexible approach to labour has often been criticised by trade unions. There is the concern that the reorganisation of the firm, substantial increases of productivity and the introduction of new machinery will lead to job losses. This concern is often raised because businesses use the guise of flexibility to cut back on staff, and increase the intensity of production of the remaining workers. (IMF 1989:32)

Labour flexibility, according to Pyke and Sengenberger, needs to be dealt with in such a way that there is "an economically efficient labour allocation, but not at the expense of security and loss of income, and the undermining of worker confidence and motivation. Basically, there have to be mechanisms in operation that remove the age-old fear of unemployment without imposing sclerosis on the system." (1992:23)

Conclusion

The last section of chapter three looked briefly at the changing nature of the support given to small businesses in South Africa. This increased support is attempting to emulate the kind of government and community support of small business seen in Italy and Japan which is described in chapter four. The second part of chapter four focuses on intra-firm organisation and how these changes have led to improvements in output and quality. Broadly, intra-firm organisation under postfordism can be divided into two areas; one is reorganising the firm around new technology and two is implementing different ways of dealing with labour. At some point the two intersect.

The coming together of these two aspects are important in achieving the success of intra-firm organisation.

Chapter five and six discuss the electronics industry, a subsector in the South African economy. This discussion draws on chapter four in attempting to situate this subsector within a postfordist analysis. This subsector was selected because of its international character and because it can in many respects be understood and related to the postfordist paradigm. Some of the features that relate to the postfordist paradigm include: small business have the opportunity to succeed particularly if they work in networks, there is potential to have high levels of technology along side rudimentary production techniques, there is a need for a high degree of innovation and there is an international standardisation that gives local firms the opportunity to compete on world markets.

Chapter 5: Small businesses in the electronics industry in South Africa

Background to the industry[20]

International

The global electronics industry has grown significantly in the last 40 years with an increasing breakdown of international boundaries. An estimate for 1992 by an electronics publication suggests that the world market size for electronic equipment and components was $673 billion (Goode 1995:7). Mackintosh (1989:45 cited in Goode 1995:7) suggests the employment for one sector of the electronics industry to be in excess of seven million people in Japan, USA and Europe.

The electronics industry has also grown substantially in Third World countries with significant inroads made by countries such as Brazil, Mexico and India. The Asian newly industrialised countries (NIC's) have also achieved phenomenal growth.

The short life cycle for products is a notable feature of the industry as new and better products continually come on to the market. These technological push factors have forced companies to invest large amounts of money in research and development in order to keep up. High capital costs as well as the need for strong distribution networks has meant that a small number of multinational corporations dominate the electronics industry. Nevertheless small businesses can and do play a role. Small businesses would either play a role in subcontracting relationships or by focusing on niche markets.

[20] Electronics would fall under the main sector: Electrical machinery (ISIC 383). The professional electronics sector falls under ISIC 3832, which is radio, television and communication equipment and apparatus. This is a subsector of electrical machinery. This subsector covers the firms in which the research was undertaken. Goode (1995:15) has identified problems with the ISIC classifications as parts of the electronics sector are covered under another classification while ISIC 383 covers subsectors that do not directly relate to electronics. Thus he reaches the conclusion that "professional electronics as defined in this study is poorly described by the existing statistics" (Goode 1995:15).

The issues that characterise this market are similar to other markets and include: quality of products, technical knowledge, product reliability, introduction of new products, research and development, reliability of delivery time, etc.

Table 5.1: World Electronics Markets: 1988 market segmentation

Percentages	EDP	Office equip	Indust. Control	Medical	Military	Telecomm	Consumer	Component	Total
Production									
SA Share of World	0.04	0.09	0.08	0.10	0.16	0.24	0.31	0.08	0.12
Market Segment	28.29	2.66	9.05	3.23	12.77	10.21	9.62	24.17	100
SA segment	8.45	2.11	6.34	2.82	16.90	21.13	25.35	16.90	100
Consumption									
SA Share of World	0.53	1.09	0.79	1.11	1.99	2.54	1.81	1.74	1.32
Market Segment	28.93	2.74	8.59	3.19	12.20	10.35	10.37	23.64	100
SA Segment	30.26	4.74	7.06	10.58	15.81	11.29	9.96	10.30	100

Source: Elsevier; 1990 [from Goode 1995:9]

Table 5.1 above provides a description of South Africa's consumption and production with respect to the international market. There is a strong indication that South Africa's production is lagging behind its consumption. In the above table 'Market Segmentation' refers to the world market share each of the subsectors and 'SA Segment' is a breakdown by segment of the South African market. These figures indicate the relative strength of each sector vis-à-vis one other. Thus the consumer market and telecommunications market are the strongest production areas in South Africa whereas the electronic data processing (EDP) and component markets predominate in the world market. A comparison between the world market segment and the South African market segment reveals that South Africa has very low production levels of EDP products and high production levels of telecommunications and consumer products. In terms of consumption the noticeable areas of discrepancy between 'Market Segment' and 'SA Segment' is South Africa's high percentage of consumption of medical electronic products and low consumption of electronic components.

Table 5.2 below highlights the local production strengths of each subsector in greater detail. For example the Military subsector at 87.8 % had a high degree of 'Local Manufacture Market' i.e. 87.8% of the products sold in this sector were made in South Africa. Security equipment had a 29% local production content in 1991. Thus R152 million of the market of R513 million is locally manufactured. The South African professional electronics sector as a whole had 34% of locally manufactured products in 1991. Goode (1995:18)) finds that, "... at 34% local content, even professional electronics which represents the stronger part of the local manufacturing activity does not manufacture more than a third of the local demand it supplies".

Table 5.2: Local production analysis for 1991

	Local market	Local manufact	Imports landed	Local manufact
	Rm	Rm	costs %[21]	market
Components	881	163	756	18.5%
Military	460	404	81	87.8%
Control & Automation	582	30	198	5.2%
Security Equipment	*513*	*152*	*43*	*29.6%*
Power Equipment	264	175	50	66.3%
Test & Measurement	219	50	189	22.8%
Transportation equip.	139	69	80	49.6%
Total	**3058**	**1043**		**34.1%**

Source: BMI 1992 [from Goode 1995:18] emphasis added

Overall South Africa is a net importer of electronic products with local production meeting only 22% percent of domestic demand (Goode 1995:8). BMI (1992:21) argues that the international demand for electronics is growing faster than the global production. They argue that this gap leaves room for South Africa to enter the market. However, they recognise the difficulties associated with breaking into a highly concentrated, capital intensive market.

[21] "Local production of electronic equipment draws on a component industry which perforce sources from all over the globe. Manufacturers buying components from local agencies treat locally bought imports as complete local content, thus an appraisal of true local content needs to discount imported inputs." (Goode 1995:18). This column represents the values which are used to derive the discount.

South Africa

The South African electronics industry has a long history of state involvement. The industry was given a great deal of support by the military as well as by parastatals such as the Post Office. During the 1970's and 1980's the Post Office gave preferential sixteen year contracts to firms in the industry. The government also shielded the industry through protectionist policies. There were tariffs on components as well as heavy import duties on finished goods such as hi-fi and television units. From the early 1990's the government support to this industry decreased. The Post Office reviewed its contract procedure, the military spending on electronics declined and tariffs and duties were reduced substantially. For some components, the tariffs of 25 percent were reduced to zero. The television industry saw the shutting down of the assembly and manufacturing divisions in several major corporations such as Teljoy and Philips. Other companies associated with the military industry were forced to retrench staff and refocus themselves either in the international market or on products that had a local demand. Firms associated with the military industry were often inefficient and unequipped to deal with the changes that affected them once the military contracts ended. A few firms have been able to successfully remain within the reduced military and television industry.

With the breakdown of sanctions, the post 1990 period has seen an increase in international competition with the local electronics industry often unable to compete. At the same time the strategic focus on the industry by the government declined. The impact of these changes on the industry was huge and it is estimated that there was a decline from 55 000 people to 35 000 people employed in the industry.[22]

In 1994 powerful lobby groups came together to relook at issues of how to promote the electronics industry in South Africa. A Standing Committee for Electronics (SCE) was set up which comprised of representatives from labour, business and government. The report issued by the Committee called for demand and supply side measures for

[22] The figures for employment are from the SCE report and no dates are given. BMI produced a report in 1992 on the industry and at that time the employment levels were 55 000 people. As the SCE report was published in 1994, one presumes that the decline in employment was over this two year period. The figures may not include small and medium enterprises as these are difficult to ascertain.

the electronics sector which would cost the government R355 million per annum. Part of the cost to the government would be lost income from the granting of tax incentives on investment, training, and reskilling. Some of the measures in the report include a proposal that the Department of Trade and Industry consider providing more extensive support for industrial innovation and niche products. The report also argues that small and medium enterprises should receive R50 million a year in support. The final report was released in November 1994 and an article in Engineering News in April 1996 (26/04/96), a year and a half after the report was released, highlighted the fact that the government had been slow to react on the findings of the SCE.

Despite the failure of government to actively reinvolve itself in directly supporting the industry, it has once again started to grow. In September 1995 the Cape Business News reported that electronics manufacturing in the Western Cape was the major manufacturing growth sector. The article estimates that the sector grew about 25 percent a year between 1989/1990 and 1994/1995. The number of firms grew from 148 to 155 over the period, whilst those firms manufacturing security equipment grew from 27 to 32, with their turnover increasing from R55 million to R89 million.

Table 5.3: SWOT Analysis of the Industry

Strengths	**Weaknesses**
• Low cost of skilled labour and engineering services • Expertise in areas of infrastructure development • Components distribution sector supply electronics firms adequately with raw materials • Export success in niche products	• Lack of indigenous technology and design • Not a major job creation industry • Lack enough skilled people to maintain systems hardware • Market and product development strategies employed have an overwhelming domestic focus
Opportunities	**Threats**
• Proximity to under-developed markets that depend on national projects and large-scale financing • Improved acceptability in the region, and	• Rising labour cost • High cost of capital

favour with triad countries who wish to direct social development funds into the region • Service market is expanding • Direct exchange lines at present only 12 per 100 head of population. In Europe ±40 per 100 head of population	• Falling away of tariff protection • Public sector purchases which at present represents 25% of revenue are declining

Source: Danida 1996

Table 5.3 provides an analysis of the strengths, weakness, opportunities and threats (SWOT) that face the South African electronics industry.

Most of the small firms in which the research was conducted had no direct relationship to the military or Post Office in terms of the products that they produce as they focus on home and business security. Changes to the industry have had a bearing on the firms studied as it has in some respects created an environment conducive to small firms. For example, there is a trained workforce that small firms can draw on, this is valuable as the cost and time to train workers would be reduced. Furthermore, the success of the industry in the early years (during the 1970's and 1980's) has produced highly skilled electronic technicians who are able to compete with the best in the world in terms of knowledge and design. These technical people are able to give guidance to the small firms and with the downsizing of the big corporations many of them have moved into the small firm.. There is also a solid infrastructure in this industry that firms can draw support from, for example, there are training programmes available at all levels of skill requirements, there is a strong industry federation, and supply networks are in place.

In depth research sites

Background of Companies

The three core firms under observation manufacture products for the South African security industry.

Company A:

This firm started as a family run firm, working from home. It was started over 15 years ago by a husband and wife team and it is the oldest of the three firms. The husband is an electronics engineer and designed the original product. He no longer actively works in the firm but still does development work for the company from home. The current Managing Director has been with the company for over eight years. Aside from being the Managing Director, he undertakes product development. Product development is for him, "what makes the whole thing fun ... what lets you sleep at night". The firm is involved in the manufacture of radio equipment which transmits and receives signals[23]. They are only manufacturers and do not undertake any of the installations themselves. They sell to security companies who install the product to the end user. There are about 55 people in total who work in this enterprise. Their yearly gross income is around R12 million.

Company B:

Company B was started by a person who was working at one of the larger companies in the industry. He was doing his own design and limited production while still working at the company. He then left the company and started to work for himself. A couple of months later he moved into a workshop and employed two staff members. The company has been in existence for about five years. The products they sell include car alarms, remote controls, and immobilisers. They sell to distributors who in turn sell to the security companies or to the companies that install the products. The company offers a unique application development where they work with a company to develop a product that is suited to a specific need. At the time of the research there were about 15 people who work in the firm, and they have a gross yearly income of about R1.5 million.

[23] The systems are mainly used in the armed response aspect of the security industry.

Company C:

This firm was started by a person who had been designing products for a number of years previously as a sole trader. The company, like the other two firms, manufactures products for the security industry. They sell many of their products through distributors but also install their products for clients. They have the widest range of products, including time delay locks and motorcar logbooks. Like *company B*, they design and produce limited orders and unique applications. The firm was started about three years ago and there are currently 35 people employed by the firm. A few weeks prior to the research the company absorbed the operations of another firm.

All three of the firms started with one or two people who, in the literature, would be called entrepreneurs. It is their skills, both in terms of design and in terms of running the business, that have allowed the firms to flourish. In all cases, as the firm grew, so additional people were brought in to help not only with the increased production demands, but also with the running of the firm. The founders of the firms have all remained on the development side of the business and other people have been brought in, sometimes as partners', to deal with the administration, manufacturing and sales aspects. The firms have all grown from micro firms employing one or two people, to small and medium enterprises employing between 15 and 55 people. Management in all three case are white males and females, with the manufacturing staff mainly comprising black female workers. The technical staff are almost always males (of no particular race group).

Single Interview research

Background of Suppliers

Supplier 1

The first supplier interviewed set up his small firm after a number of years as a sales rep for a large company. The purpose was to supply the small firms with the products that they needed from the very basic equipment like soldering irons to the

slightly more sophisticated such as soldering pots, to the technologically advanced. High technology machines would include Surface Mount Devices or Pick and Place machines. The competitors of this firm focus mainly on supplying the large companies but the managing director found that there are a lot of small companies that are being set up in the industry and there is a large market in catering specifically to them. Some of the small firms he deals with are what would be classified as micro enterprises and operate out of their homes or garages. Over the past couple of years he has witnessed the growth in size of the companies he supplies and his firm has grown with them, catering to their increased technological requirements.

Supplier 2

The second supplier interviewed is a medium sized company and are part of a very large publicly listed company. They produce and supply crystals for security and telecommunications firms. They are not involved in the mass production of their product as the Japanese dominate the world market in the large volume crystal production. The focus of the company is not to compete with the mass produced crystals, instead they focus on the specific needs of the industry in South Africa operating in niche markets.

> "The advantage that we have got being a local manufacture is that we are very sensitive to client demands, we can produce miracles if we are required to." (Managing Director of the company).

Part of their service is to help the client with the products that they need, be it in the form of advice or actual design. The company has a great deal of technical knowledge and experience.

Background of Subcontractors (Contract Out Assembly)

A contract out assembly firm or subcontractor does not have its own products nor does it design and develop new products. Its facilities are used by other companies that do not have their own or have limited production capability. In the latter case a firm might experience an increase in demand of their product and contract out the

excess. The former is the trend in Europe where firms concentrate on design and development, preferring to contract out the manufacture of the product.

Subcontractor I

This firm specialises in surface mount manufacturing which involves the use of very specialised capital equipment. The machines are a similar to the assembly system, i.e. they place a number of very small components onto the PC board. Many firms do not want to or cannot afford to purchase this equipment (the price of one of these SMD machines starts at R750 000). Instead they approach a contractor who specialises in surface mount manufacturing. The small nature of the components used in SMD and the speed at which the machines operate rule out any possibility of workers effectively making these boards on a production line.

This surface mount device (SMD) contractor operates its machines 24 hours a day with the employees working in shifts. The company has been in existence for over five years and it has grown from one person to fourteen people. Most of the staff are young white males. The company is ISO9002 certified which is very important because it means that they maintain a very high quality standard and can compete in the international market. The firm has received a number of overseas contracts and the Managing Director commented that it is about one third cheaper for German firms to have their SMD products compulated in South Africa with the same quality as firms in Germany.

Subcontractor II

This company uses an assembly system similar to those discussed in *Company A*, B and C above (i.e. workers manually placing the components into a PC board). The company has been in business for ten years employing 15 full time workers, with up to eight contract workers who are called in during the peak periods. This firm has mainly coloured female staff who do the placing of the components, many of whom have been with the firm from the beginning. The firm has an automated soldering

machine at a cost of R150 000, but is not as technologically sophisticated compared to the SMD firm.

Conclusion

The above description of the firms breaks the research into two parts, those 'core firms' where intensive research was undertaken and those where single interviews were conducted. The research findings (presented below) integrates the results of the single interview research with the discussion of the core firms.

The findings are broken up according to the production process identified during the course of the intensive research. The first and most important part of the production process is the design of the product. This requires technical skills where new products are developed or existing ones modified. The next part of the process is the manufacture of the product. This is where the components, transmitters, crystals, etc., that have been purchased are placed into printed PC boards. The manufacturing side is either labour or capital intensive. The products are then sold by the sales part of the firm. All the firms had sales people who either negotiated with distributors or were involved in the direct selling of the product to the user. The last aspect of the firm is service and support. With the type of product that is being sold many things can go wrong; for example, lighting could strike a system, customers could forget their codes, or components may register faults. These problems may involve technicians going into the field to locate and fix the problem or a product coming back to the workshop to be repaired.

Research Findings

Design

Design of the product is the first stage identified in the production process. Designing the product is undertaken by a person with a particular skill often with some form of training (a technical degree such as electronic engineering or attendance of short

training courses). While a high level of training of the design technician may enhance the quality of the product many of the entrepreneurs in the industry have taught themselves a great deal. Once a product has been designed, the layout of the design needs to be printed on a PC board. This process would involve printing the name/type and strength of a particular component on the board so that the assembler knows which part to put in and where the part should be inserted.

Under postfordism the growth of the companies is linked to the continual modification and improvement of the product or products, as well as the introduction of new products. Design of new products and the continuous modification of old products is one area where the firms under scrutiny have come in line with the postfordist trend. To illustrate this point three examples have been selected.

Company B in their production of remote controls continually improve the accuracy and increase the frequency distance.[24] By focusing on the niche market of accuracy and distance they have become recognised as one of the leading firms. While their products are more expensive, people in the industry know that if they have a problem with distance *company B* is the firm to approach for assistance.

Company A produces units that link a home or business to a security company. These units operate on a medium wave frequency and the frequency has to be bought by the security company from Telkom. There is a great demand for medium wave frequencies in South Africa and in certain highly populated areas, like Johannesburg and Pretoria, a new frequency is difficult to obtain. Part of the design and improvement work in *company A* is to try and increase the number of users on a single frequency.

The last example is *company C* who were tendering for a contract in Kenya. The contract was for a product that was highly sophisticated and had only been made by a

[24] The type of business that these firms are involved in requires the use of frequencies to send a signal from one unit to another unit. There are three frequencies - high, low and medium. High is used by the military and for television, medium (136 - 174 mgs) is used by security firms, paging companies and

few firms in the world. By having successfully designed and tested the product before many of their competitors they stood a good chance of winning the contract.

It was also found that the design process is flexible because of the capacity of the firms to interchange components. The board needs to be designed such that all the components required to make the product function can fit into the board comfortably. Several different makes of a component can be chosen for a PC board and the designer would need to be careful about which make is used since quality and size can vary between component makers.

Problems can be encountered with components because overseas markets sometimes 'dump' obsolete or discontinued components onto the South African market. Such products come in at a cheaper rate and a firm may design their PC boards according to these components specifications. However, when the firm orders more of the product at a later date, the supplier has run out of stock as the components are no longer available on the world market. The PC boards then need to be redesigned because the replacement part may have different specifications to the obsolete part.

An additional problem with components is that some are of an inferior quality. These components are often cheaper but they may not have a long life span. These problems could affect the overall quality of the final product. As a result of these problems the firms studied preferred to use common, readily available parts as well as better quality components even if they are more expensive. *Company B*, in particular, mentioned that they had problems in the past because they were using cheaper components.

Modifications to the final product do not necessarily involve the reprinting and redesign of existing board - the manufacturing staff could be informed of the changes and if the components involved are of a similar size then it would take a few minutes

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two-way radio's. Low is unstable and the uses are therefore limited to shorter range products, like garage remote control openers, or remotes to activate a car alarm, etc.

to 'train' the staff. Training usually involves informing the production line staff of the alteration and giving them the new components.

The small firms' capacity to continually improve old products as well as develop new products is important as it helps the firm keep up with their competitors - both local and international. The design flexibility is crucial to the firms because of the problems they have encountered with supply of components

Manufacturing

Profile of the Workers

The workers on the assembly side are by and large black females; this phenomenon is partly because there is a general belief in the industry - shared by management and workers alike that females are better at assembly. One respondent, from management, mentioned that: "The tendency is to be more females. I find that females are more skilled than men, particularly in the finer work. They have got greater dexterity, ... That [job] was very fine work, welding wires.. about a tenth of hair onto diodes and I found that Indian females were particularly skilled at doing that job. There are many brain surgeons there". A worker responding to the same question as to why female workers were mainly in assembly, responded by saying that it was because women workers found it easier as they were able to concentrate more than men.[25]

The Manufacturing Process

The manufacturing process in the three core companies is simplistic. It involves workers placing components into a PC boards; the boards are then soldered, coded and tested. After this they go back to the assembly side to be placed in their containers and are ready to be sold.

The level of skill required to do most of these jobs is low although some basic training is required. All the firms preferred to hire employees with some basic skill and

[25] The exception to this was subcontractor I who's workers were mainly technically qualified white males.

experience in assembling. Workers with experience are able to complete boards faster with few mistakes. Quality in inserting the components is very important as inserting a component into the wrong place can cause a board to malfunction. Most of the workers had come from other firms that were involved in electronics and had been retrenched. Firms include Teljoy, Philips and STC. Several technical people also had experience in these firms at some point in their career.

In the three core firms each worker completed their own boards - this production system is in opposition to the assembly line production where the worker inserts several components onto a board and then passes the board to the next worker. A conveyer belt could be used in the latter system. The use of a conveyer belt is one of the key features of the fordist production line.

The system whereby each worker completes their own board has arisen for a number of reasons. Not all of these reasons are incompatible with postfordism. One of the primary explanations for the 'own board' system is due to the origins of the firms - the firms started out very small with only one or two workers making their own boards, and this system has continued despite the firms growth. Another reason is that it is generally felt by workers and many of those in management that the quality is better if each worker does their own board. Furthermore, this system allows the tester of the boards to see who is making mistakes and what mistakes are being made. The workers would then be informed of the mistakes and if necessary they would be shown what they are doing wrong so as to improve. Lastly, the workers commented that they prefer making their own boards.

Workers who work at different speed complete different amounts of boards per day. In both *company A* and *B* there was an exceptionally fast worker who could make more boards in a day than the other workers. The treatment of this varied in the two companies. In *company A*, the worker was tested and could make double what the other workers were making in a day - however, she was holding back. To put it in

numerical terms, while other workers were making 8 per day she could make sixteen in a day, but was only making 10 boards. Her complaint was that she was not receiving additional money for the extra boards made. In *company B*, however, the fast worker was making the maximum amount of boards she could. Her motivation was that the salary increases that they received were based on the number and the quality of boards produced.

Company C differed from the other companies in that it has a system of workers completing their own boards as well as a mini assembly line. This assembly line involved a team of four women working as a unit to produce one board. There were eight workers in the manufacturing section and they were broken up into workers who had been at the company longer and those more recently employed workers. The four more experienced workers formed the mini assembly line. Their motivation for making the boards in this way was to 'push out' (work fast) when there was an urgent or large order. They did not work in the assembly line system all the time and preferred to make their own boards. This flexible approach to production gives the workers some control over their job.

The firms do not use the highest levels of technology that is available and as a result have a production process that is labour intensive.

Skills and Training

The levels of education of the workers in the core firms varied from standard five to those who had matric. All of the workers who were interviewed indicated that they would like to receive additional training. Most wanted training in electronics so that they could understand a bit more about what they were doing. One worker wanted to move to the testing side and receive training in how that was done.

Of the core firms, only in *company C* were the workers given the opportunity to improve their skills. Each worker from the tea person to the technical staff were asked if they wanted further training and in what area. *Company A* had assembly workers that had been employed for fifteen years and most of these staff had developed skills

over time and the company was taking limited advantage of this fact by promoting some of the workers or moving them into more complex areas. For example, one of the assembly workers was moved into the repair side, the tea person was promoted to the assembly line and one of the assembly workers was offered a job in administration. A training programme in this company would have enhanced this upward movement and empowered the workers.

All the firms in the study had a very low staff turnover rate and most firms had workers who had been employed from when the company started. As the companies had started small and then grown there had been no need to retrench staff (rather the opposite is true, they absorbed the retrenched staff of the larger companies). Management said that workers were hired not only on the basis of previous skill but also if they could fit into the team. The importance of hiring on the latter basis is because all the workers need to get along and a problematic worker could affect production.

Subcontractor I had the most skilled staff, all of whom had some technical qualification and continually receive training. The company is ISO9002 certified and part of the requirement is to have a staff training schedule.

The Managing Director of *supplier 1* argued that workers in general need to receive additional training. He found that because they come from factories where they were only inserting one or two components they are not effective in small firms where they need to be 'jacks of all trades'. One of the services that he was looking into was a training school to teach workers how to solder correctly.

In terms of job flexibility the small nature of these firms means that workers are often able to do most jobs on the factory floor - they are not limited to doing only one job such as inserting five components into a PC board. They can compulate a variety of different boards and they can also make other products that the firms use to complement their main products. *Company A* makes aerials which they include with their transmitters. The longer serving staff have the skill to make these aerials as well

as the boards. The production manager at *company A* said that, "if someone is absent then they can be replaced by another person. They are versatile."

The areas of training and skills is a big problem in the small firms. Most of the workers are not highly skilled when they come to the firm and they do not receive much formal training once in the firm. Postfordism identifies a skilled and trained workforce as one of the key success factors. One could argue that in a larger firm the jobs done by the assembly workers are deskilled, monotonous and typical of the fordist production regime. However, because of small size of the firm, the workers are able to rotate, do different jobs and learn new skills.

Unions

None of the firms except for *supplier 2* were unionised. At *company A* there was an attempt by a Nactu union to organise the production workers. This attempt failed and the management were very wary of any form of unionisation because of the fear that a strike will cause the production line to shut down. When confronted with the prospect of unionisation, the management of *company A* responded by saying that no unions were allowed. The workers accepted this and did not pursue the issue. Workers at this company had been unionised at previous companies and one worker commented that things were better with a union because the wages were better. The Managing Director of *subcontractor 1* believed quite strongly that unions were going to kill the industry (he did not accept unions in his company).

The rejection of unions is a strong feature of the South African business environment. Most of the firms interviewed had not been directly involved in any dispute with unions nor had they suffered any losses as a result of union activity. One can only assume that the fear of unions has filtered down to the small businesses in the sample via the media and the experiences of other firms. The nature of the small business is not conducive to the kind of confrontational unionism practised by the main South African trade unions in the past. Management, however, would need to realise that there can be some positive outcomes from the unionisation of workers such as that described in the Italian case study. Unions, on the other hand, would need to

reformulate their approach when dealing with the less financially secure small business, and play a more positive role in helping the business succeed.

Communication and Relationships between Staff

The small nature of the companies allows workers and management to communicate. A sense of family and working as a team was promoted in all of the firms though there are tensions that exist within this 'family'. The issue of racial differentiation between the managerial staff and the assembly workforce creates problems in communication and interaction between the two. I found that there were very good relationships among the workers on the factory floor, and there are good relationships among the administrative and technical staff; although there was very little interaction between the two groups. This may not only be related to race - other factors such as who workers would normally interact with in the course of their daily work could affect the closeness of the relationships.

Racial divisions in the workplace not only places a strain on the 'happy family', it also limits the possibilities of the 'homogenous value system' which was described above as one of the features in both Japan and Italy. To illustrate, the workers at *company A* were upset at the racism showed by the white administrative staff. The issue was over the toilet. There are 38 black female staff on the production line who share one toilet, while the seven white (and one Indian) female administrative staff have a separate toilet which is kept locked - and is only for their use. The production staff found this to be a problem, not only because of the perceived racism involved, but also because of the logistical problems when all the production staff need to go to the toilet during lunch time.

The social divisions in the firm have increased as the firms have grown in size. Workers at *company A* commented that the Managing Director no longer has time to come and talk to them any more. He also was no longer convening the weekly meetings that they were supposed to have with him. The workers at this firm said that he was the only person from management that they could talk too:

> Question: If you have got a problem do you ever tell anyone?

Response: No, Mr [name of director] haven't got enough time to come and talk to us.
Question: Do you think that you can speak to anyone else in the company?
Response: No, I usually like to speak to Mr [name of director] because I think he is the one who minds us better than the other ones.

Workers at *company B* felt that they could communicate with the Managing Director but did not talk to him about their problems. This response was different to the Managing Directors response - he felt that he had a good relationship with his staff and that they told him their problems. Social interaction at *company B* was slightly better than the other companies and could be related to the smaller size of the company in terms of space and in terms of numbers.

The relationship between workers and the directors of *company C* had declined as the company had grown. The older workers commented that the managing director no longer came and spoke to them about how well the company was doing.

The Managing Director of *Subcontractor I* said that he maintains a good relationship with his staff and believes that communication is very important in the business because without it the business will fail. He added that it is important to watch what is happening in the company, because if there is tension among the staff then the productivity will decrease. The whole company goes out occasionally for drinks on a Friday afternoon and this builds the spirit of the company and relieves the tension.

When speaking to workers many problems in the workplace were discussed but most of these problems were not communicated to management. Issues such as wages were very important and some workers went as far as saying that they would leave if they were offered more money elsewhere. Workers in *company A* were the most dissatisfied with the wages that they receive as many are sole supporters of their family and just 'scrap through'. Other problems in the workplace include: the smoke from the solder, the cramped nature of the working space, the cold rooms in winter, and the lack of facilities to heat up their food[26].

[26] These problems were mainly identified in *company A*.

The problems experienced by the workers create a negative working environment. This may affect their attitude towards the company as well as their performance. Their inability to communicate their problems to management is a further debilitating factor.

In spite of the complaints that the workers made, all those interviewed said that overall they were happy working in their respective firms. They were allowed to listen to the radio and talk freely although there were occasions when they were told to talk softer. When asked about talking in the workplace, a worker from *company C* commented that the director was happy with them talking and became worried when they were not talking and there was silence. The motivation was if there was no talking, it meant that the workers were unhappy or distracted and this could affect the quality of the product.

Quality and Technology

Because of the importance of quality to the firms, is it crucial that the workers do not make mistakes in the placing of components. All the firms had a system of marking the boards so that the worker who made the board can be identified. This would allow the quality controller and the tester to identify problem areas. Even if all the components are placed correctly, the board would still need to be tested to ensure that none of the components are faulty. The identification of where problems arise is important because some problems may arise from worker mistakes and others from poor quality components.

There are quality problems that could from the soldering of the components to the PC board and often the soldering can make the difference between having a good and bad product. In *company A* and *B* they were both using a dip type soldering machine where the board was held by a clip and then hand dipped into a bin of hot solder. The solder sticks to the metal ends of the components holding them in place but does not stick to the rest of the PC board as it is plastic. Until recently, *company A* had the system of each worker soldering all the components on their boards but this method is

time consuming and can lead to quality problems. If a PC board has been badly soldered then it may cause the product to malfunction. *Company A* believed that by changing from individual soldering to soldering with a machine (costing R7500), it could double the output of the workers.

Company C pursued the best and most sophisticated method of soldering - they had purchased a machine costing over R100 000. The way the machine works is that several unsoldered boards are placed at one end, the machine is turned on and the board moves through the machine and the solder is applied to it, it comes out at the other end successfully soldered. This latter method produces the highest quality product as it gives consistency in the application of the solder.

The nature of the electronics industry is that most of the tasks that are performed by the workers on the production line can be automated which would result in an improvement in quality. The soldering and the placing of the components can be done by machine. The flexibility of having workers who can make a number of different types of boards is easily achieved by a machine as they have been designed with this flexibility in mind. The replacement of workers by machines would, however, require a more technically trained workforce.

The Managing Director of *company B* argues that the use of more technologically advance assembly systems such as surface mount technology (SMT)[27] is where South Africa is heading in the near future.

> "SMT, surface mount technology that started showing its face three to four years ago here a little more that just once in a while ... it started getting more and more common. Last year I came out with my first surface mount product, this year I am probably going to do another three or four at least. Next year you will find over 50% of my products will be surface mount. .... Ultimately, within the next two or three years we are going to be going ... (mainly) surface mount".

[27] The components used in SMT are smaller and cannot be placed by a person.

The managing director of *subcontractor I* commented that the SMT machines they purchased were extremely flexible. Flexibility is an important factor in their decision to purchase these particular make of machine because they constantly need to change to new products as their batch runs are relatively short. The shut down time when changing over to producing a new product is fifteen minutes and can be reduced to two minutes. At the time of the research the company was producing at full capacity - 24 hours a day, with minimal shut down time. This meant that if there was a problem with one of the machines and a line had to be temporarily closed then the company would be behind in its production schedule. The company was thus looking at purchasing a new machine in order to take off some of the pressure as well as to allow for more business opportunities.

A high level of technology is needed in the testing of the products (once they have been completed). Testing in an important process as it ensures that the product is working and that the frequency is set correctly. All the companies regarded the testing of the product to be important and had sophisticated equipment and trained personnel to conduct the checking; this was the one area where none of the firms compromised. In *company B* and *C* the testers were males and some of them had technical qualifications such as T4 and T3.

In line with the training programme at *company C* the person in charge of the testing section had recently completed a quality course and had become the quality control manager. He said that the course really helped him to understand how to improve the quality of the products. For example, he now uses statistical methods to calculate the percentage of errors on batches that come out of the soldering machine as well as for the staff to check the quality of their own boards and random quality checks by the quality control manager. Using these techniques enables him to determine whether the problem lies with the machine or with the production staff. Since implementing these quality control methods the returns (faulty products) from the field are virtually nil.

Company A has a person conducting a visual check on each board to see if all the components are in place, after which the board is coded and then tested with a machine.

The testing equipment in *subcontractor I* was of an extremely high quality. The failure rate for the products of this company were three hundred products per million produced (less than one percent) and they were trying to bring this down. One company in South Africa has a defect per million rate (dpm) of 4 products. This figure was the eventual target that the SMD company was hoping to achieve but because of the continual changing of the products that they produced it would be difficult.

Subcontractor II does not have ISO9002 although the Managing Director said that he is planning to apply for it soon. The quality of the products assembled by the company is reasonable as it has a low failure rate of products - between three and five percent - which compares favourably with *companies A, B and C.*

A measure of the success of testing is a low return rate per thousand/million. While all the companies sought to maintain a low return rate there are methods that could be implemented that would create further reductions. The implementation of ISO9002 or advanced quality control methods and the training of workers are part of these mechanisms.

Staff Flexibility

All the companies have production peaks at certain times of the year, particularly around November and December. The Easter period and July were also cited as peak times. These peaks c ary; for example, during the national elections in 1994 there was a sharp increase in sales. For *company A* this increase in demand was out of the ordinary with their usual pattern. The demand for the products of *companies A, B* and *C* is mainly linked to the situation in South Africa though the move into export markets is altering production patterns. *Company C* was tendering for a large order in

Kenya - if they won the contract it would mean that the traditionally quiet time of February and March would become incredibly busy.

The companies response to increased demand (either through winning a contract or during the traditionally peak periods) with respect to workers is to increase the hours and the intensity of the labour. The three core firms and *subcontractor I* did not employ additional contract labour during the peak periods; though the firms are continually expanding and periodically take on new full time workers. The two companies that used contract workers were *subcontractor II* and *supplier 2*. The Managing Director of *subcontractor II* felt that the employment of contract workers is the best approach since it allows him to be flexible. The firm has no long term contracts and could not afford to operate with a full complement of staff, thus when a big order comes in contract workers are employed. As the firm is continually expanding some of the contract workers have become full time. The Managing Director believes that the contract workers are happy with the situation and they know the conditions of employment from the outset.

During the peak periods workers are expected to work overtime up to 18:00 as well as on Saturdays. They are also expected to increase the amount produced. In *company A* two extra units per day are expected to be produced during these peak periods.

The normal working day during the off peak season in *company A* is from 8:00 - 17:00; with half an hour for lunch, ten minutes for morning tea and afternoon tea. Workers in this company have their wages deducted if they are continually late. In *company B* the hours of work are from 8:00 - 16:00. Originally it was 8:00 - 16:30 but the staff wanted to leave early so they work through their tea breaks. Wages are not deducted if staff arrive late but most are on time. *Company C* had the most relaxed atmosphere where the hours of work are from 8:30 to 16:30 with an hour lunch. Workers often arrive late and the director says that they are usually working by 9:00.

Overtime work is often difficult for the staff as travelling on public transport outside of ordinary working hours is a problem for those that stay in the township. For

example, these workers can only work an hour to and hour and a half later in the evenings. The workers reside in a variety of townships across Johannesburg including: Soweto, Voslorus, Tembisa, Reiger Park, Springs, Actonville, New Modder and Palmridge. In *company A* and *C* those workers not living on the East Rand found problems in getting to work. Those workers who stay in Soweto would need to catch two taxis each way. As a result of the far distances workers were spending between R150 and R200 per month on transport which takes up a huge portion of their salary.

Consequently, the location of the business is important for workers. Staff at *company A* were very unhappy when they had to move from Germiston to their current location in Bedfordview as this meant that they could no longer take the train to work. Those who work in *company B* are happy with their company location in the Johannesburg central business district. The management of this company is planning a move to new premises. *Company C* is also planning a move to bigger premises. A couple of months earlier they found a new site in Randburg but this move was rejected by all the employees of the firm as it would be even more difficult to get transport to Randburg. The growth in all three companies has necessitated a move to bigger premises.

The apartheid city has created problems as workers are located far from the manufacturing centres. Aside from the additional expenses that it creates for the workforce it impacts negatively on the community sprit as seen in the Italian industrial districts. As a result there is little interaction among the workers after hours.[28]

Sales and Exporting [29]

In terms of sales the common theme that ran through all of the three core firms was they did not engage in extensive direct marketing of their products. *Company C* was

[28] The two exceptions were the workers from Soweto in *company A* and the family members in *company C*.
[29] The research was conducted prior to the 20 percent fall in the rand in mid 1996.

the most active in this regard. Both *company A* and *B's* main strategy was to rely on word of mouth. The companies have three possible alternatives for the sale of their products. They can work through an agent - an agent is a person who handles the product on behalf of the company. They can sell to a distributor - a distributor would be a separate company that buys the product from the manufacturer and then sells the product to retailers or installers. The third possibility is to sell the product to the end user directly. The small and close nature of the South African market, particularly in security and related products, means that most firms would know about one other. If a firm is selling a good product then the distributors would want to have it in stock.

The companies pursue a number of different strategies simultaneously. *Company A* sells directly to the security companies (who install the products into the homes and businesses of their clients) and are also involved in the occasional direct installation on behalf of the security companies when these companies do not have the technical expertise. In terms of the export market, the company works through distributors. For example in Kenya, which is one of their largest export markets, they sell to a distributor. The motivation for this route is that they do not know the market and do not want to take any undue risk by dealing directly with the security companies. In an interview with the sales director, he mentioned that they are considering revising this strategy in the future. *Company A* is also involved in exporting to Saudi Arabia, Mauritius, Zambia, Angola, Ivory Coast, Maputo, Zimbabwe, and Namibia. The Managing Director had recently concluded a business trip to China to look at the possibilities of exporting there. The company has export sales of over R800 000 per annum.

Although *company B* has not entered the export market they are negotiating with another company to produce a remote control to work with an alarm system and these units would be for the export market. *Company B* mainly works through distributors and wholesalers. One of the products that they produce is car alarms and the Managing Director feels that it is better to stick to manufacturing the products than to get involved in the actual installation of the alarm. This is despite the fact that there is

almost a 100% mark-up of the product from the time that it is sold by *company B* to the time that is installed into a motor vehicle.

Company C is more marketing orientated, they occasionally place adverts in trade magazines and have in the past set up a stall at a security fair. In response to having a stall at future fairs they felt that it was not a good idea as few of their potential customers would be looking in this environment for products. They also mentioned that in terms of the South African market, they are well established and well known. The company has started to focus on the export market and they now export units to Brazil, England, Kenya, Zambia and Zimbabwe. They were able to gain access to these markets through distributors, contact ' friends (one of the directors is from Zimbabwe).

Expanding exports was identified by all three companies for the future particularly as the South African market is becoming saturated. The target markets identified are other African countries as these countries seem to prefer buying from South African firms rather than the European counterparts. There may be preference because the products designed in South Africa are more suited to the conditions in other African countries than the industrialised nations products or it could be the case because, as one of the respondents put it, "Africa is becoming closer to SA - local is lekker".

Supplier 2 is not involved in exporting in any significant way but they supply firms in Zimbabwe and Kenya. The Managing Director says that there is very little original equipment manufacturers in these countries and the crystals that are supplied to them are for radio and telecommunications. He is not aware of any major electronic assembly operations in the rest of Africa.

Supplier 1 does not export any of their products[30] though the local firms that they supply are involved in the export of their products. The Managing Director feels some of the firms he supplies are very good and internationally competitive and that

[30] Most of their products are in fact imports.

the industry has a lot of potential to grow and has the capability to compete on international markets.

Subcontractor I, the SMD firm, has found that the international subcontracting market is particularly lucrative because of the comparative advantage.[31]

Service

A problem experienced by the firms was that incorrect fitting by technicians at the retail outlets resulted in goods being returned due to malfunctioning. *Companies A* and *C* responded to this problem by having regular, free training courses where they invited all the technical people who fitted their products to come into their offices and receive training on how the product should be fitted or new products available. *Company A* also travelled once a year to Cape Town and Durban to train technicians there while *company C* paid for all the technicians in other areas to come to Johannesburg for the training. *Company B* responded to the problem of incorrect fitting by providing an explanatory pamphlet which is issued with all the products. The plan that this company had was to provide an improved pamphlet in the near future - they recently purchased computer and printing equipment for this purpose.

Another form of service that the companies offer is backup service. For *company A* backup is a very important part of what that they offer to clients.

> "we have established a lot of good will among our clients. We are a very service orientated company and we take great pride in providing top class backup service. And that is twenty four hours. So if any one of our clients have a problem, they could phone any of us - whether it be our standby technicians or a director or senior manager at three o'clock in the morning and believe me you get a very helpful response - pleasant. That is just the way we like to be and that has paid dividends." (Manager at *company A*)

[31] This is discussed above (page 58).

Company C has similar feelings about the importance of service:

> "We have, in the market place, probably the best name for service; like to a degree where a lot of our clients from financial institutes are coming to me and saying to me 'I need you to do A,B,C' that does not involve anything that the company does but they are so impressed with the service. And that was one of our main objectives when we started, was to be tops in service." (Director *company C*)

Quality of the product is another factor that affects peoples' perceptions of the firm. People want to know that they are buying a product that is reliable and that would not give problems in the near future and if there are problems, they will be serviced.

Another aspect of the service that *company A* offers is that they keep all their clients orders in stock - so that there is no turn around time. The way the systems works is that once a client places an order, the company will keep a repeat order waiting in the store so that when the client orders the stock, it would be readily available. To offer such a service is not only expensive for *company A* but it also involves an element of risk. The risk comes in when a client no longer purchases the product from them - either because they are no longer expanding or have closed down or changed supply company. Since each of the products have the frequencies set to the requirements of a particular client, if a client no longer purchases the product, the PC board would have to be altered. For the management of *company A*, the risk is worth the benefit that the service brings to their clients. Their competition, on the other hand, would only have an order ready a week or two from the time that it is placed.

Company C keep small quantities of some of their products in stock. This is so they can have immediate turn around on small quantities of ongoing products. If, however, there are large quantities ordered then it is normally between three and six weeks deli very time.

The commitment that the firms have to 'going the extra mile' for their clients has helped them develop a reputation and build their credibility. The relationship between

being service orientated or demand driven and the success of the firm is noted in the literature. This success is all the more relevant when the firms direct competitors - who do not have a strong focus on service - are losing market share. The case studies of Italy and Japan highlighted the role that relationships with customers plays in focusing the firm on the needs of the customer and building this into the design of the products and the future service requirements.

Suppliers

The relationship between the firms studied and their suppliers has been characterised as very good and in most cases better than the relationship with the customers.

> "...and as far as my component suppliers go, I probably have got even a better relationship, where they will actually rush around, go overseas, do everything to get it here. But then it also because we have grown so much - from when I started at [company name], we were probably using Mantech, as our component suppliers, and we were probably going five thousand rand a month. Now I am in the industry of minimum R100 000 component usage a month. As you grow, and as the more money you spend, so your clout becomes a lot harder, but even before we were big spenders, Mantech, I think at that stage, still pulled through for us." (Director *company C*)

The directors at *supplier 1* and *2* stressed that they have excellent relationships with that companies that they supply. *Supplier 1* said that many of his customers need to be trained in how to use the products that they purchase and he provides this service. *Supplier 2* often does design work to assist their clients with new products.

One of the problems in the industry that is beyond the control of the individual suppliers is that there are shortages in the supply of certain components[32]. These shortages are the result of an over demand on international markets as well as the discontinuing of certain product lines. Staff often complained at *company A* that they are required to finish a number of boards even though a particular part had not yet

[32] I was unable to interview a supplier of components.

arrived and as a result the work in progress piles up. This leads to several problems: firstly, the staff are under pressure when the part does arrive because they then have to go back to the board and insert the part - which means that their daily rate will decrease and they will have a poor record for that day. The second problem is that products are not being finished on time for delivery. Thirdly, capital is being tied up in unfinished products - it is important for small and medium enterprises to have liquid capital.

Company B tried several systems of purchasing component supplies. The first system was to use a number of local suppliers. The Managing Director explains the problem:

> "my suppliers knew how much I ordered every month, and yet they would not always keep the stock on site. There would be a few times when I would not have, I would literally be crying. I would have to hunt around for supplies to last me for a month or two. Last year I got to the stage when I said, 'this is it, I have had enough'. I took a few months stock, I looked at what I sold - worked out what I need, added an extra ten or twenty percent to it. Looked at the increase. By the time I was ready, those few months of survey ... I knew what I would be using, and placed a six month call off order."

The second system of a 'call off order' is where the company would be using one supplier for 80% of the components used. The supplier company would deliver the components each month according to the qualities determined in advance. In order to get a good deal the Managing Director said that he called for tenders to supply the company. The tender was worth between R60 000 and R70 000 per month.. He feels that this systems works out best for both his company and the supplier.

The third system of component supplies that *company B* attempted, was to import the components directly. They hired a person to phone and negotiate prices with the overseas companies. This system did not work out as the savings of importing the components themselves, after the salary of the person hired to do the job, did not make the whole process financially viable.

Company A had a person whose job was solely that of buying. This person said that often the price that the supplier quoted was inflated and she had to negotiate them down. The buying power of this company, although not revealed in the research, would have been several hundred thousand rand per month.

Subcontractor I had set up a company whose main function was to supply them with components although it also supplies other companies. This idea is similar to that of the second option for company B but they have externalised the relationship and by supplying other companies they can get greater discounts on bulk buying. The success of setting up a separate supply company may be limited as there is a lot of competition among the wholesalers for components in South Africa.

All the non supplier firms interviewed found that most of the locally made components are poor quality and they preferred to import most of their components. *Supplier 2*, a local manufacturer of components, was the exception and the other firms in the research verified that the quality of the product and service of this company was excellent. In addition to manufacturing their regular products, *supplier 2* also import many types of finished products to supplement their range.

A further problem with the supply side is the printing of the PC board. A PC board needs to have a design printed onto it in a special material and this process is only done by a few operators in South Africa and it can take these companies up to three weeks to print the board. The longer turn around time for the final products is mainly because the PC boards take such a long time. The director at *company C* commented that they can get their 'printer' to do it in a week if there is great urgency but they only used this measure in extreme cases because they did not want to abuse the relationship that had been built up.

In terms of the supply of machinery none of the firms complained about these suppliers though they dealt with them on a less frequent basis. *Supplier 1*'s main area of supply is that of machinery and the Managing Director has established overseas

contacts and travels to several European countries every year in order to see the latest and best machinery that is available for his clients. By using the best, most up-to-date technology, South African manufacturing firms will be able to break into international markets. This is one area where South Africa is at its greatest weakness and there is little, if any, original manufacture of machinery in the country.

Conclusion

This chapter has analysed the electronics industry and the firms within this industry in an attempt to gauge the extent to which the concepts and ideas of postfordism have become part the industry. By discussing each case in great detail it is possible to draw on the understanding of postfordism developed in chapter four and bring this to bear on the firms in South Africa.

The next chapter discusses the areas in which aspects of posifordism have been found in the electronics industry. The bulk of the chapter is focused on the discrepancies between what is described as postfordist and what is witnessed in the electronics subsector.

Chapter Six: Towards a Model

Four of the key components of the postfordist paradigm highlighted in chapter four are labour, networking, homogenous value systems and institutions. If one were to consider the possibilities of postfordism being present in the South African economy it would be rejected by looking at these areas. The areas where one sees change taking place is in the focus on niche markets, quality products, and design.

Labour

> Postfordism involves 'encouraging responsible autonomy on the part of workers so that they get involved in the organisation of production, exercise initiative, and utilise know-how; this pattern of labour relations is quite different from the external discipline imposed from above through the stopwatch and the unrelenting pressure of the assemble line. ... The labour force employed to operate these machines and systems will also be flexible." (Jessop 1992:29)

How labour is utilised is a key concern of postfordism. Both in Japan and the Third Italy, labour is treated fundamentally different from that under the fordist mode of production. In the field work a lot of emphasis was placed on researching the labour aspect of the businesses. Postfordism requires labour to be multi-skilled, productive, well trained, and empowered so as to be able to offer suggestions and improvements.

The research found that a division of labour existed in the workplace. On the one side there is management and technical staff (often white) and on the other is the black female workers who assemble the products. These workers have very little training in the actual processes involved in designing a PC board. Most of the workers would not know which components to use as replacements and what the functions of the components are. When asked about the possibilities of further training few wanted

more schooling yet all expressed a desire to become more involved in the technical side of the operation. The advantage of working in a small firm is that these workers are often given some room grow within their jobs and develop new skills. For example, they occasionally rotate in the jobs that they do and can often do other workers jobs. This is often required of them in a small firm. Furthermore some of the workers mentioned that they have learned how to do basic appliance repairs which they do in their homes.

The conditions of labour described in the literature survey is an ideal when one looks at South Africa. One could argue that the situation in the small firms researched is substantially better in terms of working conditions than in a large factory where the workers place the same few components day in and day out.

Pyke and Sengenberger argue that there needs to be co-operation between employees and employers and their representative organisations if a country wants to develop along the lines of Japan and Italy. "Such co-operation can only be built on a process of mutual trust with the consequence that the development of economies on [industrial] district lines would be more difficult in regions with a history of hostile behaviour by one side or the other." (1992:24). South Africa has such a conflictual history and, as discussed above, the small firms refuse to work with unions or allow them to organise in their factories. Any attempt to develop industrial districts would have to take into consideration these strong negative feelings towards unions. Furthermore one would also need to consider the racial dynamics that exist in the country and workplace.

Homogenous value systems

A common community is an important factor in inter-firm collaboration. The affects of the apartheid ideology still linger in the relationships between the different racial groups in the industry. The changes in the political system and the attempt by the government to promote a single 'rainbow' nation has an effect on the day to day

relationships between people. Social interaction on a daily basis between different racial groups also has the effect of breaking down the divisions created in the past.

Nunes (1994) argues that a community spirit need not arise from a specific ethnicity or race, but could come from being located in the same industry. Her research on the clothing industry in the Western Cape revealed that racial divisions had been broken down to form a strong clothing industry community.

It would be difficult at this stage to identify a single homogenous community in the electronics industry. One might be able to find a community amongst the owners and managers of the small firms. Many of the people at management level have spent several years in the industry and, as a result, know or have met one another through encountering each other at trade fairs, conferences, social events or even from working together.

It was mentioned in the previous chapter that many of the workers in the small firms had worked previously at the large companies before being retrenched. Workers at one small business may know the workers at another but because of the geographical separation they would not get the opportunity to interact unless they stayed in the same township.

Networking

One of the key success factors of postfordism is a move away from the firm operating in isolation and working with other firms in networks or clusters. There is scant evidence that networking or clustering of subsectors is taking place in South Africa. There is a definite tendency for the firms investigated to want to 'go it alone'. Some level of co-operation does occur amongst the small businesses; particularly when there is an extraordinarily large order or if there is a specific product they do not produce which another firm in the industry produces.

Social networking also occurs amongst the management of firms on a limited basis. People in different firms are acquaintances and know who is producing good and bad products. The social networking offers the greatest scope for the development of inter-firm co-operation. The manager of *company B* commented that social interaction with another small firm has helped him in the conceptualisation of certain designs.

The firms studied in the intensive research all sought to incorporate the several aspects of the business in one firm and did not strive to work with other firms to avoid the costs of setting up a separate department. From the previous chapter, we saw that they involved themselves in design, production, testing, sales and marketing, and service. By not working with other firms they are unable to achieve certain economies of scale, an example would be in the area of marketing where all the firms are weak. Substantial improvements in the firms capabilities would be improved if they were to work together.

The greatest level of co-operation was between firms on different levels where there were excellent relationships between the companies and the firms that supplied them with components or machinery, as well as good relationships with the firms and people that purchased the final products.

I would argue that there are three reasons for the small firms not working together in any coherent or formalised manner; one is that there are no geographical clusters of firms or industrial districts that bring the firms into a common locality; another is that there is very little trust among the actors in the industry. The last reason is that there is no person, company, organisation or institution that is actively pushing for small firms in the industry to network.[33]

[33] One of the respondents mentioned that a couple of firms had been talking about coming together to work in the same geographical area. These firms would support each other by giving work to one another - but they could still work with firms outside of the group. This idea was placed on hold.

Institutions

The institutions that have been set up to assist small businesses were not used by any of the firms in the research. The firms were started without the support of an agency such as the Small Business Development Corporation (SBDC) nor were subsequent loans obtained from this organisation[34]. Most of the respondents found the SBDC to be useless and some felt that the SBDC did not understand the electronics industry; one of the more successful companies was even turned down for a loan application. My own research into the SBDC was not met with a great deal of success as they have completely ignored the industry and offer very little technical or financial assistance to the sector.

The only other institution that had been approached for assistance was the Industrial Development Corporation (IDC), where one of the firms received a loan to purchase capital equipment. The IDC was involved in the Standing Committee for Electronics (SCE) and they have several people in the company who are specialists in the field. However, they have not taken up small businesses in electronics as a specific priority.

One of the major institutions in the industry is the Electronic Industry Federation (EIF). It is a representative body of all the major electronics firms in the country and claims to represent 90 percent of the industry. It appears, however, that they do not represent the small firms in the industry as none of the small firms interviewed were members of the EIF and an article in the Financial Mail commented that the EIF 'has long been regarded as the bastion for large vested interests' (11/11/94). The president of the EIF, Keith Prins, outlined in an interview with the Engineering News that the EIF was developing mechanisms to try and assist small businesses.

> "An attempt is being made to identify the problems experienced by small, medium and micro enterprises (SMME's) in the high tech electronics field. The objective is to use existing resources to support these enterprises to make a more significant contribution to the economy and to gain access to appropriate international niche markets. ... SMME's .. do not have a friendly

[34] One firm was located in a SBDC hive but the firm received no support from the SBDC, besides a low rental.

environment in which to succeed. Many of the problems have to do with finding investment capital, getting export finance, access to international partners and putting internal systems and processes in place." (Keith Prins, chairperson of the EIF, Engineering News 26/04/96)

One of the proposals by the EIF was to establish a separate, more affordable, structure that would incorporate the SMMEs in the electronics industry federation.

The South African institutions described above have not played a significant role in bringing about inter-firm collaboration or reorganising the intra-firm relationships. If South African small and medium enterprises want to compete on the world markets these changes need to take place and it is institutions that will need to initiate the changes and provide assistance.

Niche export markets, quality products, and product design

Piore and Sabel see the flexible specialisation path as:

> "a strategy of permanent innovation: an accommodation to ceaseless change, rather than an effort to control it. This strategy is based on flexible - multi-use - equipment; skilled workers; and the creation through politics, of an industrial community that restricts the forms of competition to those favouring innovation. (Piore and Sabel 1984:17)

If one were to consider the three aspects of niche export markets, quality products and product design in the case study then one would find traces of postfordism within the South African economy.

While the design aspects of the firms may not be the best in the world, the examples indicate that they are significantly developed and are often able to compete on international markets. The success of the exporting attempts by both *company A* and *company C* highlights this point. The export market offers a great deal of potential for the industry. Several of the firms researched were engaged in some way with

exporting their products and saw this market as the future growth potential of the business.

The focus on producing high quality products for niche export markets is where the future of these firms lies as they could never hope to directly compete with the low value mass produced products. Best (1990:218) finds that even small firms in the Third Italy are "ill equipped to compete on the basis of price with mass producers. The strength of the Third Italy is in the flexibility and innovation that come from decentralized and autonomous design capabilities."

A Japanese study into product development describes it as "dynamic and continuous process of adaption to changes in the environment" (Imai et al 1985: 340, cited in Best 1990:155). Three important organisational features of the product development process can be identified: 'self organising' development teams[35]; overlapping development phases; and a commitment to continuous learning.

The phases of product design, development, and commercialisation are overlapped so that problems can be tackled simultaneously. Thus with overlapping development phases, the product development group faces challenges collectively rather than in isolation, which would be the case with distinctive specialist departments. Information is shared across functional boundaries as common themes are developed and responsibility is shared.

The integrated approach differs from product development under fordism which is done sequentially by specialised departments. Thus, after a new product prototype is completed by the design department the product is given to manufacturing and the design department ends its involvement. The production engineers design the modifications in plant layout and machines and then the actual production activities are turned over to manufacturing managers and unit engineers. Once the new product

[35] 'Self organising' development teams refers to the autonomy given to the project teams to define their own activities, within a broad strategic product development goal. The project teams are composed of members with diverse functional backgrounds who work together. This could include product

comes off the assembly line, the sales department takes over. "Individuals in each department do not work with individuals in other departments; it was the task of management to coordinate across departments." (Best 1990:155)

The product development process in the South African case study has many similar features to 'the New Competition'. It follows a dynamic and integrated approach where the innovator is involved in the process from design through to marketing.

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engineers, process engineers, manufacturing personnel and marketers. The team would work together from the birth of a new idea to its maturity in the new product.

Chapter 7: Conclusion

Whether one agrees or disagrees that there is a move to postfordism, there is definite agreement that something is happening in the international economy. These international shifts have occurred in the last ten to twenty years and only in the last few years has there been a recognition of the shift in the mode of production. Consequently small businesses have started to receive increased attention by governments, businesses, unions and academics. There is, however, very little agreement among academics as to what is meant by postfordism and flexible specialisation; some even dispute the changes described by these two concepts.[36]

The features of postfordism described in chapter four have started to filter through to South Africa. In chapters five and six I have suggested that small firms in the electronics industry have adopted several strategies that are promoted in the 'new way of doing things'. However, key components of inter-firm collaboration and intra-firm collaboration do not occur within the South African electronics industry.

According to traditional economic theory, the larger the firm the better it will do; particularly because it can achieve economies of scale but also because a large firm will be able to have power to shape and influence markets. We have seen in the discussion of Japan and Third Italy that there is a successful alternative. Networking by small businesses can overcome the barriers associated with small size, yet this has not been a feature of small businesses in South Africa who are often at the mercy of suppliers and the dictates of the market.

One of the issues underlying this research is the problematic of the free market approach to firstly explaining the industrial success of countries such as Japan and secondly, in attempting to posit an a solution to the manufacturing problems in the

[36] The lack of a strong coherent body of thought has made itself felt in this thesis specifically with regard to terminology and concepts.

Third World, and South Africa in particular. Best argues that the opposite is true: there has been and still is, strong state intervention in the Japanese economy; and that the networking and inter-firm co-operation depend on subverting the free market.

> "Inter-firm cooperation goes some way to explaining the success of networked groups of small firms in the Third Italy; it also implies that market coordination can undermine the competitiveness of small firms. ... But if inter-firm cooperation is a condition of small firm success, then policy making based upon the competitive market ideal may actually contribute to industrial decline." (Best 1990:227)

Sayer concurs:

> "Crucial to Japanese industry's success has been its exceptionally highly organized character. In no other comparable capitalist country has the visible hand of organization and planning pushed back so far the invisible hand of market forces. Moreover, the degree of protectionism - both formal and informal, intended and unintended - is exceptional." (Sayer 1989:681)

Postfordism should be understood as a move away from the dictates of free market yet still engaging with the market.

What this thesis highlights is the need for strong state intervention by creating an enabling environment through appropriate policy as well as the setting up of institutions to support small and medium enterprises. Manufacturing in the country has been identified as weak and in many respects behind that of the First World. If South Africa is to make the transition to a strong First World industrial economy it needs take cognisance of the issues posed by postfordism and draw on the examples of the best in the world.

Appendix A: Interview Schedule

About the firm

1. Number of employees?
2. What is the nature of the firms operations?
3. What does the firm manufacture?
4. Does the firm have linkages with other firms, this could be in terms of marketing, finance, training, importing components, technology etc.
5. Does the management conduct strategic planning and goal setting?
6. Does the firm produce a product that is used in production by a large firm. i.e. is it a subcontractor?

About the product that is produced by the firm

1. Does the manufacture of the product involve the use of high technology?
2. How is the product manufactured?
3. Does the firm export any of the products?
4. Are there a lot of competitors who produce the same products (both nationally and internationally)?

Employees

1. What is the relationship like between the employees and the employer?
2. What are the level of skills of the employees?
3. How does the manger/owner view the employees?
4. Is there a common background among the employees?
5. Do the workers belong to a union?

The industry

1. What are the problems faced by the industry?

Flexibility

1. How are raw material supply's handled?
2. The production process?
3. Does the firm use computers in the production process?
4. What is the ability of the firm to adapt to changes in the market?
5. Is there a continual improvement of the product/s that the firm produces?
6. How does the firm deal with a sudden surge in the demand of the product?
7. How do they respond when there is a slow period?

The Future

1. What changes would the firm like to make internally with respect to technology?
2. Are labour practices and how labour is organised, going to change in the near future?
3. What is seen as the best government policy for the industry?
4. Do the prospects for breaking into / or maintaining export markets seem positive?

BIBLIOGRAPHY

Allen J; "Fordism and Modern Industry"; Political and Economic Forms of Modernity; Open University; 1992

Amsden A; "Third World Industrialisation: "Global Fordism" or a new model?"; New Left Review, 82; July 1990

African National Congress (ANC); Reconstruction and Development Programme (RDP); Umanyano Publications; Johannesburg; 1994

Bethlehem L; Evaluating the concept of 'racial fordism': a case study of the South African pulp and paper industry; Unpublished thesis; University of the Witwatersrand; 1994

Best MH; The New Competition; Polity Press; Cambridge; 1990

BMI Technology; Prospects for the Electronics Industry; Johannesburg; 1992

Boswell J; The Rise and Decline of Small Firms; George Allen & Unwin Ltd; London; 1972

Baumann Ted; An industrial strategy for the Household electrical durables sector; Industrial Strategy Project; 1995; UCT press

Burgess RG; "Methods of Field Research: Interviews as Conversations"; In the Field; 1993; London; Routledge

Capecchi V, "A history of flexible specialisation and industrial districts in Emilia-Romagna"; Industrial Districts and Inter-firm Co-operation in Italy; F. Pyke, G Becattini and W Sengenberger (eds); ILO; 1990

Chandler AD; Scale and Scope The Dynamics of Industrial Capital; 1990; Harvard University Press; Cambridge, Massachusetts

Danida; Business-to-Business, Denmark - South Africa, Sector Profile: Electronics; National Productivity Institute; April 1996

Davidson JW and Lytle MH; "The view from the Bottom Rail"; After the Fact; 1982; United States; Alfred A Knopf Inc

Department of Trade and Industry (DTI); White Paper On National Strategy For The Development and Promotion of Small Businesses in South Africa; Government Gazette No. 16317; 28 March 1995

Department of Trade and Industry (DTI); The Presidents Conference on Small Business; Conference Papers; Durban; March 1995

Edwards R; "Connecting Method and Epistemology - A white woman interviewing a black woman"; Women's Studies Int. Forum; Vol 13 no5 1990; USA; Pergamon Press plc

Fujita K; "Women Workers and Flexible Specialization: the case of Tokyo"; Economy and Society, 20; Routledge; 1991

Goode R; An Industrial Strategy for the Electrical Distribution Equipment and the Professional Electronics Sectors; UCT Press; Cape Town; 1995

Granovetter M; "Economic Action and Social Structure: The problem of Embeddedness"; in The Sociology of Economic Life; eds. Granovetter M and Swedberg R; 1992; Westview Press; Oxford

Harper M; Small Business in the Third World; John Wiley & Sons; New York; 1984

Hedrick CL; "Theory of the Firm: Past, Present ane Future; An Interpretation"; in The Economic Theory of Organization and The Firm; ed Cyert R; 1988; Harvester Wheatsheaf; New York

Hirst P and Zeitlin J; "Flexible specialisation versus post-Fordism: theory, evidence and policy implications"; Economy and Society, 20; Routledge; 1991

Hoffman K; New Modes of Management and Production organisation: exploring the implications for Industrial Policy and Firm Management; Research Proposal to the World Bank; Sussex; 1989

Humphrey J; "Introduction: Reorganizing the firm"; in IDS Bulletin; Vol 24 no 2; 1993

International Metal Workers Federation (IMF); Productivity. A guide for trade unionists; Learn and Teach Publications; Johannesburg; 1989

Jessop B; "Post-Fordism and flexible specialisation: Incommensurable, contradictory, complementary, or just plain different perspectives?"; in Regional Development and Contemporary Industrial Response; ed's Ernste, H and Meier V; Belhaven Press; London; 1992

Lichtenstein GA & Hoeveler J; Network Approaches Business Development, Innovative U.S. Approaches; Associate Collaborative Strategies; Philadelphia USA; January1996

Lipietz A; "Towards Global Fordism"; in New Left Review, 132; March 1982

Maller J and Dwolatsky B; "What is Fordism? Restructuring work in the South African metal industry."; in Transformation; No. 22; University of Natal, Durban; 1993

Martinelli A and Smelser NJ; Economy and Society: Overviews in Economic Sociology; Sage Publication; London; 1990

Ntsika Enterprise Promotion Agency; Quantitative Criteria for Small Business Policy; unpublished paper; Pretoria; October 1996

Nunes S; A sociological analysis of subcontracting: A case study of the clothing industry. Unpublished thesis; University of the Witwatersrand; 1994

Piore M and Sabel C; The Second Industrial Divide: Possibilities for Prosperity; Basic Books; New York; 1984

Programme for development research (PRODDER); Small Business Development; HSRC; Johannesburg; August 1994

Pyke, F; Industrial Development Through Small-Firm Cooperation; ILO; Geneva; 1992

Pyke and Sengenberger; "Introduction"; Industrial Districts and Inter-firm Co-operation in Italy; F. Pyke, G Becattini and W Sengenberger (eds); ILO; 1990

Pyke and Sengenberger; Industrial Districts and Local Economic Regeneration; ILO; Geneva; 1992

Rasmussen J, Schmitz H, and van Dijk M.P.; "Introduction: Exploring a New Approach to Small-Scale Industry"; in IDS Bulletin; Vol 23 no 3; 1992

Sayer A; "Postfordism in Question"; in International Journal of Urban and Regional Research; December 1989

Schmitz H; "On the clustering of small firms"; in IDS Bulletin; Vol 23 no 3; 1992

Späth B; "The institutional environment and communities of small firms"; in IDS Bulletin; Vol 23 no 3; 1992

Standing Committee for Electronics; Policy measures for the restructuring of the South African electronics industry; November 1994

Thompson G, Frances J, Levacic, Mitchell J; Editors introduction; Markets, Hierarchies and Networks, The coordination of social life; 1991; Sage Publications; London

Thompson P; The Voice of the Past; Chapter 7; The interview

Trigilia C; "Italian industrial districts: Neither myth nor interlude"; Industrial Districts and Local Economic Regeneration; ed's Pyke and Sengenberger; ILO; Geneva; 1992

Williams K, Cutler T, Williams J, and Haslam C; "The End of Mass Production?"; in Economy and Society, 16; Routledge; 1987

Williamson K; Cutting coats according to the cloth: subcontracting relationships between large clothing enterprises and "cut - make - and trim:" companies in the Western Cape.; Unpublished thesis; University of Cape Town; 1994

Newspaper Articles

Cape Business News; Strong growth in electronics; September 1995

Computing S.A.; EIF supports call for state to assist local industry; 14/11/94

Engineering News; Despite govt lethargy industry shoots ahead; 26/04/96

Engineering News; Boost for small electronics businesses; 19/05/95

Financial Mail; Support for Made in SA; 11/11/94

Star; R29-m spent in development of manufacturing industries; 27/12/94