LEARNING TO COMPETE: INNOVATION AND GENDER IN THE SOUTH AFRICAN CLOTHING INDUSTRY

African Economic Policy
Discussion Paper Number 8
July 1998

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Funded by
United States Agency for International Development
Bureau for Africa
Office of Sustainable Development
Washington, D.C. 20523-4600

ABSTRACT

This study explores the relationship between international pressures of globalization and the patterns of competitiveness and innovation in one segment of the manufacturing sector in South Africa. It is based on a survey of over 100 textile and clothing firms conducted in 1997 in three South African provinces (Gauteng, KwaZulu-Natal, and Western Cape).

The research took as given several international economic phenomena and policy changes. Most notably, the economic environment in which the South African textile and clothing sectors must operate encompasses two interlinked phenomena. First, the end of apartheid has brought South Africa back into the international economic community. This has led to the second reality, which is South Africa's joining the World Trade Organization and its commitment to tariff reduction and trade policy liberalization. For the textile and clothing industries in South Africa, the result has been elimination of export subsidies, phased reduction of tariff protection, and their replacement with several supply-side export promotion measures.

One legacy of the Uruguay Round of multilateral trade negotiations is the elimination of the Multi-Fibre Arrangement, under which an elaborate system of bilateral trade quotas determined import/export relations, and the transition to liberal trade conditions for textiles and clothing under the Agreement on Textiles and Clothing (ATC). By 2005, when the ATC expires, textile and apparel firms around the world must be able to compete in a markedly different international commercial environment.

Research on textile and clothing firm competitiveness in South Africa focused on a range of qualitative and quantitative variables. More specifically, firm owners or managers were asked about production and export strategies, labor use patterns, investment policies, overall management relations, relations of the firm to broader national and international markets, production costs, and access to government incentive programs.

This discussion paper highlights the role of gender in labor/management relations. In particular, it examines differential attitudes of men and women managers toward incremental process innovation and the implications of those attitudes for improving manufacturing efficiency.

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I. INTRODUCTION

A team of U.S. and South African economists has been studying the competitiveness of South Africa's textile and clothing firms. The purpose of the research is to develop typologies of South African textile and clothing firms, identify best practices with regard to strategies for enhancing competitiveness within each firm type, compare the financial and economic costs of assembly, and analyze all of the above in the context of evolving competitive advantages in global textile and clothing markets.[1]

Given that the clothing sector depends primarily on female labor, gender relations are central to labor relations. The major contention of this paper is that, as presently constituted, gender relations raise serious barriers to innovation and competitiveness in South Africa's clothing industry. Using evidence from firm-level interviews in South Africa, the paper concludes that there is considerable room for effective innovation if gender relations can be restructured so that the firm is less hierarchical and more cognizant of the potential contributions of women workers.

This paper examines implications of competitiveness pressures for firm behavior. The first section describes both the global environment in which clothing production operates and South African trade policy as it affects the clothing industry. The second section provides a brief survey of the literature on innovation in traditional sectors. A third section links innovation to gender through the case study evidence from the firm interviews.

II. INTERNATIONAL ECONOMIC CHALLENGES FOR SOUTH AFRICA

Since the 1993 election of the Government of National Unity, South Africa has been contending with two new economic realities. The first, resulting from the end of apartheid, is the considerable enthusiasm that has brought the international economic community once again to South Africa's door ready to invest in and trade with South African firms. This enthusiasm has created particular macroeconomic pressures for South Africa's leading economic policy makers. By 1995, increased portfolio capital inflows caused an appreciation of the South African currency (Rand); as a result, the competitiveness of South Africa's industries suffered. Indeed, some sectors welcomed the international financial market's 1996 attack on the Rand for its contribution to enhancing the competitiveness of South Africa's industries. In its macroeconomic strategy announced in mid-1996 (Growth, Employment

[1] A survey was administered to over 100 clothing and textile firms in Gauteng, KwaZulu/Natal, and Western Cape provinces. Firm owners or top managers provided historical, structural, management, product, market, and cost information during the course of a two-hour interview. The sample was drawn from membership in one of two associations of formal firms in South Africa (the Textile Federation and the Clothing Federation) and from a Durban-based association of informal firms (Thekwini Business Development Centre).

and Redistribution, or GEAR), the government recommended a conservative fiscal and monetary program to dampen inflation and stabilize the Rand. Although strongly supported within the government, the program can be criticized for raising domestic interest rates and curbing economic expansion, thereby exacerbating unemployment, which is a particular concern in a country whose employment patterns are already highly skewed among racial groups.

The second new economic reality is South Africa's accession to the World Trade Organization (WTO) upon its signing the Marrakech Agreement (referred to as GATT 1994). This treaty, signed to date by 132 countries, integrates for the first time a broad range of products and a wide community of nations into an international legal framework for trade. Previous international trade agreements under the GATT (General Agreement on Tariffs and Trade) had established rules of trade for a subset of manufactured products. GATT 1994, however, integrated agricultural products, textiles and clothing, services, and investment-related measures. Moreover, most developing nations are now members of the WTO, though some nations in Sub-Saharan Africa have not been active traders to date. At the same time, many nations in Asia (China's current observer status is one notable exception) and Latin America have become important players.

Owing to high tariff and nontariff barriers, South Africa's industries have long enjoyed protection from competition with world markets. The effect of these barriers has been to shift domestic demand for fabric and trim from international to South African sources. This policy of protection has two effects. First, it makes domestically produced and imported clothing more expensive in South Africa than it would be in the absence of protectionist policy. Second, it makes South African exports more expensive in international markets because of the higher cost of inputs.

To compensate for the input cost disadvantage, the government of South Africa has offered export incentive schemes to textile and clothing exporters. Until it was eliminated in July 1997 as incompatible with WTO regulations, the General Export Incentive Scheme (GEIS), a direct export subsidy program, provided cash grants to exporters on the basis of the value exported, the degree of processing, and the degree of local content. Another scheme likely to be eliminated soon are duty credit certificates (DCC) which offer duty rebates to textile and clothing exporters who manufacture on the basis of either local or imported materials on which full duty was paid. The duty credit is figured as a percentage (10 percent for yarn, 15 percent for fabrics and other textiles, 20 percent for household textiles, and 30 percent for clothing and clothing accessories) of the sales value of exports. The certificates may then be used to import material or clothing duty-free.[2] Other assistance schemes include export finance facilities, duty rebate provisions, competitiveness funds, and export marketing

[2] Thus, the certificates have actually contributed to penetration of the local market by duty-free clothing imports. This is not the intention of duty drawbacks schemes in other countries, which are normally designed expressly for export promotion (Salinger et all., forthcoming).

assistance.

As part of its commitment to the WTO, South Africa will lower its duty barriers on textiles and clothing imports.[3] As South Africa works toward meeting its WTO commitments, textile and clothing firms must develop new business strategies to compete with international suppliers in South Africa, neighboring countries, and abroad. This challenge implies a steep learning curve for the South African textile and clothing sectors, which in 1993 exported 23 percent and 8 percent, respectively, of their total production and imported 29 percent and 3 percent of total demand. During the tariff phase-down period, South African firms must learn to contend with the pressures of globalization in their industries. Stated another way, they must learn to compete.

III. EVOLUTION OF TEXTILE AND APPAREL AND ITS REGULATION

Historically, the development of textiles and apparel manufacturing has been an important first step in many countries' progression toward industrialization (Dickerson, 1995). Over time, as the relative costs of labor and capital have shifted, textile and apparel manufacturing has relocated from the United States, Great Britain, and Japan, which dominated international trade of textiles and clothing in the first half of the 1900s, to lower-cost countries (or "production platforms") (Park and Anderson, 1991). This phenomenon has taken place in successive waves over a period of more than 40 years. In Asia, for example, labor-based clothing industries moved out of Japan to South Korea, Hong Kong, and Taiwan, then to Mauritius and Bangladesh, and most recently to Madagascar, Viet Nam, and Indonesia.

As the success of new developing-country textile and apparel exports took hold, textile and apparel interests in developed countries grew increasingly protectionist. Under the Multi-Fibre Arrangement (MFA), textile and clothing importers could establish bilateral import quotas in individual product categories whenever a trading partner's exports to its market became a threat to domestic market interests (Cline, 1990). Ironically, though, the system of regulated textile and apparel trade helped spawn increased internationalization of textile and apparel production. As international clothing entrepreneurs filled quotas in one exporting country, they frequently sought new production platforms

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[3] Protection has been determined by a combination of ad valorem tariffs and specific duties applied on the basis of reference prices. Before September 1995, ad valorem rates were assessed as follows: clothing, 90 percent; household and other made-up textiles, 55 percent; woven and knit fabrics, 45 percent; yarns, 32 percent; and polyester fibers, 25 percent. In August 1995, the government announced that maximum specific duties would be eliminated in four years and ad valorem duties reduced over eight years to the following end rates: clothing 40 percent; household and other made-up textiles, 30 percent; woven and knit fabrics, 22 percent; and polyester fibers, 7.5 percent (CloFed, 1997).

in which to forge commercial relations with existing manufacturers or even to establish new manufacturing operations. Exports could grow free of the risk of quotas from a new platform for some time before attracting the attention of importers. This "quota-hopping" behavior of the international clothing industry, defined by its low fixed capital requirements as an internationally "footloose" industry, is one of the factors that spurred the establishment of clothing operations in developing countries (Whalley, 1995).

Pressures to remain cost-competitive have led other industrial country-based clothing sectors to move important parts of their production capacity offshore. Regional or bilateral trade agreements allow textiles produced in capital-intensive industries in the industrial countries to be processed into home textile and apparel products by labor-intensive assembly operations in developing countries that rim industrial country poles. These products are then reimported with duty preferences into the industrial countries for end consumption. "Outward processing traffic," as this arrangement is known, takes place between Germany and Eastern European countries such as Poland and the Czech Republic. France sends its fabrics to Mediterranean clients such as Morocco and Tunisia for processing. In the United States, the North American Free Trade Agreement (NAFTA) and the Caribbean Basin Initiative (CBI) offer duty advantages to textile manufacturers who cut their fabric in the United States and ship it to Mexico and the Caribbean nations for outward processing.[4]

A key element in the successful development of export-oriented apparel industries is access to inputs imported from world markets at world prices. For the exported final garment to remain cost-competitive in the consumer market abroad, garments must be assembled in low-wage countries where the internationally sourced fabric and trim required for assembly are imported at low or zero duties. During the 1950s and 1960s, however, many developing countries pursued strategies of import substitution to encourage domestic industrialization. Imports were therefore frequently subject to highly protective tariff barriers. To promote exports in today's markets, these protective walls had to be circumvented. Some developing countries began to offer preferential duties and other advantages (e.g., relaxed labor codes, modernized power and telecommunications facilities) to enclave export industries frequently organized in industrial parks or export processing zones (EPZs) (Salinger et al., forthcoming). Alternatively, some countries established preferential import duty arrangements without the physical infrastructure components of EPZs. In addition to duty advantages, trade-related institutions such as customs services, port facilities, banking, domestic truck/rail transport, and sea/air transport in/out of the country must work efficiently if goods are to circulate without significant constraint.

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[4] From Mexico, garments are imported duty free, while from the Caribbean, duty is assessed on the offshore value-added only. However, the U.S. outward processors and importers are lobbying heavily for "CBI parity" to establish equal duty preferences for Mexican and Caribbean exporters.

The economies of East and Southeast Asian countries such as South Korea, Malaysia, Indonesia, and Thailand, which implemented highly liberalized trade facilitation policies (in combination with human capital investments), have grown at dramatic rates.[5] Annual per capita income growth rates (1980 to 1993) in these countries are among the world's highest 8.2 percent in South Korea, 6.4 percent in Thailand, 4.2 percent in Indonesia, and 3.5 percent in Malaysia. Many of these economies are no longer agricultural, and many (their current financial crises notwithstanding) are no longer considered "developing." In Indonesia, for example, agriculture represented 45 percent of gross national product in 1970, but only 19 percent in 1993. In Thailand, manufactures represented 8 percent of total merchandise exports in 1970, but 73 percent in 1993.

To help other developing countries not in the vanguard of such reforms to achieve similar economic growth, "structural adjustment" programs were introduced in the 1980s. Structural adjustment refers to the bundle of economic policy and institutional reforms promoted by international development aid organizations, the purpose of which has been to liberalize economies, promote integration with external markets, enhance growth, and improve incomes.

As more and more countries have begun following this model of export-led growth, the world has experienced a surge in international commerce. As a result, it became clear by the late 1980s that some of the existing international trade rules no longer promoted efficient exchange. A mandate calling for necessary reforms evolved into the Uruguay Round of international trade negotiations. Realizing that textile and clothing trade relations had become exceedingly cumbersome and costly under the MFA, the Uruguay Round placed elimination of the Multi-Fibre Agreement on its agenda. Developing countries insisted on trade liberalization for the textile and apparel sectors of their growing economies. They viewed such liberalization as a bargaining chip in return for developed countries' demand for liberalization of agricultural and services trade.

Today, international textile and apparel trade is managed by the Agreement on Textiles and Clothing (ATC), signed as part of GATT 1994. The ATC lays out a process whereby bilateral import quotas for four broad product groups (tops and yarns, fabrics, made-up textile products, and clothing) will be liberalized over a ten-year period from 1994 through 2005.[6]

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[5] All figures are from the World Bank (1995).

[6] This obligation applies to four countries or country groupings maintaining restrictions under the MFA, namely Canada, the European Community (of 12), Norway, and the United States. It also applies to 55 other countries that chose to use transitional import safeguard mechanisms. As of January 1, 1995 (date of ATC effectiveness), countries had to integrate product categories equivalent to (i.e., eliminate import restrictions applying to) at least 16 percent of their 1990 import volumes. It is stipulated that goods must be included from each of four product categories (listed above). On January 1, 1998, a further 17percent of 1990 import volumes were integrated. The third phase, integrating an additional 18 percent of imports is scheduled for January 1, 2002 and the remaining 49 percent will be integrated at the expiration of the ATC on January 1, 2005. To date, the four

IV. GLOBALIZATION AND COMPETITIVENESS

The shape and dynamics of international textile and apparel production and trade will have changed significantly by 2005. Countries and individual textile and apparel industries are anticipating, preparing for, and beginning to adjust to the market and technological changes that are starting to be felt all over the globe. These changes hold important implications for the competitiveness of firms everywhere and for the management and policy strategies pursued by firms and the governments that regulate their markets.

The first effect of increased globalization and liberalization of international trade is a reduced emphasis on cost as the sole determinant of competitiveness. Whereas neoclassical economists previously focused on relative costs of production as the primary factor influencing "comparative advantage," other factors are recognized today as equally vital (Porter, 1990), particularly as more countries continue to liberalize their economies and squeeze out the costs of inefficiencies.

To begin, when costs of production are defined as the costs of assembly and delivery to an export point, such costs usually represent a minor portion of total cost. Today, the largest component of total cost is the value of all the services bundled into the final cost of goods. Today's vendors of differentiated consumer products must also cover the costs of product design, rapid turnaround of designs, merchandising, service, trade, and quality control in order to nuance their products in the eyes of the purchaser.

For example, consumers in developed and newly industrializing countries no longer demand standardized products but rather products that distinguish wearers from the masses. Thus, textile mills that provide specially treated fabrics offering unique looks or wear characteristics and apparel companies that provide sophisticated, high-quality clothing products more successfully appeal to end consumers and achieve higher returns than those firms supplying standard cotton knits and T-shirts. Moreover, increasingly sophisticated consumers are demanding increased variety in product choice, which is leading to shorter product seasons, a more rapid product cycle turnover, and smaller lot sizes.

As a consequence of shorter product cycles and a more rapid turnaround, retailers are assuming a much more pivotal role in the design and merchandising process in the United States. In many markets, private labels designed by retailers are beginning to take market share away from established brand

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participating countries have emphasized product categories at the lower end of the value-added chain (especially tops and yarns, fabrics) (World Trade Organization, 1997), raising concerns that the ATC's final objective of complete integration of textiles and apparel trade will not be accomplished.

labels. Moreover, as retailers seek the lowest cost platforms to contract for the manufacture of their wares, assembly of private label clothing is much more heavily dependent on garments imported into the United States. While this trend bodes well for foreign apparel suppliers, it brings increased expectations in terms of inventory management, order control, and delivery of goods. As a result, foreign suppliers need to adopt more sophisticated, computerized systems that can follow inputs, cut-ups, and final goods through every stage of the apparel export process. Firms that can manage this pipeline effectively and communicate regularly with their clients at every stage of the process will outcompete those that cannot.[7]

Another aspect of service is quality. Increasingly, consumers expect fabrics whose colors do not run and clothes whose seams are finished and whose fit is right. To counter substandard product quality, one strategy pursued today by large apparel manufacturers in the United States is automation. Computerization of cutting and of particularly tricky assembly operations can help ensure standard sizing and end-product quality. The U.S. apparel industry is also actively pursuing demand-activated manufacturing technologies, i.e., technologies that allow manufacturers to respond more accurately and rapidly to tailor-made style and size orders (Sheridan, 1994). The use of whole-body scanners by manufacturers and retailers will allow customers to order clothing cut and assembled according to a larger array of computerized patterns so that the final product properly fits individual body types. The use of snapshot fashion ordering systems and digital fabric printing will allow the realization of mass customization, i.e., large-scale manufacture of specialty products tailored to individual consumer style and color preferences (Pine, 1993; Anderson et al., 1997; Anderson and Pine, 1997). Research and development of these new technologies in the United States is funded by public/private partnerships that represent fiber producers, textile companies, labor unions, apparel manufacturers, and the U.S. Department of Commerce.

Taken together, all of these features of the new global economy describe a regime that has come to be called new competition or post-Fordism. It stands in contrast to old competition, or Fordism, in which profitability was based on long production runs of standardized products. The Fordist firm is hierarchical and gives workers little autonomy. Indeed, the old competition firm deskills its workers; the classic case is the assembly line. The old competitive firm also keeps large, just-in-case inventories rather than the just-in-time inventories characteristic of new competition. The new competitive firm is seen to compete on the basis of flexible specialization or the ability to adjust quickly to a changing competitive environment. It depends on skilled workers who are given considerable autonomy and are able to use sophisticated machines.

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[7] A 1985 study, quoted in Sheridan (1994), estimated that the pipeline from fiber manufacture to garment sale was as long as 66 weeks, of which 55 covered materials sitting in inventory at various stages. Shortening this pipeline is crucial to improved inventory management.

Another important element of today's international competitiveness equation is macroeconomic stability. With increasing numbers of countries demonstrating that macroeconomic stability and transparency contribute to export expansion and growth, countries cannot afford to be macroeconomic laggards.

Finally, peering into a crystal ball to a time when all countries have eliminated macroeconomic instability, converted from quotas to tariffs for managing trade, and reduced tariff and institutional barriers to minimum levels, access to preferential trade agreements may remain an important ingredient in the competitiveness game. For example, Mexico and Canada, as well as the Caribbean basin countries, enjoy such an advantage vis à vis the U.S. market. If the proliferation of regional trade agreements continues, it will be important for South Africa's trade negotiators to hone their skills and try to negotiate preferential access for South African firms as well.

Traditional hypotheses of the determinants of competitiveness have focused on factors such as larger firm size (to take advantage of economies of scale) and high-capacity use throughout the year (to produce large product lines with long seasons). In addition, it has been assumed that increased firm concentration in the industry and a more highly integrated domestic fiber-textile-clothing pipeline are pivotal to competing against imports. However, observation of textile and apparel industry trends at the international level raises a number of important questions for South African firms. For example, it may be more important for South African firms to pursue competitiveness-enhancing strategies such as management innovations. Managers could encourage shop-floor teams to organize production and management/labor teams that brainstorm about product assembly, new staff training, marketing, and shop-floor organization.

Other factors implicated in competitiveness are smaller-sized firms, with increased product specialization (i.e., reduced product diversity), linked by a design/marketing central to handle orders with international buyers; increased product flexibility; (i.e., specialization in what a firm does best as long as the firm can spot or even initiate design trends and respond to them quickly); improved CAD/CAM/computer-aided marketing/computer-aided business planning; acquisition of other new technologies; and export learning (i.e., learning about such things as timing, packaging, shipping procedures, paperwork, and quality standards).

The firm that achieves flexible specialization will exhibit several if not all of the above characteristics. The central argument of the following sections is that these characteristics are in turn related to the gender-based nature of labor relations in the clothing industry.

V. INNOVATION IN TRADITIONAL INDUSTRIES

Recent analysis of innovation from many theoretical perspectives defines a broad range of process and product-related changes as innovative. The otherwise varied literature is united by a common critique of the vision of innovation as systemic and cataclysmic change, which is best expressed in the Schumpeterian concept of creative destruction. The central themes of these critical approaches is that the rate of technical change depends more on efficient diffusion than on being first in the world in radical innovations and as much on social innovations as on technical innovations (Freeman, 1991, p. 10). From this starting point, innovation in recent studies appears in many forms —both systemic and at the level of individual knowledge and skills. One of the more subtle and widespread shop-floor practices identified in the literature is incremental innovation, or marginal improvements within an existing production structure. Moreover, such improvements are a product of the social relations of work as well as of the available machinery (Hollander, 1965; Flaherty, 1985). Linked to learning-by-doing, this form of innovative activity is widely recognized as dependent on the discretion accorded to workers and managers in exercising independent decision making.

Despite the breadth of practices included in the literature, most recent work assumes that the scope of innovation in traditional industries is limited by the low skill levels of workers and the simple nature of their machines. Theories of flexible specialization and new competition assume either implicitly or explicitly the necessity of sophisticated machines and workers. Flexible specialization and new competition share a core proposition that competitiveness in a newly globalized and competitive world depends primarily on a firm's ability to anticipate and react quickly to changes in markets. As described in the previous section, the ideal flexible or new competitive firm is small, employs highly skilled (or at least multiskilled) workers, retains minimal inventories and managerial strata, and works closely with both suppliers and customers in determining product and process characteristics.[8]

Flexible specialization or new competition implicitly views traditional industries as moribund inasmuch as they lack the basic preconditions for innovation, namely, flexible (typically programmable) machines and workers adept at operating them. While market niches may still exist for traditional sectors, the conclusion is that niches are accessible only to the most adaptable firms.[9] With adaptability seen to depend critically on the skill level of workers, the future for labor-intensive, low-skill production is likely to be gloomy.

This prediction dominates despite a recognition within new competition theory that shop-floor and social organization within the firm can broadly affect efficiency and competitiveness. For example,

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[8] The seminal work on flexible specialization is Piore and Sabel, 1984.

[9] South African industry-level analysis typically takes this view as well. The most through work on the clothing sector is Altman, 1994. Levy, 1992, also discusses the potential for competitiveness in clothing and other traditional sectors in South Africa.

new competition analysis strongly links hierarchies in the Fordist-type mass production factory to loss of innovativeness in American industry. Hierarchies are seen to limit flexibility directly through bureaucratic inertia and indirectly through disincentives that prevent lower-level managers and workers from assuming responsibility for improvements (Becker and Olsen, 1987; Boyer, 1991).

The new competition and flexible specialization approaches highlight two additional firm characteristics relevant to traditional sectors, albeit within an industrial district framework (networks of firms whose success derives from their embeddedness in a particular social as well as economic environment). The first salient characteristic is that firms in the district are bound together by forces of trust and reciprocity that foster a sharing of information about new technologies and forms of organization. Second, firms are mainly small, with fluid and nonhierarchical internal organization. Workers are skilled and indeed multiskilled, informed about the entire process of production, and in proximity to extra-firm sources of information about the industry. The district firms thus are seen to have strong advantages for incremental innovation in both labor and capital by virtue of relations among and within firms. Diffusion of new technologies is aided by the free flow of information across firms, by the skills of workers in adapting new machines to different conditions, and by relations of trust with employers.

These features of flexible firms, including internal organization, are treated as inconsistent with traditional industries outside districts. Because non-district traditional industry firms typically use low-skill, low-wage labor, they are not able to achieve flexible production. Their workers are not multiskilled, firm size is large, authority is internally highly stratified, and relations among firms are not cooperative. The implication is that traditional sectors cannot achieve incremental innovation sufficient to compete with flexible specialization firms. The only hope for such firms is to revamp their productive structure entirely. We are thus back in the Schumpeterian world of innovation through radical change in which traditional industries are written off as poor candidates for transformation.

Treatment of traditional industries by flexible specialization theories is questionable on two grounds. First, we can take the description of the structure and performance of these firms as accurate but question the theoretical basis of evaluating skills in traditional versus "new competition" firms. Second, much debate focuses on whether these "new" firms, even within industrial districts, are indeed as egalitarian and innovative as flexible specialization analysis claims (Harrison, 1994). In either case, rethinking the assumptions of the new competition and flexible specialization theories leads to a more optimistic view of the role of traditional industries in a world of new competition. Accepting the picture of the flexible specialization firm as accurate does not preclude incremental innovation in traditional industries such as clothing. The pessimistic view of innovation in these sectors depends on the hypothesized centrality of worker skills in conjunction with an assessment of workers' skills in these industries as deficient. More will be said later about the gender-based nature of skill assessment. The more general issue raised first is the supposed uniqueness of the flexible specialization road to multiskilling.

Several case studies have demonstrated that incremental innovation is possible in traditional firms (see, for example, Defourney, Estrin and Jones, 1985; Rosenberg and Rosenstein, 1980; Simmons and Mares, 1985). Together, they show that at least the intrafirm characteristics of the district firms can be reproduced in other contexts. There are, in fact, many routes to flexibility.

Further calling into question the exclusivity of flexible specialization, many studies have shown that flexibility depends not merely on new machines but rather on social organization within the firm. In a study of the U.K. boot and shoe industry, Flaherty (1985) found a dramatic example of innovation in the use of both labor and machinery that directly challenges the district vision of traditional industry. To begin, the skills of workers only appeared to be low; instead, they were undervalued precisely because the mass production machines of the conventional shop floor did not require application of skill. Observation of what workers did under such conditions obscured what they could do within a changed organization of work. In this study, one manager's efforts to restructure production built on the latent skills of workers who had been assumed by other managers to be inflexible and incapable of multitasking. After many experiments with different production, product, and marketing structures, the study found the greatest gains in productivity and profits in experiments that decentralized production and control to an unprecedented degree. The manager set up separate small shops on the main streets of British villages in which workers made shoes virtually to order. Workers also managed the shops, organizing and monitoring the flows of inputs and outputs. This structure is identical to the ideal of the flexible specialization firm, in which the product is highly variable in response to the needs of the buyer and control is vested largely in the direct producers.

Capital requirements for flexibility are also more varied than flexible specialization theory suggests. The machinery in the shoe shops was very simple such that worker skill rather than the sophistication of the machinery lay behind the quality of the shoe. Indeed, the machines used by the workers were older and less automated than the machines in the main factory, but the workers produced higher value-added product sufficient to yield higher profits to the company. This result calls into question the central proposition of the new competition and industrial district theory that firms become flexible by applying sophisticated and adaptable (hence computerized) technology. Traditional sectors are both less deskilled than appearances suggest[10] and less dependent on sophisticated machinery for productivity gains than generally assumed.

Collaborative relations among machinists on the shop floor is a strategy already in use in some clothing firms in the United States as well. For example, at a brand label denim jeans production facility in Tennessee,[11] women machinists are hired out of secondary school without any previous

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[10] By deskilled, we mean lacking the skills necessary to maintain or accrue competitiveness.

[11] Information gleaned from a manufacturing study tour conducted under the aegis of the International Textile and Apparel Association annual meetings held in Knoxville, Tennessee, in November 1997.

aptitude testing. After spending just two weeks at an on-site training center, where they are exposed to a range of machines, they are screened for skills acquisition and team-learning aptitudes. They are then placed on the production floor where they will continue to be schooled by colleagues. Production is organized around teams of about 40 women, with daily production quotas assigned by team. Team members are expected to be multiskilled as reflected in flat wages across skills (machinists and cutters receive the same hourly wage, graduated by years of experience with the firm). Moreover, production teams manage their own budgets, and a salary bonus is directly linked to cost efficiency. Labor may be traded across teams in the event of an absent worker. Teams are also the first and most important means of controlling product quality and are expected to self-correct flaws during production. Interestingly, management still believes that the old incentive, task-ordered system, whereby machinists are paid piecework incentives to maximize production, is the most effective strategy for reducing costs. Management has learned, however, that the team system of work organization works best for reducing absenteeism and maximizing output quality.

The results of these firms are not unique. Other deskilled workplaces have rebounded as workers were incrementally reskilled. As Boyer (1990, p. 12) points out in summarizing the results of a large body of evidence, "technical flexibility is only one out of a whole spectrum of flexibility strategies" and "multiskilled workers can in some cases replace heavy mechanization." More important changes for improved flexibility include decentralization of production decisions, networking and joint ventures, long-run and cooperative subcontracting, on-the-job training and general education, learning-by-doing, and learning by communicating with other workers (Boyer, 1990, pp. 27B30). The introduction of computerized or otherwise sophisticated equipment requiring highly skilled workers is thus only one among many possible forms of innovation.

The implications for traditional sectors are clear. While it appears to be almost always true that deskilling of blue-collar workers has produced dismal results for productivity, reskilling can take forms that do not exclude traditional sectors. Industrial district relations, although facilitating change, are no more necessary than any other of the many innovation strategies.

Before investigating gender and innovation, it is important to note that one approach to innovation does recognize the potential for innovation in traditional sectors. It distinguishes sectoral patterns of innovation and, through cross-country empirical research, places traditional industries in the category that innovates through a widening rather than deepening pattern. A successful widening pattern "is related to an innovative base which is continuously enlarging through the entry of new innovators and the erosion of the competitive and technological advantages of the established firms in the industry" (Malerba and Orsenigo, 1991, p. 48).

The industrial structures of specific sectors are thus seen to support different patterns of innovation. In traditional industries, the most innovative structures involve small rather than large firms and instability rather than stability in technological leadership. At the international level, traditional

sectors are found to perform better in innovation when the sectors are composed of small firms that enjoy fluid entry and exit and multiple as well as changing loci of innovation. This structure conforms closely to the independent small shop approach of the shoe experiments wherein each shop was free to develop its own styles and procedures of work within the broader corporate organization. Innovation in traditional sectors thus depends heavily on the organization of work as well as on the nature of the labor or capital goods. Moreover, the type of capital used by the firm is connected to the internal structure of the firm.

The significance of this empirical work is that it allows for different patterns of innovation across sectors. In many sectors, innovation is indeed confined to large firms and/or major changes in the nature of production. In fact, it may be the case that radical innovation comes almost exclusively from large firms undergoing discontinuous leaps in processes or products (Freeman, p. 476). This picture must, however, not be generalized to a description of the process of innovation in all sectors. Not all important innovation is radical or dependent on industrial district characteristics. Moreover, sector-specific features of the labor force and the type of capital create varying paths to innovation even within traditional industries.[12]

Thus, despite the general pessimism about traditional sectors, an evolutionary approach to innovation does allow greater scope for change in traditional sectors and firms. Within this framework, "...no two firms are expected to innovate in identical fashion and it is this emphasis on the decentralized emergence of technological diversity that is a defining characteristic of an evolutionary approach" (Metcalfe, 1995, p. 27). This approach eschews a standard, fixed path toward innovation, whether of the Schumpeterian or the industrial district type. Its strength is "to make sense of variety" (Metcalfe, 1995, p. 28).

VI. GENDER AND INCREMENTAL INNOVATION

Even with its many strengths, the evolutionary approach does not include analysis of gender-specific factors impinging on innovation. While the literature is clear on the significance of incremental innovation, it falls short on explaining barriers to change. A nagging question therefore confronts all evolutionary analyses of innovation. If incremental change on the shop floor is so effective, why do firms not engage in it more frequently?

One common answer is that change affects entrenched interests within firms. A less researched area

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[12] On clothing and textile incremental innovation, see for example, Antonelli, Petit, and Tahar, 1992; Hoffman and Rush, 1998.

concerns limits to change arising from the nature of the workforce, particularly its gender.[13] Given traditional sectors' reliance on female labor, particularly for the production of clothing and footwear, gender relations must be addressed. The central contention of this section is that without an understanding of the role of gender, even an evolutionary approach understates the potential for innovation in traditional sectors.

Gender may be incorporated into innovation at several levels. At the most obvious level, gender is treated as a mechanism by which interests within the firm are both identified and entrenched. Gender then amplifies the explanation of why firms tend to resist shop-floor incremental change even when it is to their benefit. Male supervisors, for example, resist change that undermines their authority over the female workforce. Male workers fear devaluation of their jobs if performed by women. In this model, male managers tend to side with male supervisors and workers.[14]

At the next level of complexity, it is not just male solidarity that supports the entrenched structure, but also attitudes held by management independent of supervisory responses to change. The commonality of views on women among workers and managers then can be traced to a gender-biased ideology that affects males in the workplace regardless of any shared interests. Ideological visions of women take many forms, and dismissive attitudes toward women's skills are not by any means limited to poor countries. Disparaging assessments of women workers were expressed in many of the interviews conducted by the authors, both in South Africa and the U.K.. Stereotypes of low-wage female workers suggest that women can not perform more than one or at most two tasks, they are not interested in and even resist change, they are not inherently solidaritous but rather quarrelsome, and they are unreliable unless closely supervised. More detailed comments from South African employers are discussed below.

Another manifestation of ideological interpretations of gender roles is the undervaluation of skills of women workers. Interviews with U.K. manufacturers across a wide range of low-wage sectors revealed that relative skill levels were believed to be sharply unequal between men and women.[15] When asked about skill levels, managers ranked men's as high and women's as low. This result can be explained in part as a reflection of occupational segregation of workers by gender. For example, in clothing and footwear, women are stitchers and men are generally cutters. Segregation notwithstanding, however, men's and women's skills appear more comparable in response to other

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[13] There is a vast literature on the role of rural women in production and the costs of gender-biased analysis of rural economic efficiency, but little similar work on women in industry. For rural studies, see for examples Elson, 1991; Palmer, 1991; Mackintosh, 1989; and Hart, 1991.

[14] For a detailed study of the relationship between gender and intrafirm hierarchy in the automobile and electrical sectors, see Milkman, 1983.

[15] These interviews were conducted for a report on low-pay sectors in Britain. See Rubery and Craig, 1984.

questions. When asked about the time required to train an "all-around" stitcher versus a cutter, respondents usually cited 22 to 24 months for men and 18 to 20 months for women. This is not a sufficiently significant difference to explain the large male-female wage gaps in the sectors studied.

Where firms in a particular sector are clustered geographically and women are immobile, one explanation for the undervaluation of women's skills is the large supply of women preferring to work locally. Another explanation in the clothing and footwear sectors is the manner in which skills are acquired. Many women are taught to sew at home; thus, the training time within the firm is less than the actual length of the training. These labor market forces work to the disadvantage of women without any direct gender discrimination. Lurking in the background, of course, is a third source of undervaluation of women's skills, purely gender-based bias.

That gender biases, like other ideologically based stereotypes, pose both widespread and substantial barriers to change is widely acknowledged. Datta and Nugent (1989) summarize cogently both the costs and benefits of ideological relations in production. "Both the adherence to contracts and the efficiency of performance can be affected by perceptions about the fairness and legitimacy of contractual agreements. Since these factors, in turn, can be affected by ideology, ideology can also play an important role in reducing transactions costs... At the same time, however, ideology can increase the transactions costs of changing contractual forms and thereby also the inefficiency of institutions in the long run."(Datta and Nugent, 1989, p. 38; quoted in Evans, 1993, p. 12).

The persistence of gender bias, even when it becomes costly, is explained in part by fundamental economic factors. Women in traditional sectors, whatever the country, are paid very low wages relative to overall manufacturing averages. In the U.K., wages of a stitcher in the clothing industry were only 48 percent of the average manufacturing wage in the early 1980s while in South Africa in 1996 they were 37 percent. In the face of low wages, women are expected to be docile. They therefore constitute the ideal workforce, accepting of discipline and satisfied with low wages. Costs of underestimating their skill and flexibility are hidden underneath their potential for exploitation as passive and dependent workers.

From this cost-benefit perspective, gender barriers to change can be seen as forms of behavior that, although supported by ideology, were nonetheless economically functional at one stage in the development of traditional sectors. In the world of the old competition, mass production based on the repetitive and low-wage labor of compliant females working only at one task generated satisfactory levels of profitability. However, in today's world economy defined by intense competition among low-wage countries, this type of mass production becomes vulnerable on two grounds. As discussed in the first section, products must adapt to changing production costs, technology, and consumer tastes. In addition, mass production is rootless, ceaselessly moving where labor costs are lowest. In such footloose industries, the input procurement, product design, merchandising, and exporting strategies that ultimately comprise a much larger portion of final garment sales value and are critical in

determining products' competitiveness are easily transported around the world by "the firm," as broadly understood. Whether this leaves the local production base in any one country even more deskilled or contributes to progress on the export learning curve is still debated. In any case, as a result of these movements, profits for the sectors overall are threatened, while the continued presence of firms in any one country is uncertain.

The literature on the origins, benefits, and costs of gender biases helps frame the discussion of gender barriers to innovation. The next section identifies specific types of innovation in South African clothing production as well as their potential for innovation as linked to gender barriers to change. Gender is seen to be important not just in the organization of work but also in the possibilities for the introduction of new machines. Thus, even though labor is the focus of the analysis, the type of capital that can be used directly depends on the real or perceived abilities of workers to operate new machines.

VII. INNOVATION, FLEXIBILITY, AND GENDER IN THE SOUTH AFRICAN CLOTHING INDUSTRY

The history of the garment industry in South Africa is similar in many respects to that in other countries. Production began as home production, a cottage industry with families servicing small retail outlets that supplied the material. Factory production followed in the early 20th century, introduced by immigrant master craftsmen and tailors from Britain and Eastern Europe. In the early years of factory production, factories were not much more than sweatshops. The typical site was a small workshop owned by a middleman tailor who contracted for merchant tailors with rates fixed per piece. This form evolved from custom-made products to the first truly mass wholesale production of uniforms for specific institutions such as the police and the military. The final stage, completion of which was spurred by large government requirements during World War II, was quantity production for the general market (Meer, 1990, pp. 62–65).

Two distinguishing characteristics of the South African industry are its relatively late evolution to full mass production and the role of race in the structuring of production. In fact, South Africa's experience differs from that of most other countries where gender segregation by job has historically been more rigid. Instead, race relations underpin much of current practice in the industry and are intertwined with gender relations within the factory. On the eve of World War II, the workforce was predominantly white and female. During and after the war, both race and gender changed. In Natal clothing centers, the industry came to depend on Indian men, who were the majority of machinists (stitchers). By the 1960s, Indian women replaced Indian men; during the 1970s, African women replaced Indian women. By 1970, white workers comprised only 5 percent of the workforce while in the 1930s the workforce was more than 50 percent white women (Meer, 1990, p. 64).

Other distinctive features of the South African clothing industry appear in the pay and labor relations systems. Piecework, the standard pay scheme internationally, is illegal. Wage bargaining is national and, until recently, allowed little variation across regions. The South African Clothing and Textile Workers Union (SACTWU) has a closed-shop agreement with the manufacturers, and virtually all formal firms in urban areas are unionized. An employers' team, which includes representatives from the manufacturers' association (CLOFED) and the union, is responsible for bargaining; local representation is nonexistent.

Internally, the South African factory looks much like that in other low-wage countries. Firms are organized around mass production techniques (if not long production runs) and low-skilled labor—but with one significant difference. While South Africa is not unique in world production of clothing, its history of apartheid has entrenched its traditional structure to a degree not as evident elsewhere. The government previously subsidized labor-intensive production as part of a policy to keep black South Africans in the so-called homelands by creating jobs in outlying areas. The Regional Industrial Decentralization Policy (RIDP) gave subsidies of more than 90 percent for wages paid to workers in the decentralized areas. Further subsidies reduced costs of transportation, rent, investment, and even managerial incentives to attract white managers to outlying areas (Flaherty, 1995). The industry was also heavily protected from foreign competition, as noted in the first section. The result is that government policy had the effect of encouraging firms to remain in "the old competition"mode of production with little incentive to innovate in either capital or labor use.

Such generous government interventions partially obscured the costs of gender bias as well as those of other inefficiencies. Nonetheless, decline of the industry was evident even in the protected era of apartheid. Output growth in the industry fell from 5.7 percent annually in 1970-1981 to -5.9 percent from 1981-1984, to -1.1 percent from 1984-1989, and to -6.8 percent in 1991-1992.[16] Slight recovery accompanied the transition to democracy, with growth of 3.3 percent in 1993-1994 and 14.1 percent in 1994-1995; growth declined again by 9.6 percent in 1996. Employment has fallen from a peak of 139,731 in 1982 to a low of 110,873 in 1994 (and rose to 120,446 in 1995). In a trend seen in other South African sectors, employment continued to fall during the 1990s even as output rose, leading to the phenomenon of "jobless growth" during the economic recovery of 1994-1996.

In response to these declines, there has been much talk of expanding exports by upgrading products and penetrating market niches. However, there is as yet little evidence that an upgrade will occur at the level of the firm. More prevalent are responses explicitly directing production away from export-quality output as firms move into even lower-wage areas and countries. Of those remaining in the higher-wage urban areas, many firms are moving out of the formal into the informal sector. Rather than demonstrating a concerted effort to develop export capacity, the industry is retreating piecemeal more

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[16] Domestic policies cannot be blamed entirely for the decline. These periods of contraction coincide partly with the years of sanctions against South Africa and with worldwide problems in the industry.

and more into an old-fashioned structure rooted in still more extreme exploitation of vulnerable labor.

The previous section argued that both theory and case study evidence support the proposition that innovation can and does occur in traditional sectors. At the international level, most innovation in these sectors takes the form of incremental innovation often achieved through learning-by-doing. The South African clothing industry is no exception. As competitive pressures of the type described in the first section have begun to be felt, some firms have responded creatively. In this section, we first describe the sample from which we derive our evidence on innovation and flexibility and then explore the role of gender in explaining the level and form innovation. We must insert a warning at the outset, however. Scarcity of experimentation with traditional gender relations in the clothing industry in South Africa makes our suggestions for change speculative. While certain types of innovation appear to have consequences for gender, the data are not yet sufficient to ensure the statistical rigor of our conclusions.

Our firm sample consists of a wide variety of firm sizes and specialties. The smallest firm is a two-person firm manufacturing T-shirts with wildlife designs for sale in curio shops of game parks. The largest firm manufactures mass market clothing for both South and Southern Africa, employing 1,700 production workers in its South African factory. This latter firm vigorously pursues the low-wage, female labor, mass production strategy associated with old competition and, in fact, is moving its production out of South Africa into still lower-wage neighboring countries. Our sample also includes firms with full manufacturing facilities, design firms, cut-make-and-trim shops, and informal sector operations. All market strata are represented, from high-priced worsted suits sold in Britain to bottom-end uniforms for domestic workers. All firms are located in the traditional urban clothing centers of Cape Town, Durban, and Johannesburg. Some firms specialize in exports while others have no interest in exporting.

Interviews were conducted mainly with managing directors of larger firms, although in a few cases accountants provided the required information. In smaller firms, interviews were conducted with the owner/manager. The interview format combined set questions with open-ended discussion of the structure, strategy, and goals of the firm (see the appendix for the questionnaire). Interviews generally lasted between one and two hours. In most cases where manufacturing was done on the premises, the interview concluded with a tour of the shop floor, during which interviewers assessed the state of the capital stock as well as the organization of work.

In linking gender to innovation, we first consider innovations embodied in changes in the organization of intra- and interfirm relations. A survey of findings on flexibility-enhancing innovation (Boyer, 1990) identifies the following as effective changes: decentralization of production decisions, networking and joint ventures, long-run and cooperative subcontracting, on-the-job training and general education, learning-by-doing, and learning by communicating with other workers. Using these firm characteristics as the basis for assessing innovation, we see the South African industry as

achieving all forms of flexibility, but only to a very limited degree.

Decentralization of production decisions may refer to intra-organizational decentralization across corporate divisions as well as to levels of hierarchies. Among the large, multidivisional firms, we found considerable decentralization. The concept of profit centers is well known and well regarded among the major firms to the extent that divisions typically are (at least allegedly) independent operations left to survive or die according to their own decisions. A successful family firm producing women's fashion clothes took the principle to such a level that a troubled division run by a brother was about to be written off as a nonperformer, family ties notwithstanding.

Decentralization within a factory, the change more closely linked to innovation and flexibility, is by contrast difficult to find in the sample. The factory floor looked similar in almost all the sample firms. In fact, Meer discusses the typical clothing factory in the Durban area in terms that express what we observed in our sample. "Communication is controlled in the factory. Overseers ensure that workers do not talk to each other and thereby interrupt the flow and quality of work. Workers' minds are not allowed to detract from the work and are kept mesmerized by piped in music. Tea and lunch breaks are short and the women are so tired they have little energy for socializing" (Meer, 1990, p. 40). More recently, Altman (1994, pp. 55–60) also found dominance of the traditional production line over modular dedicated cells and any type of sort production cycle arrangement. The above organization observed by the authors permits no decentralization down to the level of the machinists who do the stitching.

We also found that supervisors exercise little discretion. Managers determine the pace and organization of work after costing and producing sample garments while supervisors merely detect and report interruptions in the flow of work. The manager of one of the largest firms described his system of supervision as a combination of detailed work measurement and holding a gun to their heads. Though more graphic than other descriptions, it is not unusual. In most of the firms whose production facilities we visited, supervisors' jobs consisted of enforcing standards and roles determined by higher-level management.

Where supervisors do appear to have some discretion, at least in the handling of personnel problems, gender appears to play a significant role. The Durban study conducted by Meer in the late 1980s found that supervisors were universally male, which is not the case for the sample of firms we interviewed. In several of the latter firms, promotion to supervisor was through the ranks such that machinists became supervisors.

The change in the gender of supervisors may be related to a shift in perceptions of gender and work. The Meer study found that employers used women when men were unavailable and even preferred to employ some number of women workers to tame some of the most extreme behavior of male workers (for example, dagga smoking in the factory). Nonetheless, managers hired African men to do

"women's work" even when women were available (Meer, 1990, p. 222). In our sample, employers more often expressed a preference for women workers due to their lower militancy, greater reliability, and docility. As women become attractive workers in their own right, women as supervisors become a less unthinkable alternative.

This point should not be overstated, however. In our sample, female supervisors were more common in areas of Durban, where race as well as gender plays a role. Yet, Meer found a highly racially biased view of women workers among employers. For example, Indian women workers were poorly educated, with an illiteracy rate of 8 percent compared to 0.4 percent for African women (Meer, 1990, p. 89). Nonetheless, employers preferred Indian women because they saw them as more educated. No doubt language plays a role in this inversion, but purely racial comments were common both in Meer's study and in our interviews. Indian women are typed as more disciplined, stable, and motivated.[17] African women are viewed as "raw," not acculturated well to factory work, uneducated, and less skilled. Given these attitudes, it is not surprising that Indian women were the female supervisors we encountered. Even so, the Indian women supervisors do not appear to have independent authority on the shop floor. They are themselves subject to close supervision by either the manager or, in larger firms, higher levels of supervisory personnel.

Promotion of women to supervisory positions does not preclude complaints about women workers. Our interviews disclosed all of the stereotypes of women mentioned in the previous section. The most frequent complaint was that the women are unskilled and unskillable, with negative consequences for flexibility and innovation. Women are seen as wedded to their own machines, unwilling to learn new tasks, and resistant to change of any type. These perceptions constrain experimentation with several of the innovative changes cited by Boyer, including learning-by-doing, learning by communicating, and on-the-job training. As a result, firms tend to see inflexibility as a costly but unavoidable problem given the inherent limitations of a female labor force.

Firms do employ several strategies to achieve flexibility, but mainly within the presumed unchangeable parameters of female intransigence and lack of skill.[18] In larger firms, we found overstaffing of critical positions such as collar-setting. Though in violation of union wage agreements, smaller firms sometimes pay higher wages to good workers who perform these and other central tasks.

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[17] There are many startling inconsistencies in managers' views of African women workers. Coexisting with the complaints about lack of education and interest in improving their skills is widespread acknowledgment that these women are hard workers with very low turnover rates. Many employers told of average lengths of service with the company of 15 to 20 years among African as well as Indian (and other nonwhite) workers.

[18] In Altman's sample of 61 firms, 43 percent of firms in the Western Cape and 31 percent in Natal have more than 60 percent of workers who can perform more than one task (Altman, 1994, p. 60).

In one creative but distorted view of flexibility, we were told that informal sector firms enjoy a great advantage in achieving flexibility. If, for example, a key worker such as a collar-setter were absent, the owner can just "go round the corner and drag her out of bed." While extreme, this example suggests that employers hold deeply entrenched beliefs that women cannot be multiskilled and that firms must do whatever is necessary to work around that limitation.

At the other end of the gender bias spectrum, we found one firm (a cut-make-and-trim firm) with an innovative approach to the shop floor that has potential to generate multiskilling. The firm is owned by a woman, who says she stays in the business to "take care of [her] women." In this factory, machinists may become multiskilled voluntarily and almost invisibly. Rather than imposing schemes for job enlargement, the owner encourages women to use left-over material during their lunch hour to make their own garments. Because the women cannot perform more than one or two of the operations required to make a complete garment, they must ask others for help. At this stage, it appears that the new operations are mostly just observed and that the women cooperate mainly by trading operations.[19] In some cases, though, women seem to be teaching other women their jobs. Nonetheless, the women are still reluctant to share their machines with other women such that the firm has yet to achieve multiskilling. The point, however, is that by questioning the traditional structure of the workplace in which women are kept apart and in ignorance of each others' work, this owner has set in motion forces that may generate multiskilling naturally as an outgrowth of the interests of the workers themselves.

Though in more modest ways, several other firms also foster communication and learning-by-doing among women workers. Offering instruction in new operations during lunch and after hours is one strategy, although a lack of response to such offers is common in view of the long hours these women put in at work, home, and commuting. Some firms allocate bonuses by line or by team so that workers are forced to interact at least to monitor and penalize shirking. Judging from the interviews, neither of these approaches has generated significant increases in flexibility or productivity, although they are credited with reducing absenteeism to some extent. Widespread sentiment among the managers interviewed by the authors holds that the bonuses are simply too small to be effective (Altman, 1994, agrees). A more credible explanation for the ineffectiveness of bonuses in increasing output or quality, however, is that the workers work only for target incomes. That is, if workers get larger bonuses, they will simply take more time off in the next period because they will have earned the ability to afford more leisure.

The authors did not observe any changes in shop-floor practices that amount to real decision making by workers. The only type of worker participation in decision making occurs when several firms in the sample conduct meetings to give workers an opportunity to discuss problems and offer solutions. Nonetheless, not even the most enthusiastic managers describe these meetings as designed to tap the

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[19] The workforce of this factory is mixed Indian and African, yet both races participate in job training.

latent knowledge or skills of workers. Rather, the purpose of the meetings appears to be to contain labor unrest or dissatisfaction or to inform workers of upcoming changes in the product or process of production.

Firms rely for flexibility on innovation mainly through new machines rather than through new forms of labor organization. Here, the impetus seems to come from product changes that require new machines to perform new operations. In all but the largest firms, flexibility is achieved largely through adaptation of existing machines to new function. This is a good example of learning-by-doing. In one illustrative case, a long-established factory producing hats and caps found that it needed to replace metal grommets with embroidered ones. In travels abroad, the manager found a machine that would embroider the grommets. With the cost of the machinery prohibitive, however, the manager returned and adapted existing machines to perform embroidery functions. The workers whose machines were adapted were not consulted while the work required of them changed only minimally. In many other firms, machines ranging from button coverers to underbed trimmers undergo similar modification, also without changing the skill required of the workers. Gains in productivity can be substantial. The button covering machine increased output by 200 percent with a small increase in cost. Nonetheless, many firms refused to follow this course, arguing that the women were too resistant to change to make any new techniques profitable.

In line with other industries, larger clothing firms innovate less incrementally and more by radical changes in machinery. Radical innovation occurs mainly through computerization of marking and cutting or design. Workers in these phases of the production process are retrained to operate the new machines and thus are reskilled by the innovations.[20] Other innovations of this type in the sample firms are computerization of both delivery of work to the machinists and control of inventory and orders.[21]

A few firms are experimenting with alternatives to the traditional bundle system requiring simple changes in the organization of the line rather than computerized delivery systems. The effect of these arrangements is not clear from the interviews. Some firms believe that the women perform the work more smoothly with fewer bottlenecks while others feel that the women are not sufficiently adaptable to use the new systems effectively.

More dramatic changes are evident in the structure of interfirm relations. As Boyer (1990)

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[20] From our observations, the workers performing these tasks are predominantly women, yet they are assumed to be capable of learning by doing even though less skilled women are not. This, too, may be a manifestation of the interaction of race and gender in that the design and marking/cutting workers are not African but white or Indian.

[21] See Altman, 1994, pp. 48-60 for a detailed description of some of these changes in the production line.

emphasizes, subcontracting is an effective means for improving flexibility. Our sample firms are rapidly becoming more dependent on subcontracting as a way to move production out of urban areas or even out of South Africa altogether. Unfortunately, the subcontracting arrangement is too often not the type Boyer finds effective. Rather than long-run and reciprocal relations with subcontractors, relations as described by the majority of the subcontractors in the survey are short-term and one-sided. The cut-make-and-trim firms tell a consistent story of being squeezed by the firms they supply. As competitive pressure mounts in a declining industry, subcontractors find their margins falling even as their costs rise. In addition, they see themselves victimized by ever shorter delivery times and threats of cancellation of orders that are as little as two days late. The large firms that subcontract report a similar experience. They take the position that they, too, are squeezed between the mills and the retail sector, both of which are highly concentrated and protected.[22]

In short, rather than working toward innovative interfirm relations that build on reciprocity and trust to achieve productivity, South African firms are moving backward toward increasingly unbalanced relations in which subcontractors are selected for their low costs over any other attribute. A frequent complaint is that customers are no longer loyal even to long-standing suppliers. While it used to be that subcontractors could call upon the customer to help out in times of tight cash flow, subcontractors now get little relief.

What we find in the South African clothing industry, then, is a pattern of innovation that is limited to changes in machinery. While such innovation in many cases does embody learning-by-doing and incremental change in the form of adapting existing machinery rather than buying expensive new equipment, it leaves untapped significant labor resources and potentially productive new forms of interfirm relations.

The final issue is the link between gender and a pattern of limited innovation. The central features of that link are already apparent from the foregoing discussions of the role of gender stereotypes in the industry. The main argument is that because women's skills are undervalued and their docility is exploitable, firms have not been pushed to find ways to use labor more effectively. Women in South Africa are in fact militant, but only in their communities and certainly not in the workplace. Far from being "fresh out of the bush," as one employer characterized them, these women have long depended on urban employment to support their families and hence have not been free to express dissent on the shop floor for fear of losing their job (Meer, 1990, p. 65). Their vulnerability, combined with apartheid policy to restrain workers' rights, has created an illusory path to profitability based on inflexible and noncompetitive labor relations both within and among firms.

South Africa's traditional strategies are no longer supported by government subsidies to achieve

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[22] Altman found the concentration of retailing to be a chronic complaint in her sample as well. In 1991, the top four chains accounted for 56 percent of retail sales (Altman, pp. 45-46).

apartheid goals. On the contrary, the new trade policies described in the first section require firms to adapt quickly to both domestic and international competition. Even at low wage levels, South African clothing—under current forms of organization of labor—is widely regarded as uncompetitive (Monitor, 1995). The response so far has been to fall back on gender stereotypes to justify and enforce attempts to reduce wages still further. Pro-labor legislation enacted under the new government will make such attempts difficult, but it is in any case a doomed strategy. Building on inflexibility rather than flexibility is short-sighted to the point of self-destruction. Unhappily, gender biases obscure the true costs of inflexibility and merely entice the industry into a dead end despite the availability of alternatives that can improve the lot of both employers and women workers.

VIII. CONCLUSION

This paper argues that competitiveness strategies are crucial if countries and their firms are to integrate their economies and exports successfully into the international market. However, we also argue that countries and their firms must make choices as they craft these strategies. Many in South Africa have chosen a Schumpeterian-cum-old-competition approach driven by cost minimization objectives, which in turn leads to a progressive deskilling of the labor force.

Firms are of course not unconstrained in their choice of strategy, as is evident from the power of retailers. Many other factors external to the firm impinge on its ability to change. Trade unions set a floor on wages (although even in the highly unionized apparel industry, wage differentials are at least 50 percent across regions). Mandated holidays and leaves are both long and poorly timed to fit with the industry's busy and slack periods. The trade policies outlined in the first section affect the ability and desire to export, rendering innovation apparently less crucial. Cultural and social factors often limit women's roles in the workplace independent of management views of women. Current government policy that cuts the expenditures on education shifts more of the training burden to the industry.

These difficulties notwithstanding, one set of alternative strategies has gone overlooked. These strategies focus on maximizing the talents of the firm's labor in order to bring multiple skills to the creative fore. In this alternative, labor is seen as a partner in the process of "learning to compete" and, as such, can be critical to improved product design and manufacture. Such an approach enhances the productivity of labor as it is reskilled and its talents integrated into the competitiveness process. It offers real hope that labor may share in the gains accruing from globalization. To the extent that women managers relate in a more collaborative fashion to their shop-floor labor, they may be spearheading an incremental yet important innovation in process management. That innovation may be vital to the future success of a competitive apparel industry in South Africa.

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APPENDIX
SURVEY QUESTIONNAIRE

Descriptive
Age, founded by whom for what
Size, turnover, number of employees (workers, mid management, top management)
Use of contract cut-make-trim labor? If so, percentage of total volume
Where does this firm sit in the chain?

Product mix
Key 3 products, relative share of total production
Breakdown of production for domestic and export markets?
Size of average run for key products, how compare with RSA/overseas averages?
How quickly can a run be changed?
Would this firm describe its output as standardized clothing or fashion lines?
Are there adequate support industries in RSA, or does firm need to go international for raw material, trim, machinery, market intelligence?

Exports
Where, relative sizes of overseas markets
How is intelligence gathered about markets and products?
Does the firm outsource to foreign apparel manufacturers/retailers?
Does the firm use Government export incentives? If so, which; if not, why not?
How involved is firm with outsourcing to foreign manufacturers in Europe/US/Japan? (helps firm up learning curve for design, production, and marketing)
Today, the key offshore markets are US and Europe: does firm target any other market segment, such as Africa, or Japan?
Is firm involved in branding for international marketing?

Labor
Labor force supply/demand concerns; any seasonal supply/demand issues?
Unionized? Benefits of union?
What wages and benefits are paid per class of worker?
To what extent does the firm use informal labor?
Are there training requirements, or is training done on-the-job? Are any critical skills usually lacking in new hires? How does the firm find skilled labor?
What is the average longevity of workers, management?
How easily can workers be retrenched, if necessary?
What kind of labor productivity-enhancing standards are enforced?
Participatory labor/management strategies exist? If so, describe.
What kinds of quality assurance programs are implemented?

Capital
What is their current equipment strategy?
Source of new, used machinery; age of machinery
What investment incentives are available for new equipment?
Without incentives, how are new investments financed?
How good is maintenance, or how bad are down times?
What about use of new production technologies? Such as:

Open-end vs. conventional spindles
Friction spinning, air-jet spinning
Increasing emphasis on man-made fibers rather than cotton -simplified yarn formation
Shuttleless looms vs. conventional looms
Computer-aided design for clothing, fabric design, linked to
Computer-aided manufacture: computerized knitting, weaving cutting, sewing

Financing Source of investment/working/trade finance; problems with?

Management What is the firm's management style regarding its labor force?
How is the shop floor organized?
How much time spent on Clo/TextFed networking? Benefits of?
Where does firm go for new technology/design/market insights?
To what extent does firm use Internet for commercial or market intelligence needs?

Industry What can Government/associations do to promote marketing expertise?
What kind of public incentives would help firms develop international marketing savvy?
How integrated is firm with factor/input suppliers, designers, retailers, overseas markets?
What is the status of relation between firm and prime retailers, in RSA and abroad? Do these differ?
How are they evolving?
What kind of inventory management and just-in-time delivery innovations adopted?
How important are corporate mergers in the SA textile/clothing industries today?
Are foreign investors interested in the sector?
Are physical infrastructures (power/transport/port/telecomm) adequate or not?
What about international air/shipping links?

Costs Breakdown of costs of production for no more than three main products (distinguish between imported and domestic sources)
Raw materials
Consumables
Labor (unskilled, skilled)
Overhead/administration/selling/finance
Transport
Port charges, for export
Total cost vs. wholesale price of product
percent top quality market output vs. seconds market of output
Unit price, domestic; unit border price
What taxes paid?
Import duties
Payroll levy for training (included in W cost figure?)
Health insurance
Pension/unemployment
Corporate taxes
Other (identify)
What subsidies received?