

Chapter 3:

**Craft Production In Crisis:
Industrial Restructuring in Germany During the 1990s¹**

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During the 1980s, the system of organization in which German (then West German) manufacturers were embedded and through which they competed on world markets was touted in popular and scholarly literatures as an important potential alternative to the “Fordist” forms of organization that then existed in the United States and other older advanced industrial countries. Whereas the old “Fordist” system was rigid, slow to innovate, and focused on the mass production of standardized goods, German firms, the argument ran, were more flexible, focused on quality products and capable of jumping from market niche to market niche.

Nearly every dimension of the German political economy was praised (though rarely by the same authors at the same time): large German firms, with their intricate forms of internal decentralization, complex systems of codetermination and reliance on highly skilled and flexible workers in production looked to some as if they could provide an alternative, more social democratic, model for the corporation (Streeck 1991). Small German firms, equally as reliant on skilled workers, embedded in dense networks of sub-contracting relations and supported by a broad array of supporting public and private institutions, were held by others to be examples of an even more radical possible future in which decentralization, cooperation and trust would triumph over corporate hierarchy (e.g., and *mea culpa*, Herrigel 1989, 1992, 1993,). The German dual system that supplied the well trained workforce for these large and small firms was seen by many countries to offer the best possible solution to the public good problem of creating a large base of intermediate skills (e.g. Soskice 1991; Streeck 1991). Still others presented the German system of industrial relations, with its strong yet cooperative unions, to international labor audiences, hungry for such evidence, as a way to imagine a place for trade unions in the future within internationally competitive capitalist economies (Turner 1991,

Thelen 1992). The list of imitable German practices can easily be extended: from the chambers of commerce that governed the dual system to the decentralized, indirect incentives in Federal technology policy, all kinds of observers with all kinds of interests found something to admire in the German political economy (e.g., Streeck 1992, Katzenstein 1989, Ziegler 1990).

There may be some who continue to hold these German institutions up as a model for others today. But very few of those who do can possibly have been to Germany recently. Times have truly changed, and by all indications, German producers, large and small, as well as the many institutions that support them, have had a great deal of difficulty changing with them. All of the pearls of German industry registered deep losses in profits and sales throughout the beginning of the 1990s and have only managed a moderate recovery, despite an up-turn in the European business cycle. Huge cuts in employment rocked all of the major sectors. Even more disconcerting, the districts of thickly networked small and medium sized producers, in Baden-Württemberg, the Bergisches Land and elsewhere, also suffered: flagship industries such as machine tools have fallen into crisis, and unemployment rose regions that used to be considered immune to such things. Trade unions have not exactly stood by idly as the crisis has unfolded, but they have not been able to do anything to arrest its onset: Indeed, in many cases they have been able to do little more than protect their own by making sure that layoffs strike the most vulnerable elements of the workforce first (such as foreigners and women). So detached, in fact, have German trade unions become from the adjustment dynamics in factories today, that in many cases, even workers themselves are beginning to view the unions as part of the problem rather than part of the solution.

What happened to the German industrial system? Were the optimistic accounts in the 1980s completely off the mark or has something drastically

changed in the 1990s? The argument of this chapter will be that the arguments of the 1980s were not so much off the mark as they were one sided. The changes that began in the early 1990s and which have continued to plague economic actors and institutions throughout the decade brought other, more problematic, dimensions of the German system to light that were not especially apparent a decade ago.

In a nutshell, the German system constituted a specific kind of craft production-based alternative to the rigid, hierarchical Fordism that collapsed in the first great post War crisis. The key to the German advantage over the old system was the former's ability to gain flexibility in production by reuniting conception and execution at various levels: above all in the person of the skilled worker in batch production process and in close, cooperative subcontracting relations. Large-scale American Fordism had grown rigid by radically separating conception from execution within the hierarchical corporation and the mass production process. In a global competitive environment that demanded flexibility, the Germans had an advantage. The playing out of this advantage during the 1980s is what generated all of the attention.

Changes in the international competitive environment, however, particularly the entry of Japanese, American, and other producers deploying variants of an alternative, more open, and lower cost kind of flexible system unearthed rigidities in the German system that were not apparent in competition with the old Fordist producers. Two factors in particular were most important: first, the continued practical and cultural salience of skill distinctions within German workplaces imposed limits on the speed with which German firms could introduce new products and technologies and change the organization of production. Competitors abroad who have been unencumbered by such fixed identities in the workplace have achieved a more profound reunification of

conception and execution throughout the entire production process, making it possible for them to make products that are more elegant in design and less costly than their German counterparts. Second, this basic problem of fixed, clearly bounded skill identities was exacerbated by a host of bureaucratic elements within the German production system that separated production from development and design labs as well as different parts of production from one another. These structures developed and/or were imposed during the long period in the mid twentieth century when the main competitors of the Germans were large scale, highly Taylorized, mass producers.²

This has been a serious problem for the Germans, for it has not been immediately apparent how existing German practices and institutions could adapt to meet the stringent organizational, logistical and human resource conditions that production along more open, leaner, and lower cost lines requires. The German skill-based or “craft” industrial system³, in both its large firm and small firm variants, contains not only a wealth of previously hidden rigidities, but a broad array of institutionally entrenched actors who stand to lose a great deal in any move away from the old system. The process of adjustment during the 1990s has involved greater micro level social conflict and social transformation than has occurred in Germany for quite some time.

Though we believe these problems are great, we in no way intend to

²In other words, in comparison to a mass production system in crisis, what stood out about the Germans were the elements within their workplace arrangements that differed from that system. Now, however, when the alternative is a more open system, the striking aspects of the German system are the characteristics it adopted from and shared with the historically older system of rigid, hierarchical production.

³One has to be careful in using the word craft to not confuse the German system it is intended to denote with the British and American understanding of craft and craft system which has a more specific reference to the control of labor markets within and between firms by coherent craft organizations. In the German case, the organizations in the labor market along skill lines are absent. For this reason, it might have been reasonable to refer to the German system as the “Skill” or “Beruf” system, but we rejected that idea because it emphasizes skill too narrowly and loses the other dimensions of the German system, such as specialization, small batches, small firm or producing unit cooperation, that we intend the general term “craft” to convey.

suggest that they constitute an absolute bar to successful adjustment in Germany. For one thing, some of the Germans' most intense competitors, most notably the Japanese, are experiencing severe adjustment difficulties of their own in trying to overcome rigidities and implement more open and flexible production arrangements. This both provides some space in competitive markets for change and underscores the openness of the current international moment of experimentation: There is an international race to construct the most open and flexible production arrangements possible. All of the competitors bring to the contest a host of cultural and institutional advantages and disadvantages. A second reason for optimism in the German case is that there are already clear examples within Germany of extremely successful producers who have taken radical steps to move beyond the traditional German craft system. Though these cases are at the moment isolated ones and to a certain extent the product of unique conditions that cannot be generalized to other German producers, they do point to the possibility of a very interesting new German production system that combines some of the strengths of the old German system with the flexibility and low cost of the new open one.

This chapter will elaborate the above argument in the following way: The first section will outline what Fordism was in ideal typical form and then contrast both the German and alternative open, flexible systems to it--the latter being primarily illustrated with Japanese examples. The second section will then examine how the German system has come up short against the alternative. The third section will then look at current efforts at adjustment within Germany: It contrasts successful and unsuccessful cases of adjustment, and suggests how the former may be leading to a system that also overcomes some of the limits of the Japanese version of the alternative system.

1. Fordism and Its Alternatives

By Fordism, we mean an historically specific orientation toward production that emerged first and diffused most broadly in the United States, but which also had an important time in the sun in Europe during the early and mid-twentieth century. Fordism, as an ideal type, involved the mass production of standardized goods, strictly Taylorist organization of work in production (i.e., highly specialized tasks), and heavy reliance on unskilled and semi-skilled workers. All of these features of direct production were governed by a segmented set of hierarchies for production, development, finance, marketing, etc. The logic of Fordism involved two fundamental principles: control over market and technology and the rigid separation of conception from execution in all aspects of production and its governance.⁴

Control over markets, in the form of oligopoly or monopoly, and over technology, through long product cycles, were defining features of Fordism. It was only through the exercise of such control that the relatively rigid and large scale investments involved in mass production could be justified. Competition and innovation undermined pre- microelectronic automation mass production because production was so rigid it was always vulnerable to competitors who could offer a slightly more expensive custom product that provided precisely those things that the standard mass produced wares could not. Innovation that replaced existing products had a similarly undermining effect.

The second principle, the separation of conception from execution in product development, production, and work, was both a cause and

⁴This is a relatively narrow definition of Fordism which focuses primarily on the organization of industrial production. We want to distance ourselves from the more inclusive definitions current in the neo-Marxist Fordism debate. On that, see Jessop (1991).

a consequence of this kind of control. Product development and production planning were hidden away from outside suppliers and production management and workers in bureaucratic departments, for example, so that neither of those groups could run off with trade secrets and turn themselves into competitors of the organization. At the same time, the stability that market control afforded meant that the division of labor could be extended to achieve economies of scale in production, tasks requiring skill and manual expertise could be transferred to machines and the production process could be peopled by unskilled and semi-skilled workers who knew little of the larger process of which their jobs were a part. Such extreme fragmentation of knowledge and action was itself a way for top management--the only part of the corporation with an overview of the entire production and development process -- to exercise control and direction over the process.

In its time, this system was enormously productive: it contributed to the tremendous growth of the middle class in advanced industrial countries during the 20th century and it was arguably responsible for winning at least one of the two world wars that occurred in this century. By now, however, it is clear that for all the things "Fordism" was, one thing it clearly was not was invincible. Indeed, Fordism's hegemony within the industries of advanced industrial countries began to wane in the 1970s and fell into bona-fide crisis in the 1980s.

The key vulnerability in the system revolved around principle one above: the capacity to achieve and maintain the kind of control necessary for stable Fordist growth depended upon either the existence of a clear hierarchy of technological sophistication and industrial development in the world economy, or the existence of relatively sovereign national (or supra-national-regional) markets in which competition from foreign producers was a minimal threat. By the 1970s, it was clear that the formerly war ravaged economies of Europe and Japan had

assimilated the technological advances that had been pioneered earlier in the century in the United States, effectively eliminating any previously existing developmental hierarchy among the most advanced industrial economies. At the same time, each of those countries (or groups of countries) had grown to a point where they could no longer grow on the basis of their internal markets alone. They thus aggressively invaded the formerly sovereign market domains of the others, but especially that of the United States. Suddenly it was no longer possible to maintain control of markets or technology anywhere in the advanced west: competition that gave rise to ever more rapid product and technological innovation became the rule. In such an environment, the rigid, hierarchical principles of Fordist organization began to come under extreme stress.

Germany and Japan

In turbulent, constantly changing market and technological environments, flexibility is an asset. During the 1980s, countless case studies showed over and over again that those organizational forms--in firms, regions, and countries--that had a modicum of flexibility in production performed better than those that did not (Pyke and Sengenberger 1991; Dore 1986; Piore and Sabel 1984, Streeck, 1991). This is the context in which the German and Japanese systems of production became so interesting to outsiders. Producers in each of these economies demonstrated a degree of flexibility in production that was dramatic in comparison to the ossifying and rigid structures of decaying Fordism and moreover, they were very successful in international markets.

The key to the success of both systems lay in their ability--in different ways-- to reintegrate conception and execution in the development and manufacture of products. In both systems this reintegration occurred within firms and between firms.

The German System of Decentralized Craft Production

The successful components of the German industrial system during the 1980s revolved around the principles of craft-based manufacturing and cooperative subcontracting among specialized producers. The essence of craft manufacture as a general type of production is the deployment of general purpose machinery tended by broadly skilled workers. In a craft production process different groups of skilled workers in different segments of the production process receive from management general instructions for how and what to produce. They must then rely on their skill and experience to devise a way to make the part--or in finding that it cannot be made in its given form, go back to management and participate in its redesign.

In most industrialized countries, the coming of mass production undermined the craft organization of production. But in Germany, the craft idea became more deeply embedded in the society during the twentieth century through its association with the concept of *Beruf*, the notion that all forms of industrial production contain naturally within them broad distinctions that require different and distinctive skills. This concept became a constitutive feature of the way in which workers organized their career paths and the way that managers conceived of the situation in production. A dense network of institutions for vocational training, workplace codetermination, and collective bargaining monitored and reproduced the system, providing apprentices with intensive training and the holders of skill with the imprimatur of official recognition. This kind of public distinction accorded to holders of those who succeeded in achieving a distinctive skill (*Beruf*) created a set of public norms that made trust in the workplace possible: Managers could delegate decisions to skilled workers because they could be confident that the institutional system that provided the

worker with his or her skills had done its job.

Even though there is considerable trust and cooperation within German craft production, there is also hierarchy and fragmentation: skilled workers do not design what they produce, all do not have the same amount of experience, and the production process is divided among different kinds of skills (e.g., tool maker, mechanic, electrician, etc.). Identities within the production process, because they are so embedded in a system of institutional certificates and processes, are relatively fixed. Nevertheless, and this is crucial for understanding the flexibility of the German system over the more rigid Fordist one, the contribution that each group of skilled workers and managers makes to a final product is not fixed: indeed, it is continuously renegotiated in the heat of production. New orders and new products require new shop floor arrangements: workers are given considerable autonomy and discretion on the shop floor to respond to the new situation, and there is a high degree of cooperation between labor and management in the firm concerning the reorganization of the production process. During the nineteenth century, this kind of labor management cooperation within the craft system occurred in a direct, face to face manner between shop floor workers and managers. By the end of the twentieth century, however, after many German firms had themselves moved into mass production, this labor-management cooperation was removed from the immediate shopfloor into the institutions of workplace codetermination; but it was still very remarkable and extensive cooperation, which accorded German producers an enviable flexibility advantage over more rigid mass producers with more adversarial and contentious shop floor environments in which workers were more narrowly trained.

Relations between German firms (or individual workshops within larger companies) and their sub-contractors (internal or external) involved a similar balance between the autonomy and discretion of specialists and cooperation

among them. Typically, sub-contractors (workshops) were approached with a general set of specifications (sometimes nothing more than a vague array of needs) and were expected to apply their expertise to the resolution of the problem. As with the skilled workers, conception is reintegrated with execution not only in the invention of the specific details for producing the part or sub-assembly, but because the process of devising a solution frequently involved close cooperation with the designers in the contracting firm.

Relations between sub-contractors and their clients were not quite as embedded in a system of training and monitoring as were individual workers acquiring a *Beruf*, but there was significant institutionalization nonetheless. All producers in Germany are required to register with the Chamber of Commerce and provide that body with basic information about the firm's activities. Frequently, sub-contractors and clients belonged to the same trade association and met with one another in standards bodies in which negotiation took place about the quality and identity of products, production techniques, etc. Such institutional affiliations provided a weaker imprimatur than the *Berufe* system of vocational training. But membership and participation in such organizations provided not only publicity for the firm, but also, crucially, signified its membership among the community of respectable producers. In this weaker sense, norms of trust were also institutionalized in this system.

Producing in this way is very flexible. Since there are few specific work rules within the skill specialties, workers and managers can relatively cheaply and rapidly turn from the production of one thing to another, within a given set of parameters. German producers were widely known to be expert customizers, easily able to build into their products a broad array of special customer requests, including the construction of unique products. The process also contributed to high quality manufacturing, because the participation of producers in both the

conception and execution of products had the beneficent side effect of engendering learning among all the participating parties about what was right and what was wrong about the part being produced and the process producing it. Improvements in the production process could be implemented continuously.

This craft system always made it possible for the Germans to become the world's most successful manufacturing exporters, through their dominance of low volume and/or premium niches in world markets, even during the heyday of Fordism. The flexible craft production process was very good at producing premium high quality goods that reflected sophisticated customer desires--sometimes precisely. The strategy was more expensive, however. German production costs and products were always higher than producers in other countries in similar industries. But as long as there was a gap between standardized and very high volume mass markets and lower volume, higher-quality specialized markets, the Germans were able to flourish. During the turbulent 1980s, when commodity product markets began to fragment and customer desires became more particular and demanding, it appeared that the special characteristics of the German system were ideally suited for the new environment. The new terms of competition were related in many ways to those that had guided production in Germany throughout much of the industrialization process.

Open and Flexible Production: The Example of the Japanese

The German craft-based system was not the only system to flourish during the 1980s. Another one was the Japanese system, which deployed forms of organization in production that diverged quite significantly, both from Fordism and from the skill-fractured system of the Germans. The system of production in Japanese manufacturing is also extremely flexible and, like the Germans, this

flexibility is achieved through the reintegration of conception and execution both in development and in production. Unlike the German system, however, which retains considerable hierarchy and fragmentation within its organizations, the principles underlying the Japanese system aim for a more thoroughgoing integration of conception and execution.

Rather than relying on groups of differently skilled workers with general knowledge of their specialty to solve problems that arise in production, the Japanese attempt to respond to problems that arise in production by creating groups appropriate to the task. There are no fixed vocational identities in the Japanese production process. Unlike German workers, who come into the production process only after a long apprenticeship within a particular *Beruf*, Japanese workers enter the factory with relatively little knowledge of specific kinds of work. They enter groups within the factory that are actively engaged in collectively solving problems that they encounter in fulfilling orders in production. Apprenticeship is replaced by participation in collective problem solving on the shop floor. Identities at work associated with craft skill are replaced by identities at work associated with the capacity to contribute to the competitiveness of the company.

In this system, conception and execution are blended together in much the same way that they were in the German system: production workers receive general instructions for which they then have to devise a concrete solution. The crucial difference is that in the Japanese workplace, there are no jurisdictions that predetermine the specialties of interlocutors as there are in the German system. The Japanese get a tremendous amount of extra flexibility from this: they can virtually redefine the production process and reallocate roles within it with each new set of instructions or product change. Moreover, learning is built into the system, not only in the sense that newcomers are trained collectively by the

group, but also in the sense that this continuous self-redefinition on the part of production workers causes them to monitor their activities in a way that allows them to engage in continuous improvement and innovation.

Relations between workshops within Japanese firms and between firms and their sub-contractors involve a similar kind of reintegration of conception and execution. Here the key is the *Kanban*, or no inventory production system, which, because it eliminates all production buffers, places all workshops and collaborating firms under collective pressure to find solutions for their production problems; a problem in one area of production becomes apparent immediately throughout the whole production chain. This not only constrains work groups to come up with effective solutions to their particular production problem; it provides an incentive for horizontal cooperation as well. Everyone benefits from a smoother production flow.

The interesting feature of this horizontal cooperation is that it is structurally induced. It does not depend for its operation on the existence of trust, in the sense of shared membership in and public recognition by a community as in Germany. Cooperation, though it is important in both systems, actually differs very substantially between them. The Japanese system differs from the German in that the systematic pursuit of low inventories forces more systematic collaboration about the entire production process among all the participating groups. Thus where the German system induces learning through collaboration in dyadic relations within pieces of the production process, the imposed interconnectedness of low inventories induces collaborators to learn by monitoring the flow of the entire production process (Sabel 1993).

2. German vs. Japanese Flexible Organization

Both of these alternative flexible systems flourished during the 1980s,

while economies and corporations that had been committed to the old hierarchical Fordist system floundered and struggled with adjustment. At the time, much was made about the counterintuitive character of both systems. The flexible systems seemed to be redefining the very character of efficiency: instead of looking to lower costs through ever greater specialization in the organization of production coupled with standardization and economies of scale, the Germans and especially the Japanese seemed to be showing that an emphasis on local autonomy and generality in production coupled with greater integration between the development and production of goods was actually a more efficient way to produce (regardless of scale). Specialization in the division of labor was expensive because it involved the construction of rules and elaborate hierarchical organizations filled with people either following rules or making sure that the rules were followed. The general and more locally autonomous, cooperative systems had fewer rules and thus fewer levels of middle level rule enforcers. Less hierarchy and more autonomy turned out to be cheaper (Aoki 1988, Piore and Sabel 1984).

This principle, as it happens, also holds true among the flexible producers. That is, the system with the least formal hierarchy, specialized identities, and fragmentation in the production process, and fixed rules dictating particular kinds and preventing other kinds of behavior among members of productive organizations is the most flexible and lowest cost approach to manufacturing. The giant losses that German producers, large and small, incurred during the first half of the 1990s suggest that they came up on the short end of the stick in this contest. German companies, despite some signs of improvement at the end of the decade, have been unable to keep up with the torrid pace of new product introduction and technological innovation that the Japanese--and now especially their many "lean" American imitators--have been setting and the many

improvements in the organization of production have still not been able to bring German costs down to the competitive levels of American producers.⁵ German products in a range of manufacturing sectors-- machinery, electrical equipment, automobiles, optical equipment-- are still unattractively expensive and, notoriously, "over-engineered". Japanese and American producers are now able to produce with the same kind of quality in the same kind of high value added markets that used to be the sovereign province of German producers, and the newcomers are proving to be better in quality and less costly producers than the veterans.⁶

If the claim is that hierarchy, excessive fragmentation in production, and rigid rules are the problem, where are these characteristics located in the German system? As we saw above, the craft system itself involves hierarchy and fragmentation: Divisions between separate *Berufe* are considered to be virtually natural divisions within the production process and in the system of social differentiation in society. Masters, moreover, are the superiors of apprentices and of newer and younger skilled workers within their *Beruf*. This generic fragmentation and hierarchy, we saw, was then further exacerbated by the evolution of the German industrial economy during the long mid-twentieth century flirtation with Fordism: The institutionalization of the vocational training system reinforced the hierarchical relations between masters and apprentices and

⁵ See the very frustrated and pessimistic summary article by Michael Schumann and Horst Kern, summarizing advances in German production organization, especially in Automobiles during the 1990s, and the continued difficulties German producers have meeting international benchmarks for lowest cost and best practice: "Kontinuität oder Pfadwechsel? Das deutsche Produktionsmodell am Scheideweg" in SOFI Mitteilungen, Number 26, 1997 and will appear in Bruno Cattero, ed., *Modell Deutschland, Modell Europa--Probleme, Perspektive* (Berlin: Leske & Budrich, 1998)

⁶The remarkable thing about this claim is that it holds true of Japanese producers in branches such as automobiles despite the tremendous problems that have beset their financial and political systems. But American producers have been pressing European producers with their low cost structures and alternative forms of organization not only through competition on Export markets but also through direct investment strategie in Europe and in particular eastern Europe. See Schumann & Kern, *ibid.*.

among older and younger skilled workers while at the same time reproducing clear social distinctions among workers in different *Berufe*. Similarly, the formal institutionalization of workplace codetermination structures imposed a formal hierarchical apparatus within plants that involved significant bureaucratic mediation between management and individual workshops and *Berufe*. Masters, foremen, shop stewards and works councilors, and their counterparts or superiors in the formal structures of plant management, had significant governing authority in production.

The disadvantage of *Beruf*-based hierarchy and fragmentation in the German system comes to light under conditions of extremely rapid product and technological change. Each time a new product or a new technology is introduced--as opposed to an old one that is customized for a customer-- the various roles that each of the categories of skill will play in the manufacture and development of the new product must be bargained out. Each will want to participate; each will have its own ideas and solutions; each will defend its turf against encroachments from the others. Electrical masters and technicians will fight with mechanical ones both on the shop floor and in the design studios.

If the new product involves the increasing interpenetration of formerly distinct areas of technology and expertise--such as microelectronics and mechanical engineering-- it will take some time to iron out all of the potential areas of conflict. If the market is stable for the product and doesn't change very rapidly, it might be possible to wait until all of these conflicts have been resolved before deciding upon the final design of the product. But if the market is turbulent and unstable and the life span of the current technology is clearly going to be limited, firms are forced to bring their products on to the market while the internal conflicts are still being worked out. More often than not, impatient and nervous senior managers under time pressure but with no greater knowledge of

the technology or the market than the contending specialists, will be forced to broker a compromise between the players in a way that allows the solutions of each --to the extent that they are not contradictory--to be built in to the product. It should not be surprising that such products will appear to the customer as inelegant, overpriced and over-engineered--they are.

This is what is going on in German factories today. Jurisdictional disputes driven by the need to accelerate new product introduction at a moment when the boundaries between traditional *Berufe* are being technologically eroded is driving up the cost and driving down the quality of products. Such jurisdictional conflicts do not exist in the Japanese or most advanced American systems because there are no fixed jurisdictions or occupational identities. The Japanese can combine the work of development departments and production (simultaneous engineering) and they can continually redesign their production processes to accommodate new products by utilizing U-shaped lines and group work organization.

This is extremely difficult to do in the German system as it is constituted today: To implement more boundary blending forms of cooperation in development and production, the traditional structure of the craft system has to be deconstructed and its elements recomposed in a new more flexible (not to say Japanese) way.⁷ Given the centrality of craft as a form of social organization in German industry, as well as in the institutional environment that surrounds, supports and governs that form of social organization, the current adjustment period has been one of extremely dramatic and pervasive social transformation.

⁷One has to be careful here. We call the alternative system "Japanese" because it is the most familiar example in international discussions of flexible alternatives to the craft system. Nevertheless, two things: first, the Japanese system is itself not bereft of hierarchy and fragmentation, which cause rigidities in the current environment, nor is it proving easy within that system to move away from such rigidities. Second, German producers themselves tend to have in mind an even more radically open system of flexible production in their own discussion of reform. They recognize the limits of the Japanese case and are not interested in reproducing its limits in their own systems. Interestingly, many of our interlocutors felt that their most advanced, lowest cost, and flexible competitors were now in the United States.

3. German Adjustment

German industrial producers have been well aware of the competitive problem that they face. Most have been deeply involved in attempting to amend their internal structures of organizations in ways that, to a greater or lesser degree, depart from the craft system and implement more open and flexible arrangements within the organization of management and production. Indeed, at the moment it is possible to say that the debate in Germany is not about *whether or not* the old *Beruf*-based system and its supporting institutions need to be amended and made more flexible. Instead the debate is about *how much* needs to be changed.⁸

In this sense it is possible to distinguish between minimalist and maximalist strategies. In the former case, producers attempt to reform the old system only slightly, by cutting costs, reducing overheads and implementing some of the most basic elements of the alternative “Japanese” system. This is a top-down strategy, often initiated under financial duress and under the instigating and watchful eye of the firm’s bankers. Typically the aim is to improve the bottom line by “getting costs under control.” In the latter, maximalist case, producers have radically departed from the traditional structures of management and work organization and have implemented their own versions of open and flexible production organization throughout most areas of the firm. The reasons for this larger step vary considerably: In some cases, a crisis occurred very early at the firm and at a point in the business cycle when the rest of the economy was flourishing, and management implemented the radical changes in a piecemeal manner--not even realizing themselves what they were doing until the process

⁸ This is not to say that there are not niches where the kinds of competitive pressures being discussed in the text do not (yet) apply: The case of pumps discussed in the Wagner-Finegold Chapter in this volume strikes us as one such exceptional niche example.

was very far along. In other cases, reform is more radical because crisis at the firm resulted in a change of management and the newer reform managers came from places where they had had bad experiences with the minimalist reform strategy.

In the current, very unstable, environment, we find it impossible to declare any of the cases we have observed to be a trend: the minimalist strategies could evolve into maximalist ones, and the maximalist ones that we have observed may not work. That said, we think that the conceptual fermentation and experimentation that exists today, and the striking departure from past practice that we observed in some of the maximalist plants, has the potential to transform the old German craft system and produce a version of the new that could be more open and flexible than the traditional Japanese system.

We begin this section with a discussion of some of the maximalist plants and then turn to the minimalist cases and the troubles they encounter. The final section will consider possible trajectories away from the minimalist strategy and how the openness the Germans seem to be striving for in production combines the strengths of both the old and new.

Maximalist Strategies:

Perhaps the most impressive and advanced example of restructuring along more open and flexible lines within the entire German economy is the *BMW* Corporation. This company saw in the beginning of the 1980s that its luxury automobile market niche was going to be vulnerable to new competition from mass producers seeking to move up market in quality. It was also clear to the company that addressing such new competition would be complicated by the proliferation of a host of new technologies, such as microelectronics and new kinds of plastics. The company needed to lower its manufacturing costs, improve

product cycle turnover and innovation while maintaining or improving its manufacturing quality (Sabel et al. 1991, Herrigel 1996).

BMW's response was to attack internal hierarchy and over specialization within its organization (in all areas of management and production) while at the same time attempting to lower its level of vertical integration and decentralize production. Old functional departments within the company were recomposed and integrated with one another so that they could both scan and identify new technologies and potential suppliers at the same time that the new ideas were being modified to accommodate market tastes and adapted for production. For example, at the end of the 1980s, a new committee, known as the *Bezugsartenkreis*, was formed, which brought representatives of engineering, purchasing, and controlling (finance/accounting) departments together to facilitate systematic discussion of issues concerning product development and the location of production inside or outside the firm. In the early 1990s, production was added to this group of interlocutors and the committee was transformed into an integrated department in its own right, under the direct supervision of the top managing board. By incorporating production into discussions of product development and location, the company was seeking to reintegrate conception and execution within its organization and hoped to ensure that the development and production of new cars would occur simultaneously (*Manager Magazine* 1993).⁹

Part and parcel of this restructuring has been the redefinition of managerial careers and expectations.¹⁰ BMW wants to avoid the

⁹“Codewort Pretoria,” pages 60- 71.

¹⁰The following paragraphs draw on interviews conducted by the authors at BMW in Munich and Regensburg in the winter and spring of 1989, as well as published sources in the press as indicated. It is interesting to note, and a reviewer of this article pointed this out to us, that training for the managerial occupation, *Industriekaufmann*, now has been redefined to incorporate many of the multifunctional qualities of the system described in the text at BMW. Apprenticeship training for people who go into marketing, purchasing, and other specialties is identical, including rotation among these different departments in large firms. What is not clear is how this corresponds to changes in practice in the firms. The reviewer seemed to think that there was a

“Chimney Effect” of managers envisioning their career paths in functionally specialized terms--e.g., by making a career in marketing, development, or in purchasing. Instead, managers are increasingly expected to move horizontally through the organization, gathering experience at a variety of posts in a variety of locations. The more varied their experience, the greater is their flexibility and their capacity to collaborate with others both within BMW and at sub-contractors. Commitment to the goals of the organization, rather than to those of a narrow functional specialty within it, is the goal that BMW is trying to achieve.

The reorganization, simplification, and decentralization of the management structure to facilitate boundary-crossing exchange and cooperation has its analog in the decentralization of production away from the firm and the reorganization of the production that remains within the firm into U-shaped lines manned by work teams. Over the course of the 1980s, the company increasingly redefined the automobile as a system of subsystems (modules) and its role as the manufacturer as one of "Systems Integrator."

Figures on vertical integration vary considerably, even when the same measure appears to be used. But by the beginning of the 1990s, it was clear that somewhere between 55 and 75 percent of the total production costs at BMW came from outsourced parts. People in purchasing at that time claimed that over 80 percent of the parts purchased involved important collaborative work with a specialist subcontractor which supplies BMW with know-how and design.

Moreover, the firm was insisting that its suppliers deliver their modules on a just-in-time basis with exacting quality and cost targets. No single part or module

difference between those who entered the firm as apprentices and those who entered as managers, suggesting that there was still residual rigidity of the sort we are contrasting these examples to still very much alive in German firms. We are happy to take this Industriekaufmann example however, because our argument is not that the German system can't change; it about the character of conflicts and obstacles that are arising in the way of redefining the system.

of their automobile was considered to be, in principle, inappropriate for outsourcing. Workshops in BMW's plants were made increasingly autonomous and obligated to prove their production efficiency according to market standards: i.e., also on a low cost, no inventory, high quality basis.

The effects of this new more porous and collaborative system on the performance and organizational identity of BMW have been remarkable. Output of automobiles increased between 1984 to 1992 from approximately 350,000 cars to nearly 600,000, while sales increased during the same time period from slightly more than DM9 Billion to DM31.2 billion--all with steadily increasing profitability (*Manager Magazine* 1993, Bluethmann 1992).¹¹ Above all, the new structure made possible radical reductions in development time. The first indication that the reforms were bearing fruit came with the introduction of the *Z1* sports car in the late 1980s. Construction of this car was an experimental effort to shorten the eight-year model-development cycle that the company carried throughout the 1980s. The new engineering subsidiary, *ZT Technik GmbH*, did the engineering for the new car and BMW subcontracted out modules world-wide to firms that did the final design and development of the automobile. Within two years, the company was producing a limited edition of the car at the rate of roughly seventeen units per day. The company required another two years before the car could be produced in series. On the whole, the project did much to demonstrate that with the new system BMW could potentially reduce development times to the range -- 43 months -- previously attained exclusively by world leading Japanese producers. As the decade has progressed, moreover, BMW refined the system even more: the company introduced the third completely redesigned iteration of the *Z1*, the *Z3*, at the end

¹¹*Manager Magazine* 1993: 68; see also Bluethmann (1992).

of the decade. The rapid launch of this new car was among the most successful in BMW's history.

Predictably, many of the best additional examples of successful movement away from the traditional craft system in Germany are BMW suppliers, like the medium sized family firm, *Getrag*, located in northern Württemberg. This manufacturer of high performance gear units for standard shift automobiles began to initiate major changes in its organization in 1987 in order to meet the stringent cost and quality terms of a new contract from BMW. According to a spokesman for the company, the reorganization was guided by the idea that the new organization would be defined more by a process of change, than by a specific organizational structure. The company literally and somewhat naively set out to constitute trusting relations among all actors within the firm, regardless of role or position in the organization of the firm, which were informed by mutual respect. It discouraged thinking in terms of hierarchy and status and made all information about the company (its finances, its products, its suppliers, its customers) available to everyone within it.

To realize this vision, product teams were created that combined the previously separate departments of development, planning, purchasing and production. The many levels of management hierarchy in the old system between top management and shop floor were reduced to three. Relations with *Getrag* suppliers were also reformed so that their parts and materials would be delivered according to the stringent cost and quality standards of the *Kanban* system.

It is in the production process, however, where the departure from the old craft system can be seen most clearly. In the restructuring, the production process was broken down and completely reorganized. All line and workshop organization was eliminated and production and assembly islands, governed by

autonomous work teams, were introduced. Members of the teams allocate work amongst themselves and take responsibility for most aspects of their quality control and maintenance. Island teams possess a small budget to help them perform these tasks. Teams also have the option of turning to different suppliers--inevitably also outsiders--to ensure that their quality responsibilities are met. Workers in the teams are multi-skilled and are not constrained by old craft categories: their responsibility is to keep the island performing at exacting cost and quality standards in the best way that they can.

Clearly, one of the central ways that they do this is to interact with the other work teams and with suppliers so that the entire production flow can be continually optimized and improved. In an effort to encourage this kind of cross boundary communication both within and across teams, even the old apprenticeship system is being broken down: rather than training workers in specific trades away from the production process under the stewardship of masters, the firm attempts to integrate the apprentices into the teams from the start. Rather than learning a specific craft skill, newer apprentices are trained in the much more demanding trade of general problem solving and cooperation.

The new system, which the firm has been introducing piecemeal over the last decade, has been tremendously successful. The firm has rates of machine utilization above 80% in the teams, while serviceability rates on the same production machinery (time not spent in repair) are over 90%. Moreover, over the course of the last seven years, the firm has introduced three new generations of its product.

A third example of successful adjustment is the small machinery firm *Mettler Toledo*, a maker of electronic scales and weighing devices on the Schwäbische Alb in southern Württemberg. This firm has nothing to do with BMW or the automobile industry. Rather, reorganization at Mettler Toledo was

brought on by a financial crisis associated with an unsuccessful shift to new microelectronic variants of their product during the mid 1980s. The crisis brought in new management with a mandate to radically restructure the company.

Management made two major moves: first, all production was shifted onto area suppliers so that the company could focus its energies fully on product development, product assembly, and sales. Relations with suppliers, which were already very close and cooperative before the reorganization, were intensified so that important providers were drawn directly into the development process.

Second, all remaining activities within the firm were reorganized into teams: no functional divisions or departments survived the reorganization and all levels of formal middle management associated with those areas were dissolved. The company was reorganized around products and processes. Teams were fully responsible for the development and production of new products and dealt with the continuing needs of existing customers. The emphasis was on total process optimization and improvement. Teams maintained intimate and open contact with the assembly workers about individual orders. Assemblers worked as individuals and had responsibility for the complete assembly of a product. They could call on team members for advice and service at any time. As at Getrag, this reorganization at Mettler Toledo led the firm to attempt to get away from the old craft system of apprenticeship. By circumventing the archaic specialized roles of the dual system, the firm found it could integrate apprentices right from the beginning into production and team work.

None of these successes was achieved painlessly. Virtually all of the above cases of restructuring were initiated in periods of financial and market crisis for the firms. The elimination of hierarchy involved the dislocation of many unnecessary jobs in middle management. The introduction of teams made it

possible for fewer workers to perform more operations, thus making many others redundant, although generally this was accomplished through early retirements and attrition rather than mass layoffs. Still, hundreds of workers and managers lost their jobs at Getrag and Mettler Toledo, as did thousands at BMW over the course of the long transition to the new system. Though their situation was unique in that they began the shift away from the old craft system in the mid 1980s because of the early onset of crisis, the dislocation and job losses they experienced moving in the new direction has subsequently become broadly commonplace in German industry. In any case, these are important examples to note because their early and ultimately quite successful movement toward the new system make it difficult to claim that the Germans cannot change and that they must live or die by the craft system.

Minimalist Strategies:

That said, the obstacles to change have been extremely great in the 1990s and the situation facing firms just beginning the restructuring is much graver than it was for the three firms noted above. Those firms got to restructure themselves in a reasonably healthy economy surrounded by producers in the late 1980s who were thriving. Now, after a decade of deep recession and permanent restructuring pressures that have continued despite a moderate upswing in the business cycle, those once happy producers have all been forced to deal with the kind of financial and market crises that the above producers experienced much earlier. And with far greater intensity. The open and flexible “Japanese” system has diffused and been adopted and adapted by producers in a broad array of countries--notably in the United States--often in ways that make the system more flexible and efficient than it is even in Japan. All of these developments make the level of competition and the rapidity of technological and product change in nearly all market

segments unimaginably intense. Thousands of the finest industrial producers in Germany have all been struggling throughout the decade to make themselves cheaper, higher quality, and more flexible producers, or be competed into oblivion by those who can.¹²

The argument in section two, as well as the three examples just given, however, suggest that achieving the kind of transformation in the organization of production necessary to remain competitive in the current environment must involve far more than laying people off or shifting production outside of Germany to lower the wage bill. In many ways a whole way of life needs to be changed. The deconstruction of craft jurisdictions involves the elimination of traditional ways of envisioning one's career and narrating one's vocational life to oneself--and to one's peers, employer, and even employees. Very important forms of social status and understandings of achievement (the *élan* of the accomplished skilled craftsman, the prestige of the master, the accomplishment of the technician and applied engineer) will be threatened with devaluation by efforts to break down hierarchy and construct an environment of polymorphous collaboration in which those forms of achievement make no useful contribution to competitive success.

Similarly in the ranks of middle management, expertise at ensuring that rules and guidelines are followed by those to whom they apply loses its value when rules are permanently provisional and constructed by the very people who then follow them. What is true of the middle management is also true of the

¹² for fine examples of these struggles, successes and continuing frustrations despite significant alterations of the German system we have been describing, see Schumann and Kern, *op cit.* One is tempted to characterize the problems that the Germans face--and these are elaborated in the minimalist cases discussed in the text, as well as in the reflections put forth by Kern and Schumann--that they have been capable of altering the degree of hierarchy and fixity of role positions within the production process very dramatically over the course of the 1990s. The problem is that they are competing with producers who have developed a form of organization that differs not in degree, but in kind from the German system.

German works councils, who by law are charged with participating in the construction of rules and in practice oversee the overseers: what is a works councilor to do when production is divided into self-governing and self-redefining groups that interact independently and systematically with different levels of the firm?

This kind of social and institutional destabilization is by no means confined within the boundaries of firms. Relations between subcontracting workshops and firms are also affected as are relations between firms and supporting institutions. Among firms and sub-contractors, for example, the shared understandings of career and the shared experiences of education and training that helped make it possible to maintain the kind of trusting collaboration across parts of the production chain are undermined by the introduction of boundary-blurring production organization. Where in the old craft system, engineers and technicians with similar degrees (even from the same school) facilitated the collaboration of two craft producers, in the new system work groups deal with work groups in a manner that they collectively establish. Bonds of trust that stood on the firm ground of shared jurisdiction have to be reforged in an environment that continuously redefines the roles of the collaborators.

Between producers and supporting institutions restructuring creates a disjunction between the services offered and the kinds of problems that consumers of such services confront. State agencies (such as the Steinbeis Foundation in Baden-Württemberg), trade associations, and technical universities, for example, were quite expert at facilitating technology transfer to healthy craft producers: they knew the structure of firms and industries, frequently had stable ties to particular departments within firms and, in the case of trade associations and technical universities, often developed departmental structures, career paths and curricula of their own that mimicked craft jurisdictions and functional

divisions within firms. The current situation contradicts the old one at every level: firms are in crisis, not healthy, and their problems are organizational, not technological. Moreover, neither the firms nor the industries are sure of what their structures are likely to become, yet most are convinced of the need to attack existing craft and functional divisions and foster cross departmental integration.

In this context, there is a great danger of the supporting institutions becoming either irrelevant to the needs of the emerging new system or obstacles to the emergence of the new system. For example, trade associations, driven by their own internal bureaucratic jurisdictional inertia, can offer services along no longer existing functional lines. Or, worse, they could sanction firms by withholding resources or cooperation when producers seeking to redefine their own boundaries participate in collaborative projects organized by producers and an association from a traditionally separate industrial sector. Likewise, professors and departments in technical universities can sponsor research projects and dissertations on topics that follow the outdated disciplinary agendas of university departments and professional associations, rather than the incipient discipline crossing needs of industry. Those professors pursuing interdisciplinary agendas can be ignored on the job market or released and denied tenure in a difficult financial climate.

Given the extent to which efforts to move away from the craft system are likely to destabilize social, institutional and professional relations throughout the German political economy, it is no surprise that we found that firms are reluctant to throw the old system out *in toto* and replace it with something new. Instead, what one finds is that producers are taking piecemeal steps away from the old system: boundaries are being tested and conflicts with entrenched interests entered into on only a number of fronts. In most cases, reformers themselves do not have a precise idea of how far they need to go and how much needs to be

changed--they only know that lower costs and greater openness and flexibility in production and management are urgently needed. Few are either interested in or capable of defending the old system from criticism however, and nearly all firms and institutions are at least *talking* about moving toward more open, team-based organizational forms. Yet it is equally so that few within those organizations are able to resist calling for the deconstruction and destabilization of somebody else's department or of finding an extremely compelling technical ground for the continued existence of their own traditional privileges and duties. Adjustment is proceeding along this slow path of vision, experimentation, prudence and desperation.

Within this context, two characteristic bottlenecks have emerged among the many German firms that have recently initiated minimalist or piecemeal efforts to break from the craft system and implement more "Japanese"-like arrangements. The first is that the new forms of organization become isolated within the firm, making it difficult for the new forms of organization to work in ways that will maintain the commitment of those involved in them. The second is that the new forms of organization succeed in colonizing all elements of a firm, except for a few islands of tradition. In the first case, the viability of the entire firm hangs in the balance, in the second case the long term attractiveness of the island of tradition to the rest of the firm does.

A good example of the first problem developed at a large machine tool company in Baden-Württemberg that manufactures large scale stamping machines for the automobile industry. This company has made tremendous strides toward completely revamping its production process through the introduction of integrated product islands and group work. The traditional workshop system has been modified so that machines are now grouped around the production of particular groups of products rather than around parts for all products. All set up,

production planning, and delivery scheduling tasks, which formerly were performed by the masters and foremen of the individual machine shops, or by a level of middle management located directly above the floor of the plant, have been integrated into the new product islands. Members of product development teams, moreover, now continually move between activity in the production teams and the relocated engineering rooms on the shop floor. Technicians, programmers, engineers and skilled machine operators now work side-by-side in close cooperation and to some extent interchangeably within the teams. Groups within the islands have begun electing their own representatives to facilitate the coordination of their own internal duties as well as to maintain contact with the operations of the other groups and other product islands.

There are two factors within the firm, however, which significantly disturb the operation of these islands and constrain their ability to produce significant gains in efficiency and cost reduction. First, the changes in production have only been introduced in the areas of direct mechanical production; areas of work preparation, such as tool making, as well as materials purchasing have neither been organized into teams nor adapted to the needs of teams. As a result, teams have only limited control over their overhead costs. Since the idea of the introduction of teams is to devolve responsibility for holding down costs to the teams themselves, lack of control over overheads engenders frustration on the shop floor--and skepticism regarding the effectiveness of the new system. Changing this arrangement, however, involves attacking the privileges of some of the most highly skilled workers in the plant (tool makers)--something the management of the firm, at least until now, has been unwilling to do.

Second, changes in production have not been accompanied by corresponding efforts to deconstruct the hierarchical relations between top management departments and the newly emergent product team structure.

Management has retained the right to veto group decisions that it believes will not result in the cost savings it desires. It has also retained control over the budgets of the product islands: company management, not the teams, make team investment decisions and ultimately evaluate the performance of the teams. A speaker of one of the product islands as well as the head of all manufacturing at the firm claimed that this limitation on local autonomy and the continued existence of hierarchy threatened to undermine the effectiveness of the product islands and teams. When members of the group believe that their success or failure is the direct result of their collective efforts, all have an incentive to make continuous improvements. Without local autonomy, however, such incentives do not exist and the commitment of team members to the success of the team is undermined.

Both examples show that the partial movement away from the principles of craft organization risks making the new organizational principles appear to be a charade. Making a full commitment, however, means taking privilege and authority away from those with little desire to give them up. Clearly there is no equilibrium with the current arrangement: doing nothing will lead to the gradual erosion of moral and enthusiasm within the new product islands, returning to the old craft system will price the firm out of the market, and moving forward will involve the spilling of blood. Someone is going to lose this battle, and the stakes in the world market at the moment are such that it may be the firm itself.

The second characteristic obstacle to restructuring along more open and flexible lines reverses the forces of the previous example: rather than boundary blending and cooperative organization being isolated in production, production is isolated within the firm as the last bastion of traditional organization. Unlike the previous case, this situation redounds to the disadvantage not of the entire firm, but to the island of tradition.

A good example of this occurred at the electric turbine subsidiary of a large European multinational in Mannheim in the north of Baden-Württemberg. The parent company was well known as a very progressive company, at the forefront of globalization as well as of the decentralization of management structure and control. Subsidiaries throughout the entire global concern have been given tremendous operating autonomy, encouraged constantly to bring out new products and utilize collaborative relations with sub-contractors as well as encouraging other subsidiaries to do so.

Like BMW, the company has tried to cultivate a new kind of management career in which individual managers move throughout the organization, cross functionally, accumulating knowledge of the company, its products, its suppliers and its customers. Promotion within this company has increasingly become contingent upon having successfully participated in cooperative product development teams that involve members of different departments as well as key suppliers. To encourage this, the Mother company introduced what it calls a "Customer Focus Program" (CFP) in all of its subsidiaries. This program brought managers together across subsidiaries as well as across functional departments on a regular basis to foster dialogue on the improvement of company products and the development of new technologies. This is not simply a discussion group, however; CFP also, because it has constituted itself regularly, acts as a kind of monitoring forum for projects and subsidiaries throughout the organization. In many subsidiaries, this collaborative, team, and product oriented organizational practice has been taken right down to the shop floor in the form of group work and product oriented, low inventory production.

Not so in the Mannheim Turbine works. Hierarchy flattening occurred within the departmental structures above the shop floor, where a number of CFP groups were created. But the production process itself remains dominated by the

old workshop-based craft system and the old craft hierarchies. The plants in Mannheim continued to be organized around specialized machine and/or part production. Typically, any given work station operated with an inventory of up to five days. Operators working on particular machines dedicated to the production of a specific range of parts had little idea where their work object fit into the larger product the plant was constructing--one machinist had no idea where the parts he was making were going to go next in the line of production. Masters and foremen set up machines.

Why this continued existence of the old craft system beneath an increasingly open, flexible management structure? In part the answer stems from the strategy that the local firm pursued after the Mannheim plant was merged with the larger European mother company in 1988. Prior to the merger, the Mannheim plant was capable of making complete electrical turbine generators. After the merger, the plant was broken up and parts of the production process were shifted to parent company facilities in other locations; Mannheim was specialized on large part production. Thousands of layoffs resulted from these changes. Perhaps understandably, given the massive job losses, the works council and trade unions were reluctant to engage in additional restructuring within the production lines that remain for fear of additional layoffs. The local labor representation was persuaded that additional losses would redound to its disadvantage and therefore defended its traditional jurisdiction over how jobs were defined. As labor resisted the new structures, management, which is committed to the European parent company, not Mannheim, became increasingly frustrated and focused on finding other more profitable locations for production.

A final example shows how restructuring can go in a more robust direction. A producer of automobile gaskets outside of Stuttgart profited from its relationships with local automobile producers for many years. But complacency

and poor management, coupled with changing fortunes among German auto producers in general, gave rise to a deep and wrenching crisis at the firm. Indeed, so bad was the crisis, that the old management was removed and replaced with managers with broad restructuring experiences in their past. The new managers explicitly set out to restructure production and management organization in a way that avoided the pitfalls of piecemeal reform and minimalist cost-cutting, because they had been frustrated by the mixed results this kind of adjustment had yielded in their previous employers. As a result, from the very beginning they made it clear to the workforce and to the works-council that dramatic departures from the craft system would be implemented: U-shaped lines were to be laid out throughout the plant, group work was to become the norm, and development and production would increasingly occur simultaneously.

This kind of clarity on the part of management encouraged early acceptance and involvement on the part of works councils in the internal restructuring of the workplace. Works councilors, skilled workers, and plant managers all worked together to set up the new arrangements: many made a number of trips to the United States to observe the more open and low cost production arrangements of the firms' major competitors. Given this kind of cooperation in radical change, restructuring has proceed very far at the firm-- though progress has still been piecemeal. There are still islands within the firm that produce in the old manner, but the climate, even among those who work in the old style arrangements, is that these arrangements will not last long. Indeed, so advanced is the new system in the firm that the works council, which has traditionally been strongly identified with the IG Metall metalworkers union, has devoted itself to winning team members over to the union. Its biggest challenge is to get the elected speakers of groups to become shop stewards-or vice versa. So far, the results are mixed.

4. Conclusion

The above minimalist strategies show how difficult and treacherous the current restructuring process is in Germany today. Efforts to implement new structures in specific areas of the firm and not others run the risk of being undermined by the resistance to change elsewhere in the firm. Attachment to old jurisdictional ideas of functional right, entitlement, and authority are frequently the primary obstacles to change. Even in those cases, however, where actors with central roles within the traditional system are intimately involved in the restructuring process, such as the works council in the third example above, it is not at all certain that the new structure that it has helped to create will have a place for it. The stakes in this process of adjustment are high indeed: if the restructuring does not succeed, it could mean the very survival of the firm. If it does succeed, it is not at all guaranteed that there will even be a place in the new system for those who play a central role in bringing it into being.

The particular kinds of conflicts outlined above are unique to the German system. Problems and conflicts around the deconstruction of hierarchy and the smoothing over of fragmentation are not at all unique to Germany. The Japanese are finding that their own system of flexible production has internal problems that inhibit producers' ability to keep pace with the intensity of technological and product change in today's extremely demanding international markets. In particular, an over-identification in the Japanese system with the community of the firm has placed a limit on the capacity of larger producers to recombine production and take advantage of the specialties and flexible practices of its own suppliers--much less many of its competitors. There is little institutional infrastructure beyond the boundaries of the firm, as there is in the German system of Chambers of Commerce, trade associations, and state monitored vocational

training, that can help structure the recombination of workers, producers, and assets that the desire for greater flexibility seems to make necessary.

Indeed, when seen in this context, the German situation, as uncertain and wrenching as it is, can actually be understood to contain a ray of hope. The more decentralized, extra-firm, and public character of many dimensions of the German craft system provides producers with the raw material for the construction of an even more radically open system than the Japanese. With the exception of the vocational training system, most of the institutions that facilitated cooperation among independent producers in the old German craft system were not themselves implicated in the direct reproduction of the craft system in production itself: instead, they facilitated communication about the quality of production or the capacity of a specific producer to perform up to a particular standard. The more that internal restructuring within firms and among firms emphasizes local autonomy, responsibility for costs and continuous improvement, the less significant the boundaries of a given firm will become to the newly created pieces. And, correspondingly, the more significant will the social and economic realm between producers become for the regulation and governance of production. Even if many of the current institutions that occupy this space are themselves committed to the old craft system, the fact that the space itself is a very familiar one to the Germans could turn out to be an advantage in the long run. Time will tell.

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