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The Transformation of Work and Employment: Networkers, Jobless, and Flex-timers[1]

The process of work is at the core of social structure. The technological and managerial transformation of labor, and of production relationships, in and around the emerging network enterprise is the main lever by which the informational paradigm and the process of globalization affect society at large. In this chapter I shall analyze this transformation on the basis of available evidence, while attempting to make sense of contradictory trends observed in the changes of work and employment patterns over the past decades. I shall first address the classic question of secular transformation of employment structure that underlies theories of post-industrialism, by analyzing its evolution in the main capitalist countries between 1920 and 2005. Next, to reach beyond the borders of OECD countries, I shall consider the arguments on the emergence of a global labor force. I shall then turn to analyze the specific impact of new information technologies on the process of work itself, and on the level of employment, trying to assess the widespread fear of a jobless society. Finally, I shall treat the potential impacts of the transformation of work and employment on the social structure by focusing on processes of social polarization that have been associated with the emergence of the informational para-

1 I would like to acknowledge the significant input to this chapter of Martin Carnoy and Harley Shaiken. I have also relied extensively on data and material provided by the International Institute of Labour Studies, International Labour Office. For this, I am particularly grateful to Padmanabha Gopinath and Gerry Rodgers.

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digm. In fact, I shall suggest an alternative hypothesis that, while acknowledging these trends, will place them in the broader framework of a more fundamental transformation: the individualization of work and the fragmentation of societies.[2] Along such an intellectual itinerary, I shall use data and research findings from a flurry of monographs, simulation models, and standard statistics that have treated these questions with minute attention over many years in many countries. Yet the purpose of my inquiry, as for this book in general, is analytical: it aims at raising new questions rather than answering old concerns.

The Historical Evolution of Employment and Occupational Structure in Advanced Capitalist Countries: the G-7, 1920–2005

In any process of historical transition one of the most direct expressions of systemic change is the transformation of employment and occupational structure. Indeed, theories of post-industrialism and informationalism use as the strongest empirical evidence for the change in historical course the coming into being of a new social structure, characterized by the shift from goods to services, by the rise of managerial and professional occupations, by the demise of agricultural and manufacturing jobs, and by the growing information content of work in the most advanced economies. Implicit in much of these formulations is a sort of natural law of economies and societies, which should follow a single path along a trajectory of modernity in which American society has led the way.

I take a different approach. I contend that while there is a common trend in the unfolding of the employment structure characteristic of informational societies, there is also an historical variation in employment patterns according to specific institutions, culture, and political environments. In order to assess both the commonality and the variation of employment structures in the informational paradigm I have examined the evolution of employment structure between 1920 and 1990 for the major capitalist countries that constitute the core of the global economy, the so-called G-7 countries. All of them are in an

2 To understand the transformation of work in the informational paradigm it is necessary to root this analysis in a comparative and historical perspective. For this, I have relied on what I consider to be the best available source of ideas and research on the matter: Pahl (1988). The central thesis of this chapter on the transition toward individualization of work, inducing potentially fragmented societies, is also related, although from a very different analytical perspective, to an important book that builds on Polanyi's theory, and relies on empirical analysis of Italian social structure: Mingione (1991).

advanced stage of transition to the informational society, thus can be used to observe the emergence of new employment patterns. They also represent very distinct cultures and institutional systems, allowing us to examine historical variety. In conducting this analysis I am not implying that all other societies, at different levels of development, will conform to one or another of the historical trajectories represented by these countries. As I have argued in the general introduction to this book, the new, informational paradigm interacts with history, institutions, levels of development, and position in the global system of interaction along the lines of different networks. The analysis presented in the following pages has a more precise purpose: to unveil the interaction between technology, economy, and institutions in the patterning of employment and occupation, in the process of transition between agricultural, industrial, and informational modes of development.

By differentiating the internal composition of service employment, and by analyzing the differential evolution of the employment and occupational structure in each one of the seven countries (United States, Japan, Germany, France, Italy, the United Kingdom, and Canada) between *circa* 1920 and *circa* 1990, the analysis presented here introduces an empirically grounded discussion of the cultural/institutional diversity of the informational society. To proceed in such a direction, I shall introduce the analytical issues researched in this section, define the concepts, and describe briefly the methodology I have used in this study. [3]

Post-industrialism, the service economy, and the informational society

The classical theory of post-industrialism combined three statements and predictions which ought to be analytically differentiated:[4]

1 The source of productivity and growth lies in the generation of knowledge, extended to all realms of economic activity through information processing.
2 Economic activity would shift from goods production to services delivery. The demise of agricultural employment would be followed by the irreversible decline of manufacturing jobs, to the benefit of service jobs which would ultimately form the overwhelming pro-

3 The analysis of the evolution of employment structure in the G-7 countries was conducted with considerable help from Dr Yuko Aoyama, formerly my research assistant at Berkeley, particularly for the construction of the international, comparative database on which this analysis is grounded.
4 Bell (1976); Dordick and Wang (1993).

portion of employment. The more advanced an economy, the more its employment and its production would be focused on services.

3 The new economy would increase the importance of occupations with a high information and knowledge content in their activity. Managerial, professional, and technical occupations would grow faster than any other occupational position and would constitute the core of the new social structure.

Although various interpretations would extend the theory of post-industrialism in different versions to the realm of social classes, politics, and culture, the preceding three interrelated statements anchor the theory at the level of the social structure, the level where, in Bell's thinking, the theory belongs. Each one of these major assertions deserves qualification. In addition, the historical linkage between the three processes has still to be submitted to empirical verification.

First, as I argued in chapter 2, knowledge and information seem indeed to be major sources of productivity and growth in advanced societies. However, as we also saw above, it is important to notice that theories of post-industrialism based their original assertion on research by Solow and by Kendrick, both referring to the first half of the twentieth century in America, at the height of the industrial era. This is to say that the knowledge base of productivity growth was a feature of the industrial economy when manufacturing employment was at its peak in the most advanced countries. Thus, although the late twentieth-century economies were clearly different from the pre-World War II economies, the feature that distinguishes these two types of economy does not seem to be rooted primarily in the source of their productivity growth. *The appropriate distinction is not between an industrial and a post-industrial economy, but between two forms of knowledge-based industrial, agricultural, and services production.* As I have argued in the opening chapters of this book, what is most distinctive, in historical terms, between the economic structures of the first half and of the second half of the twentieth century is the revolution in information technology, and its diffusion in all spheres of social and economic activity, including its contribution to providing the infrastructure for the formation of a global economy. Therefore, I propose to shift the analytical emphasis from *post-industrialism* (a relevant question of social forecasting still without an answer at the moment of its formulation) to *informationalism*. In this perspective, societies will be informational, not because they fit into a particular model of social structure, but because they organize their production system around the principles of maximizing knowledge-based productivity through the development and diffusion of information

technologies, and by fulfilling the prerequisites for their utilization (primarily human resources and communications infrastructure).

The second criterion of post-industrialist theory by which to consider a society as post-industrial concerns the shift to service activities and the demise of manufacturing. It is an obvious fact that most employment in advanced economies is in services, and that the service sector accounts for the largest contribution to GNP. Yet it does not follow that manufacturing industries are disappearing or that the structure and dynamics of manufacturing activity are indifferent to the health of a service economy. Cohen and Zysman,[5] among others, have forcefully argued that many services depend on their direct linkage to manufacturing, and that manufacturing activity (distinct from manufacturing employment) is critical to the productivity and competitiveness of the economy. For the United States, Cohen and Zysman estimate that 24 percent of GNP comes from the value added by manufacturing firms, and another 25 percent of GNP comes from the contribution of services directly linked to manufacturing. Thus, they argue that the post-industrial economy is a "myth," and that we are in fact in a different kind of industrial economy. Much of the confusion comes from the artificial separation between advanced economies and developing economies which, under the conditions of globalization, are in fact part of the same productive structure. Thus, while analysts were proclaiming the de-industrialization of America, or of Europe in the 1980s, they simply overlooked what was happening in the rest of the world. And what was happening was that, according to studies from the ILO,[6] global manufacturing employment was at its highest point in 1989, having increased by 72 percent between 1963 and 1989. The trend continued in the 1990s. Between 1970 and 1997, while manufacturing jobs declined slightly in the US (from 19,367 million to 18,657 million), and substantially in the European Union (from 38,400 to 29,919), they actually increased in Japan, and were multiplied by a factor of between 1.5 and 4 in major industrializing countries, so that, overall, new manufacturing jobs elsewhere largely exceeded the losses in the developed world.

Furthermore, the notion of "services" is often considered to be ambiguous at best, misleading at worst.[7] In employment statistics, it has been used as a residual notion that embraces all that is not agriculture, mining, construction, utilities, or manufacturing. Thus, the category of services includes activities of all kinds, historically originated from

5 Cohen and Zysman (1987).
6 Wieczorek (1995).
7 Castells (1976a); Stanback (1979); Gershuny and Miles (1983); De Bandt (1985); Cohen and Zysman (1987); Daniels (1993).

various social structures and productive systems. The only common feature of these service activities is what they are not. Attempts at defining services by some intrinsic characteristics, such as their "intangibility," opposed to the "materiality" of goods, have been definitely voided of meaning by the evolution of the informational economy. Computer software, video production, micro-electronics design, biotechnology-based agriculture, and many other critical processes characteristic of advanced economies, merge inextricably their information content with the material support of the product, making it impossible to distinguish the boundaries between "goods" and "services." To understand the new type of economy and social structure, we must start by characterizing different types of "services" in order to establish clear distinctions between them. In understanding the informational economy, each one of the specific categories of services becomes as important a distinction as was the old borderline between manufacturing and services in the preceding type of industrial economy. As economies become more complex, we must diversify the concepts through which we categorize economic activities, and ultimately abandon Colin Clark's old paradigm based on the distinction between primary, secondary, and tertiary sectors. Such a distinction has become an epistemological obstacle to the understanding of our societies.

The third major prediction of the original theory of post-industrialism refers to the expansion of information-rich occupations, such as managerial, professional, and technical positions, as the core of the new occupational structure. This prediction also requires qualification. A number of analysts have argued that this trend is not the only characteristic of the new occupational structure. Simultaneous to this trend there is also the growth of low-end, unskilled, service occupations. These low-skilled jobs, despite their slower growth rate, may represent a substantial proportion of the post-industrial social structure in terms of their absolute numbers. In other words, advanced, informational societies could also be characterized by an increasingly polarized social structure, where the top and the bottom increase their share at the expense of the middle.[8] In addition, there is a widespread challenge in the literature to the notion that knowledge, science, and expertise are the critical components in most of the managerial/professional occupations. A harder, closer look must be taken at the actual content of such general statistical classifications before we jump to characterizing our future as the republic of the learned elite.

Yet the most important argument against a simplistic version of

8 Kuttner (1983); Rumberger and Levin (1984); Bluestone and Harrison (1988); Sayer and Walker (1992); Leal (1993).

post-industrialism is the critique of the assumption according to which the three features we have examined coalesce in historical evolution, and that this evolution leads to a single model of the informational society. This analytical construct is in fact similar to the formulation of the concept of capitalism by classical political economists (from Adam Smith to Marx), exclusively based on the experience of English industrialization, only to find continuous "exceptions" to the pattern throughout the diversity of economic and social experience in the world. Only if we start from the analytical separation between the structural logic of the production system of the informational society and its social structure can we observe empirically if a specific techno-economic paradigm induces a specific social structure and to what extent. And only if we open up the cultural and institutional scope of our observation can we separate what belongs to the structure of the informational society (as expressing a new mode of development) from what is specific to the historical trajectory of a given country. To make some tentative steps in such a direction, I have compiled and made somewhat comparable basic statistics for the seven largest market economies in the world, the so-called G-7 countries. Thus I can compare, with reasonable approximation, the evolution of their employment and occupational structure over the past 70 years. I have also considered some employment projections for Japan and the United States through the early twenty-first century. The empirical core of this analysis consists in an attempt at differentiating between various service activities. To do so, I have followed the well-known typology of service employment constructed by Singelmann more than 20 years ago.[9] Singelmann's conceptualization is not without flaws, but has a fundamental merit: it is well adapted to the usual statistical categories, as shown in Singelmann's own doctoral dissertation which analyzed the change of employment structure in various countries between 1920 and 1970. Since the main purpose of this book is analytical I decided to build on Singelmann's work, to compare the 1970–90 period with his findings for the 1920–79 period. Thus, I constructed a similar typology of sectoral employment, and processed the statistics of the G-7 countries along roughly comparable categories, extending Singelmann's analysis to the critical period of development of informational societies, from the 1970s onwards. Because I cannot ensure the absolute equivalence of my decisions in classifying activities with those taken earlier by Singelmann, I present our data separately for the two periods: they must not be read as a statistical series, but as two distinct statistical trends made roughly equivalent in terms of the analytical

9 Singelmann (1978).

categories used to compile the data. I did find considerable methodological difficulties in establishing equivalent categories among different countries. The appendix to this chapter provides details of the procedures followed in building this database. In analyzing these data I have used the simplest statistical procedures, always trying to show the actual trends in the social structure, rather than using analytical methods that would be unnecessarily sophisticated for the current level of elaboration of the database. I have opted for using descriptive statistics that would simply suggest lines of new theoretical understanding.

By adopting Singelmann's categories of service activities I have embraced a structuralist view of employment, dividing it up according to the place of the activity in the chain of linkages that starts from the production process. Thus, distributive services refer both to communication and transportation activities, as well as to commercial distribution networks (wholesale and retail). Producer services refer more directly to those services that appear to be critical inputs in the economy, although they also include auxiliary services to business which may not be necessarily highly skilled. Social services include a whole realm of government activities, as well as collective consumption-related jobs. Personal services are those related to individual consumption, from entertainment to eating and drinking places. Although these distinctions are admittedly broad, they do allow us to think differentially about the evolution of the employment structure across countries, at least with greater analytical depth than the usual statistical accounts. I have also tried to establish a difference between the services/goods dichotomy and the classification of employment between information-processing and goods-handling activities, since each one of these distinctions belongs to a different approach in the analysis of social structure. To do so, I built two elementary indexes of service-delivery employment/goods-producing employment, and of information-processing employment/goods-handling employment, and calculated these indexes for the countries and periods under consideration. Finally, I also calculated a simplified typology of occupations across countries, building the various countries' categories around those used by American and Japanese statistics. Although I have serious concerns about the definitions of such occupational categories which mix, in fact, occupational positions and types of activities, using standard statistics that are widely available gives us the opportunity of looking at the evolution of occupational structures in roughly comparative terms. The purpose of this exercise is to recast the sociological analysis of informational societies by assessing in a comparative framework the differences in the evolution of their employment structure as a fundamental indicator for both their commonality and their diversity.

The transformation of employment structure, 1920–1970 and 1970–1990

The analysis of the evolution of employment structure in the G-7 countries must start from the distinction between two periods that, by sheer luck, match our two different databases: *circa* 1920–70 and *circa* 1970–90. *The major analytical distinction between the two periods stems from the fact that during the first period the societies under consideration became post-agricultural, while in the second period they became post-industrial*. I understand obviously by such terms the massive decline of agricultural employment in the first case and the rapid decline of manufacturing employment in the second period. Indeed, *all G-7 countries maintained or increased (in some cases substantially) the percentage of their employment in transformative activities and in manufacturing between 1920 and 1970*. Thus, if we exclude construction and utilities in order to have a sharper view of the manufacturing labor force, England and Wales decreased only slightly the level of their manufacturing labor force from 36.8 percent in 1921 to 34.9 percent in 1971; the United States increased manufacturing employment from 24.5 percent in 1930 to 25.9 percent in 1970; Canada from 17.0 percent in 1921 to 22.0 percent in 1971; Japan saw a dramatic increase in manufacturing from 16.6 percent in 1920 to 26.0 percent in 1970; Germany (although with a different national territory) increased its manufacturing labor force from 33 to 40.2 percent; France, from 26.4 to 28.1 percent; and Italy, from 19.9 to 27.4 percent. Thus, as Singelmann argues, the shift in the structure of employment in this half-century (1920–70) was from agriculture to services and construction, not out of manufacturing.

The story is a very different one in the 1970–90 period, when the process of economic restructuring and technological transformation which took place during these two decades led to a reduction of manufacturing employment in all countries (see tables 4.1–4.14 in Appendix A). However, while this trend was general, the shrinkage of manufacturing employment was uneven, clearly indicating the fundamental variety of social structures according to differences in economic policies and in firms' strategies. Thus, while the United Kingdom, the United States, and Italy experienced rapid de-industrialization (reducing the share of their manufacturing employment in 1970–90 from 38.7 to 22.5 percent; from 25.9 to 17.5 percent; from 27.3 to 21.8 percent, respectively), Japan and Germany reduced their share of manufacturing labor force moderately: from 26.0 to 23.6 percent in the case of Japan, and from 38.6 percent to a still rather high level of 32.2

percent in 1987 in the case of Germany. Canada and France occupy an intermediate position, reducing manufacturing employment from 19.7 percent (in 1971) to 14.9 percent, and from 27.7 to 21.3 percent, respectively.

In fact, England and Wales had already become a post-agricultural society in 1921, with only 7.1 percent of their labor force in agriculture. The United States, Germany, and Canada still had a sizeable agricultural population (from a quarter to a third of total employment), and Japan, Italy, and France were, by and large, societies dominated by agricultural and commercial occupations. From this differential starting-point in the historical period under study, trends converged toward an employment structure characterized by simultaneous growth of manufacturing and services at the expense of agriculture. Such a convergence is explained by very rapid processes of industrialization in Germany, Japan, Italy, and France, which distributed the surplus of agricultural population between manufacturing and services.

Thus, if we calculate the employment ratio of services to industry (our indicator of the "service economy"), it shows only a moderate increase for most countries between 1920 and 1970. Only the United States (change from 1.1 to 2.0) and Canada (1.3 to 2.0) witnessed a significant increase in the relative proportion of service employment during the period that I call post-agricultural. In this sense, it is true that the United States was the standard-bearer of the employment structure characteristic of the service economy. Thus, when the trend toward service employment accelerated and generalized in the post-industrial period, the United States and Canada increased even more their service predominance, with indexes of 3.0 and 3.3 respectively. All other countries followed the same tendency, but at different speeds, thus reaching different levels of de-industrialization. While the United Kingdom, France, and Italy seem to be on the same path, North America, Japan, and Germany clearly stand out as strong industrial economies, with lower rates of increase in service employment, and lower service to industry employment ratios: 1.8 and 1.4 respectively in 1987–90. This is a fundamental observation that deserves careful discussion below. Yet, as a trend, in the 1990s the majority of the population in all G-7 countries was employed in services. Is employment also concentrating on information processing? Our ratio of information-processing to goods-handling employment provides some interesting clues for the analysis. First, we must put aside Japan for further consideration.

For all other countries there has been a trend toward a higher percentage of information-processing employment. Although Italy and

Germany had no or only slow increase in 1920–70, their share of information employment grew considerably in the 1980s and 1990s. The United States holds the highest information employment ratio among the seven countries, but the United Kingdom, Canada, and France are almost at the same level. Thus, the trend toward information processing is clearly not a distinctive feature of the United States: the American employment structure is more clearly set apart from the others as a "service economy" than as an "information economy." Germany and Italy have a significantly lower rate of information employment, but they have doubled it in the past two decades, thus displaying the same trend.

The data on Japan are most interesting. They show only a moderate increase in information employment in 50 years (from 0.3 to 0.4), and an even slower increase in the past 20 years, from 0.4 to 0.5. Thus, what is probably the society which puts the strongest emphasis on information technologies, and in which high technology plays a most significant role in productivity and competitiveness, also appears to have the lowest level of information-processing employment, and the lowest rate of progression of such employment. The expansion of information employment and the development of an "information society" (*johoka shakai*, in the Japanese concept) seem to be different, although interrelated, processes. It is indeed interesting, and problematic for some interpretations of post-industrialism, that Japan and Germany, the two most competitive economies among major economies in the 1970s and 1980s, are those with the strongest manufacturing employment, the lowest service to industry employment ratio, the lowest information to goods employment ratio, and, for Japan (which has experienced the fastest productivity growth), the lowest rate of increase in information employment throughout the century. I suggest the idea that information processing is most productive when it is embedded in material production or in the handling of goods, instead of being disjointed in a stepped-up technical division of labor. After all, most automation refers precisely to the integration of information processing in goods handling.

This hypothesis may also help to interpret another important observation: none of the seven countries had a ratio of information employment over 1 in 1990, and only the United States was approaching that threshold. Thus, if information is a critical component in the functioning of the economy and in the organization of society, it does not follow that most jobs are or will be in information processing. The march toward information employment is proceeding at a significantly slower pace, and reaching much lower levels, than the trend toward service employment. Thus, to understand the actual profile of the trans-

formation of employment in advanced societies we must now turn to the differential evolution of each type of service in the G-7 countries.

To do so, I shall first comment on the evolution of each category of service in each country; then I shall compare the relative importance of each type of service *vis-à-vis* each other in each country; finally, I shall consider the trends of evolution of employment in those services that have been identified in the literature as characteristic of "post-industrial" societies. In proceeding with this analysis I must remind the reader that the further we go into the fine-grain analysis of specific categories of employment, the less solid the database becomes. The inability to obtain reliable data for some categories, countries, and periods will make it difficult to be systematic in our analysis across the board. Yet the observation of the tables presented here still suggests that there are some features that merit closer analysis and further elaboration on country-specific databases.

Let us start with *producer services*. They are considered in the literature to be the strategic services of the new economy, the providers of information and support for the increase in the productivity and efficiency of firms. Thus, their expansion should go hand in hand with the increasing sophistication and productivity of the economy. Indeed, we observe throughout the two periods (1920–1970, 1970–1990) a significant expansion of employment in these activities in all countries. For instance, in the United Kingdom employment in producer services shot up from 5 percent in 1970 to 12 percent in 1990; in the United States, for the same period, from 8.2 to 14 percent; in France, it doubled, from 5 to 10 percent. It is significant that Japan increased dramatically its producer services employment between 1921 (0.8 percent) and 1970 (5.1 percent), most of this increase taking place during the 1960s, the moment when the Japanese economy internationalized its scope. On the other hand, focusing on 1970–90 on a different database, the increase of Japanese employment in producer services between 1971 and 1990 (from 4.8 to 9.6 percent), while substantial, still leaves Japan in the lower tier of employment in producer services among the advanced economies. This could suggest that a significant proportion of producer services are internalized in Japan in manufacturing companies, which could appear to be a more efficient formula, if we consider the competitiveness and productivity of the Japanese economy.

This hypothesis receives additional support from the observation of data concerning Germany. While increasing significantly the share of employment in producer services from 4.5 percent in 1970 to 7.3 percent in 1987, Germany still displays the lowest level of producer services employment of the G-7 countries. This could imply a great degree of internalization of service activities in German firms. If these data

were confirmed, we must emphasize that the two most dynamic economies (Japan and Germany) have also the lowest rate of employment in producer services, while it is obvious that their firms do use such services in great amount, yet probably with a different organizational structure that links up more closely producer services to the production process.

While it is evident that producer services are strategically crucial in an advanced economy, they still do not represent a substantial proportion of employment in most advanced countries, in spite of their rapid rate of growth in several of them. With the unknown position of Italy, the proportion of employment varies between 7.3 and 14 percent in the other countries, of course putting them well ahead of agriculture, but far behind in manufacturing. The battalions of professionals and managers have indeed swelled the ranks of employment in advanced economies, but not always, and not predominantly, in the visible spots of the management of capital and the control of information. It seems that the expansion of producer services is linked to the processes of vertical disintegration and outsourcing that characterize the informational corporation.

Social services form the second employment category which, according to the post-industrial literature, should characterize the new society. And indeed it does. With, again, the exception of Japan, employment in social services represents between one-fifth and one-quarter of total employment in the G-7 countries. But the interesting observation here is that the major increase in social services took place during the roaring sixties, actually linking their expansion with the impact of social movements rather than with the advent of post-industrialism. Indeed, the United States, Canada, and France had very moderate rates of growth of employment in social services in the 1970–90 period, while in Germany, Japan, and Britain it grew at a robust rate.

Overall, it would seem that the expansion of the welfare state has been a secular trend since the beginning of the century, with moments of acceleration in periods that vary for each society, and a tendency to slow down in the 1980s. Japan is the exception because it appears to be catching up. It maintained a very low level of employment in social services until 1970, probably linked to a greater decentralization of social support both by the firm and the family. Then, when Japan became a major industrial power, and when more traditional forms of support could not be maintained, Japan engaged in forms of social redistribution similar to the other advanced economies, providing services and creating jobs in the social services sector. Overall, we can say that although the expansion of social services employment at a very high level is a feature of all advanced societies, the pace of such expan-

sion seems to be directly dependent on the relationship between the state and society, rather than on the stage of development of the economy. Indeed, the expansion of social services employment (except in Japan) is more characteristic of the 1950–70 period than of the 1970–90 period, at the dawn of the informational society.

Distributive services combine transportation and communication, relational activities of all advanced economies, with wholesale and retail trade, the supposedly typical service activities of less industrialized societies. Is employment declining in these low-productivity, labor-intensive activities, as the economy progresses toward the automation of work, and toward the modernization of commercial shops? In fact, employment in distributive services remains at a very high level in advanced societies, also oscillating between one-fifth and one-quarter of total employment, with the exception of Germany, which stood at 17.7 percent in 1987. This level of employment is substantially higher than that of 1920, and has only declined slightly in the past 20 years in the United States (from 22.4 to 20.6 percent). Thus employment in distributive services is roughly double that in producer services, considered typical of advanced economies. Japan, Canada, and France increased the share of such employment in the 1970–90 period. About half of employment in distributive services in the G-7 countries corresponds to retail services, although it is often impossible to differentiate the data between wholesale and retail trade. Overall, retail employment has not significantly declined over a 70-year period. In the United States, for instance, it grew from 1.8 percent in 1940 to 12.8 percent in 1970, later declining slightly from 12.9 percent in 1970 to 11.7 percent in 1991. Japan had increased retail employment from 8.9 percent in 1960 to 11.2 percent in 1990, and Germany, while having a lower level of employment in such activity (8.6 percent in 1987) had actually increased it over its 1970 figure. Thus, there is a large sector of employment still engaged in distribution, as the movements of the employment structure are in fact very slow in the so-called service activities.

Personal services are viewed, at the same time, as the remnants of a proto-industrial structure, and as the expression (at least for some of them) of the social dualism that, according to observers, characterizes the informational society. Here also, the observation of the long-term evolution in the seven countries invites the introduction of a word of caution. They continued to represent a sizeable proportion of employment in 1990: with the exception of Germany (6.3 percent in 1987), they vary in the range between 9.7 and 14.1 percent, that is roughly equivalent to the quintessential post-industrialist producer services. Overall, they had increased their share since 1970. Focusing on the

famous/infamous "eating and drinking places" jobs, a favorite theme of the literature critical of post-industrialism, we do find a significant expansion of such jobs in the past two decades, particularly in the United Kingdom and in Canada, although the data often mix restaurants and bars with hotel employment which could also be considered as characteristic of the "leisure society." In the United States, eating and drinking places employment stood at 4.9 percent of total employment in 1991 (up from 3.2 percent in 1970), which is about twice the size of agricultural employment, but still less than we are asked to believe by the essays elaborating on the notion of the "hamburger society." The main remark to be made on employment in personal services is that it is not fading away in the advanced economies, thus providing ground for the argument that the changes in the social/economic structure concern more the type of services and the type of jobs than the activities themselves.

Let us try now to evaluate some of the traditional theses on post-industrialism in the light of the evolution of employment structure since 1970, more or less at the moment when Touraine, Bell, Richta, and other early theorists of the new, information society were publishing their analyses. In terms of activity, producer services and social services were considered to be typical of post-industrial economies, both as sources of productivity and as responses to social demands and changing values. If we aggregate employment in producer services and social services, we do observe a substantial increase in what could be labeled the "post-industrial services category" in all countries between 1970 and 1990: from 22.8 to 39.2 percent in the United Kingdom; from 30.2 to 39.5 percent in the United States; from 28.6 to 33.8 percent in Canada; from 15.1 to 24.0 percent in Japan, from 20.2 to 31.7 percent in Germany; from 21.1 to 29.5 percent in France (Italian data in our database do not allow any serious evaluation of this trend). Thus, the trend is there, but it is uneven since it starts from a very different base in 1970: the Anglo-Saxon countries had already developed a strong basis in advanced services employment, while Japan, Germany, and France kept much higher employment in manufacturing, as well as in agriculture. Thus, we observe two different paths in the expansion of "post-industrial" services' employment: one, the Anglo-Saxon model, which shifts from manufacturing to advanced services, maintaining employment in the traditional services; the other, the Japanese/German model, which both expands advanced services and preserves a manufacturing basis, while internalizing some of the service activities in the industrial sector. France is in-between, although leaning toward the Anglo-Saxon model.

In sum, the evolution of employment during what we called the

"post-industrial" period (1970–90) shows, at the same time, a general pattern of shifting away from manufacturing jobs, and two different paths regarding manufacturing activity: the first amounts to a rapid phasing out of manufacturing, coupled with a strong expansion of employment in producer services (in rate) and in social services (in size), while other service activities are still kept as sources of employment. A second, different path more closely links manufacturing and producer services, more cautiously increases social services employment, and maintains distributive services. The variation within this second path is between Japan, with a greater agricultural and retail trade population, and Germany with a significantly higher manufacturing employment.

In the process of transformation of the employment structure there is no disappearance of any major service category with the exception of domestic service as compared to 1920. What happens is an increasing diversity of activities, and the emergence of a set of linkages between different activities that makes the employment categories obsolete. Indeed, a postmanufacturing employment structure emerged in the last quarter of the twentieth century, but there was a great deal of variation in the emerging structures of various countries, and it does not seem that great productivity, social stability, and international competitiveness were directly associated with the highest degree of service-related or information-processing jobs. On the contrary, those societies in the G-7 group that have been at the forefront of economic progress and social stability in recent years (Japan and Germany) seem to have developed a more efficient linkage system between manufacturing, producer services, social services, and distributive services than Anglo-Saxon societies, with France and Italy being at the crossroads between the two paths. In all of these societies, informationalization seems to be more decisive than information processing.

Thus, when societies massively destroy manufacturing jobs in a short period of time, instead of gradually phasing the industrial transformation, it is not necessarily because they are more advanced, but because they follow specific policies and strategies that are based in their cultural, social, and political backdrop. And the options taken to conduct the transformation of the national economy and of the labor force have profound consequences for the evolution of the occupational structure that provides the foundations for the new class system of the informational society.

The new occupational structure

A major statement of theories on post-industrialism is that people, besides being engaged in different activities, also hold new positions in the occupational structure. By and large, it was predicted that as we move into what we call the informational society we would observe the increasing importance of managerial, professional, and technical positions, a decreasing proportion of workers in the craft and operator positions, and a swelling in the numbers of clerical and sales workers. In addition, the "left-wing" version of post-industrialism points to the growing importance of semi-skilled (often unskilled) service occupations as a counterpart to the growth of professional jobs.

To examine the accuracy of such predictions in the evolution of the G-7 countries over the past 40 years is not an easy task, both because the statistical categories do not always correspond exactly across countries and because dates for the various available statistics do not always coincide. Thus, in spite of our methodological efforts to clean up the data, our analysis on this point remains rather tentative, and should be taken only as a first empirical approach to suggest lines of analysis on the evolution of the social structure.

First, let us start with the *diversity of the occupational profiles across societies*. Table 4.15 in Appendix A brings together the distribution of the labor force in the main occupational categories for each country at the time of the latest available statistical information when we conducted this study (1992–3). The first and most important conclusion of our observation is that there are very strong differences between the occupational structures of societies equally entitled to be considered as informational. Thus, if we take the category that groups managers, professionals, and technicians, the epitome of the informational occupations, it was indeed very strong in the United States and in Canada, amounting to almost one-third of the labor force in the early 1990s. But in early 1990s Japan it was only 14.9 percent. And in France and Germany in 1989 it was only at about one-quarter of all labor. On the other hand, while crafts and operators have substantially dwindled down in North America, they still represented 31.8 percent of the labor force of Japan, and they were over 27 percent in both France and Germany. Similarly, sales workers were not a major category in France (3.8 percent) but they were still important in the United States (11.9 percent) and truly significant in Japan (15.1 percent). Japan had a very low proportion of managers (only 3.8 percent) in 1990, compared to 12.8 percent in the United States, which could be an indicator of a much more hierarchical structure. France's distinctive feature was the strong component of technicians in the higher professional

groups (12.4 percent of all labor force), in contrast to Germany's 8.7 percent. On the other hand, Germany had many more jobs than France in the "professionals" category: 13.9 against 6.0 percent.

Another factor of diversity is the variation in the proportion of semi-skilled service workers: it was significant in the United States, Canada, and Germany, much lower in Japan and France, precisely the countries that, together with Italy, have preserved somewhat more sizeable traditional agricultural and commercial activities.

Overall, *Japan and the United States represent the opposite ends of the comparison, and their contrast emphasizes the need to recast the theory of post-industrialism and informationalism*. The data on the United States fit well with the predominant model in the literature, very simply because the "model" was but a theorization of the evolution of the US employment structure. Meanwhile, Japan appears to combine an increase in the professional occupations with the persistence of a strong craft labor force, linked to the industrial era, and with the durability of the agricultural labor force and of sales workers that witness the continuity, under new forms, of the occupations characteristic of the pre-industrial era. The US model progresses into informationalism by substituting new occupations for the old ones. The Japanese model does equally progress into informationalism but following a different route: by increasing some of the required new occupations while redefining the content of occupations of a previous era, yet phasing out those positions that become an obstacle to increased productivity (particularly in agriculture). In between these two "models," Germany and France combine elements of both: they are closer to the United States in terms of the professional/managerial occupations, but closer to Japan in the slower decline of craft/operators jobs.

The second major observation refers, in spite of the diversity we have shown, to the existence of a common trend toward the increase of the relative weight of the most clearly informational occupation (managers, professionals, and technicians), as well as of the overall "white-collar" occupations (including sales and clerical workers). Having first established my call for diversity I also want to give empirical credit to the notion that there is indeed a tendency toward a greater informational content in the occupational structure of advanced societies, in spite of their diverse cultural/political system, and in spite also of the different historical moments of their processes of industrialization.

To observe such a common trend, we must concentrate on the growth of each occupation in each country over time. Let us compare for instance (see tables 4.16–4.21 in Appendix A) the evolution of four critical

groups of occupations: craft/operators; technicians, professionals, and managers; sales and clerical workers; farm workers and managers. Calculating the rates of change in share of each occupation and group of occupations, we observe some general trends and some critical differences. The share of the managerial/professional/technical occupations showed strong growth in all countries except France. Crafts and operators declined substantially in the United States, the United Kingdom, and Canada, and moderately in Germany, France, and Japan. Sales and clericals increased moderately their share in the United Kingdom and France and strongly in the four other countries. Farm workers and managers declined substantially in all countries. And semiskilled service and transportation workers presented clearly different trends: they increased their share strongly in the United States and in the United Kingdom; they increased moderately in France; they declined or stabilized in Japan and Germany.

Of all countries considered, Japan was the one that most dramatically upgraded its occupational structure, increasing its share of managers by 46.2 percent in a 20-year period, and the share of its professional/technical labor force by 91.4 percent. The United Kingdom also increased the share of its managers by 96.3 percent, although the increase of its professional/technical workers was much more moderate (5.2 percent). Thus, we observe a great diversity of rates of change in the share of its occupational group in the overall employment structure. There is diversity in rates because there is some degree of convergence toward a relatively similar occupational structure. At the same time, the differences in management style and in the importance of manufacturing in each country also introduce some variation in the process of change.

Overall, the tendency toward a predominantly white-collar labor force skewed toward its higher tier seems to be the general trend (in the United States in 1991, 57.3 percent of the labor force were white collar), with the exceptions of Japan and Germany, whose white-collar labor force still does not exceed 50 percent of total employment. However, even in Japan and Germany, the rates of growth of the informational occupations have been the highest among the various occupational positions; thus, as a trend Japan will count increasingly on a substantial professional labor force, although still holding on to a broader craft and commercial basis than in other societies.

Thirdly, *the widespread argument concerning the increasing polarization of the occupational structure of informational society does not seem to fit with this data set*, if by polarization we mean the simultaneous expansion in equivalent terms of the top and bottom of the occupational scale. If such were the case the managerial–professional–

technical labor force and the semi-skilled service and transport workers would be expanding at similar rates and in similar numbers. Such is clearly not the case. In the United States, semi-skilled service workers have indeed increased their share in the occupational structure but at a lower rate than the managerial/professional labor force, and they only represented 13.7 percent of the labor force in 1991. By contrast, managers, at the top of the scale, increased their share between 1950 and 1991 at a rate much higher than that of the semi-skilled service workers, increasing their number to 12.8 percent of the labor force in 1991, almost at the same level as that of semi-skilled service workers. Even if we add semi-skilled transportation workers, we still reach a mere 17.9 percent of the labor force in 1991, in sharp contrast with the 29.7 percent of the top managerial–professional–technical category. Of course, many jobs among clerical and sales workers, as well as among operators, are also semi-skilled, so that we cannot truly assess the evolution of the occupational structure in terms of skills. Additionally, we know from other sources that *there has been a polarization of income distribution in the United States and in other countries in the past two decades*.[10] However, here I am objecting to the popular image of the informational economy as providing an increasing number of low-level service jobs at a disproportionately higher rate than the rate of increase in the share of the professional/technical component of the labor force. According to this database, this is simply not the case. In the United Kingdom there was, however, a substantial increase in such semi-skilled service jobs between 1961 and 1981, but, even here, the share of the higher occupational level increased faster. In Canada, semi-skilled service workers also increased their share substantially to reach 13.7 percent in 1992 but managerial–professional–technical jobs progressed even more, almost doubling their representation to account for 30.6 percent of the labor force in 1992. A similar pattern can be found in Germany: low-end service jobs remained relatively stable and well below the progression in rate and in size of the upper occupational tier. France, while increasing substantially such service jobs during the 1980s, still counted them only as 7.2 percent of the labor force in 1989. As for Japan, semi-skilled service jobs experienced a slow growth, from 5.4 percent in 1955 to a modest 8.6 percent in 1990.

Thus, while there are certainly signs of social and economic polarization in advanced societies, they do not take the form of divergent paths in the occupational structure, but of different positions of similar occupations across sectors and between firms. Sectoral, territorial,

10 Esping-Andersen (1993); Mishel and Bernstein (1994).

firm-specific, and gender/ethnic/age characteristics are clearer sources of social polarization than occupational differentiation *per se*. Informational societies are certainly unequal societies, but inequalities stem less from their relatively upgraded occupational structure than from the exclusions and discriminations that take place in and around the labor force.

Finally, a view of the transformation of the labor force in advanced societies must also consider the *evolution of its employment status*. Again, the data challenge predominant views of post-industrialism, exclusively based on the American experience. Thus, the hypothesis of the fading away of self-employment in mature, informational economies is somewhat supported by the US experience, where the percentage of self-employment in the total labor force declined from 17.6 percent in 1950 to 8.8 percent in 1991 *although it has been almost at a standstill for the past 20 years*. But other countries present different patterns. Germany declined at a slow, steady pace, from 13.8 percent in 1955 to 9.5 percent in 1975, then to 8.9 percent in 1989. France maintained its share of self-employment in the labor force between 1977 and 1987 (12.8 and 12.7 percent respectively). Italy, while being the fifth largest market economy in the world, still retained 24.8 percent of its labor force in self-employment in 1989. Japan, while experiencing a decline in self-employment from 19.2 percent in 1970 to 14.1 percent in 1990, still has a significant level of such autonomous employment, to which we must add 8.3 percent of family workers, which places almost one-quarter of the Japanese labor force outside salaried work. As for Canada and the United Kingdom, they have reversed the supposed secular pattern of corporatization of employment in the past 20 years, as Canada increased the proportion of self-employed in its population from 8.4 percent in 1970 to 9.7 percent in 1992, and the United Kingdom increased the share of self-employment and family workers in the labor force from 7.6 percent in 1969 to 13.0 percent in 1989: a trend that has continued in the 1990s, as I shall show later in this chapter.

Granted, the majority of the labor force in the advanced economies is under salaried conditions. But the diversity of the levels, the unevenness of the process, and the reversal of the trend in some cases calls for a differential view of the patterns of evolution of the occupational structure. We could even formulate the hypothesis that as networking and flexibility become characteristic of the new industrial organization, and as new technologies make it possible for small business to find market niches, we witness a resurgence of self-employment and mixed employment status. Thus, the occupational profile of the informational societies, as they emerge historically, will be far more diverse

than that imagined by the quasi-naturalistic vision of post-industrial theories biased by an American ethnocentrism which did not fully represent even the American experience.

The maturing of the informational society: employment projections into the twenty-first century

The informational society, in its historically diverse manifestations, began to take shape in the twilight of the twentieth century. Thus, an analytical clue for its future direction and mature profile could be provided by employment and occupational projections that forecast the social structure of advanced societies into the early years of the twenty-first century. Such projections are always subject to a number of economic, technological, and institutional assumptions that are hardly established on solid ground. Thus, the status of the data that I shall be using in this section is even more tentative than the analysis of the employment trends up to 1990. Yet, by using reliable sources, such as the US Bureau of Labor Statistics, the Japanese Ministry of Labor, and government data compiled by OECD, and by keeping in mind the approximative nature of the exercise, we may be able to generate some hypotheses on the future path of informational employment.

My analysis of employment projections will be mainly focused on the United States and Japan because I want to keep within limits the empirical complexity of the study in order to be able to focus on the main argument of my analysis.[11] Thus, by pinpointing the United States and Japan, which appear to be two different models of the informational society, I can better assess the hypotheses on the convergence and/or divergence of the informational society's employment and occupational structure.

For the United States, the US Bureau of Labor Statistics (BLS) published in 1991–3 a series of studies, updated in 1994,[12] that together offer a meaningful overview of the evolution of employment and occupational structure between 1990–2 and 2005. To simplify the analysis, I shall refer to the "moderative alternative projection" of the three scenarios considered by the Bureau.

The American economy is projected to create over 26 million jobs between 1992 and 2005. That is a total increase of 22 percent, slightly

11 For employment projections concerning other OECD countries, see OECD (1994a: 71–100).

12 See Carey and Franklin (1991); Kutscher (1991); Silvestri and Lukasiewicz (1991); Braddock (1992); Bureau of Labor Statistics (1994).

higher than the increase in the previous 13-year period, 1979–92. The most apparent features in the projections are the continuation of the trend toward the decline of agricultural and manufacturing jobs, which in 1990–2005 would decline, respectively, at an average annual rate of −0.4 and −0.2. However, manufacturing output would continue to grow at a slightly higher rate than the economy as a whole, at 2.3 percent per year. Thus the differential growth rate between employment and output in manufacturing and in services shows a substantial gap in labor productivity in favor of manufacturing, in spite of the introduction of new technologies in information-processing activities. Higher than average manufacturing productivity continues to be the key to sustained economic growth able to provide jobs for all other sectors in the economy.

An interesting observation comes from the fact that, although employment in agriculture would decline, to a low 2.5 percent of total employment, agriculture-related *occupations* are expected to grow: this is because, while farmers are expected to decrease by 231,000, an increase of 311,000 jobs for gardeners and groundskeepers is expected: the surpassing of farming jobs by urban-oriented agricultural service jobs underlines how far informational societies have come in their post-agricultural status.

Although only 1 million of the projected 26.4 million new jobs are expected to be created in the goods-producing industries, decline in manufacturing employment is expected to slow down, and some occupational categories in manufacturing, such as precision production, craft, and repair, are actually expected to increase. Yet the bulk of new job growth in the United States is expected to take place in "service activities." About half of such growth is expected to be contributed by the so-called "services division," whose main components are *health services* and *business services*. Business services, which were the fastest-growing service sector in 1975–90, will continue to be at the top of the expansion through 2005, although with a slower growth rate of about 2.5 percent per year. One should be aware, though, that not all business services are knowledge intensive: an important component of them are computer data-processing jobs, but *in the 1975–90 period the fastest growing activity was personnel supply services, linked to the increase of temporary work and of contracting-out services by firms*. Other fast-growing services in the coming years are expected to be legal services (particularly para-legal), engineering and architectural services, and educational services (private schools). In the BLS categories, finance, insurance, and real estate (FIRE) are not included in business services. Thus, to the strong growth in business services we must add the moderate but steady growth projected for

this FIRE category, expected to be at about 1.3 percent per year, to reach 6.1 percent of total employment by 2005. When comparing these data with my analysis of "producer services" in the preceding sections, both business services and FIRE should be taken into consideration.

Health services will be among the fastest growing activities, at a rate twice as fast as its own increase for the 1975–90 period. By 2005, health services are projected to account for 11.5 million jobs, that is 8.7 percent of all non-farm wage and salary employment. To put this figure into perspective, the comparable number for all manufacturing employment in 2005 is projected to be 14 percent of the labor force. Home health-care services, particularly for the elderly, will be the fastest growing activity.

Retail trade, growing at a healthy 1.6 percent average annual rate, and starting from a high level in absolute numbers of jobs, represents the third major source of potential new growth, with 5.1 million new jobs. Within this sector, eating and drinking places will account for 42 percent of total jobs in retail in 2005. State and local government jobs will also add to employment in sizeable numbers, rising from 15.2 million in 1990 to 18.3 million by 2005. More than half of this increase is expected to take place in education. Thus, overall, the projected employment structure for the United States closely fits the original blueprint for the informational society:

- agricultural jobs are being phased out;
- manufacturing employment will continue to decline, although at a lower pace, being reduced to a hard core of the craft and engineering workforce. Most of the employment impact of manufacturing production will be transferred to services for manufacturing;
- producer services, as well as health and education, lead employment growth in terms of rate, also becoming increasingly important in terms of absolute numbers;
- retail jobs and service jobs continue to swell the ranks of low-skilled activities of the new economy.

If we now turn to examine the projected occupational structure, at first sight the hypothesis of informationalism seems to be confirmed: the fastest-growing rates among occupational groups are those of professionals (32.3 percent for the period) and technicians (36.9 percent). But "service occupations," mostly semi-skilled, are also growing fast (29.2 percent) and they will still represent 16.9 percent of the occupational structure in 2005. Altogether, managers, professionals, and technicians will increase their share of total occupational employment from

24.5 percent in 1990 to 28.9 percent in 2005. Sales and clerical workers, taken as a group, will remain stable at about 28.8 percent of total employment. Craft workers will actually increase their share, confirming the tendency to stabilize a hard core of manual workers around craft skills.

Let us examine more closely this argument: is the future informational society characterized by an increasing polarization of occupational structure? In the case of the United States, the Bureau of Labor Statistics included in its projections an analysis of the educational level required for the 30 occupations that were expected to grow most rapidly and for the 30 occupations that were expected to decline fastest between 1990 and 2005. The analysis considered both the rate of growth or decline of the occupations and their variation in absolute numbers. The conclusion of the authors of the study is that "in general, a majority of the [growing] occupations require education or training beyond high school. In fact, more than 2 out of 3 of the 30 fastest growing occupations, and nearly half of the 30 with the largest number of jobs added had a majority of workers with education or training beyond high school in 1990."[13] The largest job declines, on the other hand, are expected in manufacturing industries, and in some clerical jobs that will be swept away by office automation, generally in the lower tier of skills. Yet at the aggregate level of new jobs being created in the 1992–2005 period Silvestri foresees only modest changes in the distribution of the educational level of the labor force.[14] The proportion of workers who are college graduates is projected to increase by 1.4 percentage points, and the proportion of those with some college education will increase slightly. Conversely, the proportion of high school graduates decreases by 1 percentage point and the proportion of the lowest educated decreases slightly. Thus, some trends point to an upgrading of the occupational structure, in line with the predictions of post-industrial theory. However, on the other hand, the fact that high-skill occupations tend to grow faster does not mean that society at large necessarily avoids polarization and dualism, because of the relative weight of unskilled jobs when they are counted in absolute numbers. BLS projections for 1992–2005 show that the shares of employment for professionals and for service workers are expected to increase approximately by the same amount, about 1.8 and 1.5 percentage points respectively. Since these two groups account together for about half of total job growth, in absolute numbers they do tend to concentrate jobs at both ends of the occupational ladder: 6.2 million

13 Silvestri and Lukasiewicz (1991: 82).
14 Silvestri (1993).

new professional workers, and 6.5 million new service workers, whose earnings in 1992 were about 40 percent below the average for all occupational groups. As Silvestri writes, "part of the reason [for lower earnings of service workers] is that almost a third of these employees had less than a high school education and twice as many worked part-time than the average for all workers."[15] Trying to provide a synthetic vision of projected changes in the occupational structure, I calculated a simplified stratification model on the basis of the detailed data provided by another study by Silvestri concerning distribution of employment by occupation, education, and earnings, for 1992 (actual data) and 2005 (projection).[16] Using median weekly earnings as a most direct indicator of social stratification, I constructed four social groups: upper class (managers and professionals); middle class (technicians and craft workers); lower middle class (sales, clerical, and operators); and lower class (service occupations and agricultural workers). Recalculating Silvestri's data under these categories, I found for the upper class an increase in its share of employment from 23.7 percent in 1992 to 25.3 percent in 2005 (+1.6); a slight decline for the middle class, from 14.7 to 14.3 percent (−0.3); a decline for the lower middle class, from 42.7 percent to 40.0 percent (−2.7); and an increase for the lower class, from 18.9 to 20 percent (+1.1). Two facts deserve comment: on the one hand, there is at the same time relative upgrading of the stratification system and a moderate trend toward occupational polarization. This is because there are simultaneous increases at both the top and the bottom of the social ladder, although the increase at the top is of greater magnitude.

Let us now turn to examine the projections on the Japanese employment and occupational structure. We have two projections, both from the Ministry of Labor. One of them, published in 1991, projects (on the basis of the 1980–85 data) to 1989, 1995, and 2000. The other, published in 1987, projects to 1990, 1995, 2000, and 2005. Both project the employment structure by industry and occupational structure. I have chosen to elaborate on the basis of the 1987 projection because, while being equally reliable, it is more detailed in its breakdown by industries and reaches out to 2005.[17]

The most significant feature of these projections is the slow decline of manufacturing employment in Japan in spite of the acceleration of the transformation of Japan into an informational society. In the 1987 statistical projection, manufacturing employment stood at 25.9

15 Silvestri (1993: 85).
16 Silvestri (1993: table 9).
17 Ministry of Labor (1991).

percent in 1985 and was projected to remain at 23.9 percent of total employment in 2005. As a reminder, in the US projection, manufacturing employment was expected to decline from 17.5 percent in 1990 to 14 percent in 2005, a much sharper decline from a substantially lower base. Japan achieves this relative stability of manufacturing jobs by compensating declines in the traditional sectors with actual increases in the newest sectors. Thus, while employment in textiles will decline from 1.6 percent in 1985 to 1.1 percent in 2005, in the same period employment in electrical machinery will increase from 4.1 to 4.9 percent. Metalworkers will decline substantially, but jobs in the food processing industry will jump from 2.4 to 3.5 percent.

Overall, the most spectacular increase in employment in Japan is projected to be in business services (from 3.3 percent in 1985 to 8.1 percent in 2005), thus showing the increasing role of information-intensive activities in the Japanese economy. However, the employment share of activities in financial, insurance and real estate is projected to remain stable for the 20-year period of the projection. Coupled with the preceding observation, this seems to imply that these rapidly growing business services are, mainly, services to manufacturing and to other services; that is, services which input knowledge and information into production. Health services are projected to grow slightly, and education employment is expected to remain at the same share as in 1985. On the other hand, agricultural employment is expected to decline sharply, from 9.1 percent in 1985 to 3.9 percent in 2005, as if Japan had finally assumed its transition to the post-agricultural (not post-industrial) age. In general terms, with the exception of business services and agriculture, the Japanese employment structure is projected to remain remarkably stable, verifying again this gradual transition to the informational paradigm, reworking the content of existing jobs into the new paradigm without necessarily phasing out such jobs.

As for the occupational structure, the most substantial change projected is an increase in the share of professional and technical occupations, which will grow from 10.5 percent in 1985 to a staggering 17 percent in 2005. On the other hand, managerial occupations, while growing significantly in their share, will grow at a slower rate, and will still represent less than 6 percent of total employment in 2005. This will confirm the tendency toward the reproduction of the lean hierarchical structure of Japanese organizations with power concentrated in the hands of a few managers. The data also seem to indicate the increase in the professionalization of middle-level workers and the specialization of tasks in information processing and knowledge generation. Crafts and operators are expected to decline, but will still represent over one-quarter of the labor force in 2005, about 3 per-

centage points ahead of the corresponding occupational categories for the United States at the same date. Clerical workers are also expected to increase at a moderate rate, while farming occupations will be reduced by about two-thirds in relation to their 1985 level.

Thus, the projections of the employment structure of the United States and Japan seem to continue the trends observed for the 1970–90 period. These are clearly two different employment and occupational structures corresponding to two societies which can be equally labeled informational in terms of their socio-technical paradigm of production, yet with clearly distinct performances in productivity growth, economic competitiveness, and social cohesion. While the United States appears to be emphasizing its tendency to move away from manufacturing jobs, and to concentrate in both producer and social services, Japan is maintaining a more balanced structure, with a strong manufacturing sector and a wide cushion of retail service activities. Japanese emphasis on business services is significantly less concentrated in finance and real estate, and the expansion of employment in social services is also more limited. The projections of the occupational structure confirm different styles of management, with Japanese organizations establishing cooperative structures at the shopfloor and office level while at the same time continuing to concentrate decision-making into a leaner managerial rank. Overall, the general hypothesis of diverse paths to the informational paradigm within a common pattern of employment structure seems to be confirmed by the limited test offered by the projections presented here.

Summing up: the evolution of employment structure and its implications for a comparative analysis of the informational society

The historical evolution of employment structure, at the roots of social structure, has been dominated by the secular trend toward the increasing productivity of human labor. As technological and organizational innovations have allowed men and women to put out more and better product with less effort and resources, work and workers have shifted from direct production to indirect production, from cultivation, extraction, and fabrication to consumption services and management work, and from a narrow range of economic activities to an increasingly diverse occupational universe.

But the tale of human creativity and economic progress throughout history has been often told in simplistic terms, thus obscuring the understanding not only of our past but of our future. The usual version of this process of historical transition as a shift from agriculture, to

industry, then to services, as an explanatory framework for the current transformation of our societies, presents three fundamental flaws:

1 It assumes homogeneity between the transition from agriculture to industry and that from industry to services, overlooking the ambiguity and internal diversity of the activities included under the label of "services."
2 It does not pay enough attention to the truly revolutionary nature of new information technologies, which, by allowing a direct, online linkage between different types of activity in the same process of production, management, and distribution, establish a close, structural connection between spheres of work and employment artificially separated by obsolete statistical categories.
3 It forgets the cultural, historical, and institutional diversity of advanced societies, as well as the fact that they are interdependent in a global economy. Thus, the shift to the socio-technical paradigm of informational production takes place along different lines, determined by the trajectory of each society and by the interaction between these various trajectories. It follows a diversity of employment/occupational structures within the common paradigm of the informational society.

Our empirical observation of the evolution of employment in the G-7 countries shows some fundamental common features which seem indeed to be characteristic of informational societies:

- the phasing out of agricultural employment;
- the steady decline of traditional manufacturing employment;
- the rise of both producer services and social services, with the emphasis on business services in the first category, and health services in the second group;
- the increasing diversification of service activities as sources of jobs;
- the rapid rise of managerial, professional, and technical jobs;
- the formation of a "white-collar" proletariat, made up of clerical and sales workers;
- the relative stability of a substantial share of employment in retail trade;
- the simultaneous increase of the upper and lower levels of the occupational structure;
- the relative upgrading of the occupational structure over time, with an increasing share of those occupations that require higher skills and advanced education proportionally higher than the increase of the lower-level categories.

It does not follow that societies at large are upgraded in their skills, education, or income status, nor in their stratification system. The impact of a somewhat upgraded employment structure into the social structure will depend on the ability of the institutions to incorporate the labor demand into the labor force and to reward workers proportionally to their skills. On the other hand, the analysis of the differential evolution of the G-7 countries clearly shows some variation in their employment and occupational structures. At the risk of oversimplifying, we can propose the hypothesis of two different informational models:

1 The *service economy model*, represented by the United States, the United Kingdom, and Canada. It is characterized by a decline in the share of manufacturing employment in overall employment after 1970, as the pace toward informationalism accelerated. Having already eliminated almost all agricultural employment, this model emphasizes an entirely new employment structure where the differentiation among various service activities becomes the key element to analyze social structure. This model emphasizes capital management services over producer services, and keeps expanding the social service sector because of a dramatic rise in healthcare jobs and, to a lesser extent, in education employment. It is also characterized by the expansion of the managerial category which includes a considerable number of middle managers.
2 The *industrial production model*, clearly represented by Japan and to a considerable extent by Germany, which, while reducing also the share of their manufacturing employment, continues to keep it at a relatively high level (around one-quarter of the labor force) in a much more gradual movement that allows for the restructuring of manufacturing activities into the new socio-technical paradigm. Indeed, this model reduces manufacturing jobs while reinforcing manufacturing activity. Partly as a reflection of this orientation, producer services are much more important than financial services, and they seem to be more directly linked to manufacturing firms. This is not to say that financial activities are not important in Japan and Germany: after all, eight of the world's ten largest banks are Japanese. Yet, while financial services are indeed important and have increased their share in both countries, the bulk of service growth is in services to companies, and in social services. However, Japan is also specific in showing a significantly lower level of employment in social services than other informational societies. This is probably linked to the structure of the Japanese family and to the internalization of some social services into the

structure of the firms: a cultural and institutional analysis of the variegations of employment structure seems to be a necessity to account for the diversity of informational societies.

In between, France seems to be leaning toward the service economy model, but maintaining a relatively strong manufacturing basis and emphasizing both producer and social services. The close linkage between the French and the German economies in the European Union is probably creating a division of labor between management and manufacturing activities that could ultimately benefit the German component of the emerging European economy. Italy characterizes itself as keeping almost one-quarter of employment in self-employed status, perhaps introducing a third model that would emphasize a different organizational arrangement, based on networks of small and medium businesses adapted to the changing conditions of the global economy, thus laying the ground for an interesting transition from proto-industrialism to proto-informationalism.

The different expressions of such models in each one of the G-7 countries are dependent upon their position in the global economy. In other words, for a country to be focused on the service economy model means that other countries are exercising their role as industrial production economies. The implicit assumption of post-industrial theory that the advanced countries would be service economies and the less advanced countries would specialize in agriculture and manufacturing has been rejected by historical experience. Throughout the world, many economies are quasi-subsistence economies, while agricultural and industrial activities that thrive outside the informational core do so on the basis of their close connection to the global economy, dominated by the G-7 countries. Thus, the employment structure of the United States and of Japan reflect their different forms of articulation to the global economy, and not just their degree of advancement in the informational scale. The fact that there is a lower proportion of manufacturing jobs or a higher proportion of managers in the United States is partly due to the offshoring of manufacturing jobs by US firms, and to the concentration of management and information-processing activities in the United States at the expense of production activities generated in other countries by US consumption of these countries' products.

Furthermore, different modes of articulation to the global economy are not only due to different institutional environments and economic trajectories, but to different government policies and firms' strategies. Thus, the observed trends can be reversed. If policies and strategies can modify the service and industrial mix of a given economy it means that the variations of the informational paradigm are as important as

its basic structure. It is a socially open, politically managed paradigm, whose main common feature is technological.

As economies rapidly evolve toward their integration and interpenetration, the resulting employment structure will largely reflect the position of each country and region in the interdependent, global structure of production, distribution, and management. Thus, the artificial separation of social structures by institutional boundaries of different nations (the United States, Japan, Germany, and so on) limits the interest of analyzing the occupational structure of the informational society in a given country in isolation from what happens in another country whose economy is so closely interrelated. If Japanese manufacturers produce many of the cars consumed by the American market and many of the chips consumed in Europe, we are not just witnessing the demise of American or British manufacturing, but the impact on the employment structure of each country of the division of labor among different types of informational societies.

The implications of such an observation for the theory of informationalism are far-reaching: the unit of analysis to comprehend the new society will necessarily have to change. The focus of the theory must shift to a comparative paradigm able to explain at the same time the sharing of technology, the interdependence of the economy, and the variations of history in the determination of an employment structure spread across national boundaries.

Is There a Global Labor Force?

If there is a global economy, there should be a global labor market and a global labor force.[18] Yet, as with many such obvious statements, taken in its literal sense it is empirically wrong and analytically misleading. While capital flows freely in the electronic circuits of global financial networks, labor is still highly constrained, and will be for the foreseeable future, by institutions, culture, borders, police, and xenophobia. However, international migrations are on the rise, in a long-term trend that contributes to transforming the labor force, although in terms more complex than those presented by the notion of a global labor market.

Let us examine the empirical trends. A 1993 ILO estimate put at about 1.5 percent of the global labor force (that is, 80 million immigrant workers) the number of persons working outside their country, with half of them concentrated in Sub-Saharan Africa and the Middle

18 Johnston (1991).

East.[19] This seems to underestimate the extent of global migration, particularly taking into consideration the acceleration of migration in the 1990s. In a comprehensive study of migration dynamics on the global scale, the leading expert on the matter, Douglas Massey and his co-authors have shown the intensification of labor mobility in all regions of the world, and in most countries.[20] However, trends vary in time and space. In the European Union, the proportion of foreign population increased from 3.1 percent in 1982 to 4.5 percent in 1990 (see table 4.22 in Appendix A), but while it increased significantly in Germany, Austria, and Italy, the proportion of foreign-born residents actually decreased in the UK and in France. Concerning mobility within the European Union, in spite of the free movement of their citizens in the member countries, only 2 percent of their nationals worked in another European Union country in 1993, a proportion unchanged for ten years.[21] The percentage of foreign labor in the total labor force in Britain was 6.5 percent in 1975, and 4.5 percent in 1985–7; in France, it went down from 8.5 to 6.9 percent; in Sweden from 6 to 4.9 percent; and in Switzerland from 24 to 18.2 percent.[22] In the early 1990s, because of social disruption in Eastern Europe (mainly in Yugoslavia), political asylum increased the number of immigrants, particularly in Germany. Overall, in the European Union it was estimated that in the early 1990s the total foreign population of non-European citizens amounted to about 13 million, of which about one-quarter was undocumented.[23] The proportion of foreigners in the total population, for the five largest countries of the European Union in 1994, only surpassed 5 percent in Germany; it was actually lower than in 1986 in France; and it was only slightly over the 1986 level in the UK.[24] The situation changed in the late 1990s, as Eastern European migrations intensified in Germany, Austria, Switzerland, and Italy, and African migrants made their way into southern Europe. A relatively new phenomenon was massive illegal immigration particularly from Eastern Europe, often organized by criminal smuggler rings, and including thousands of enslaved women for the profitable prostitution traffic in the civilized Western European countries. In 1999 the number of illegal immigrants into the European Union was estimated at about 500,000 per year, with their main points of destination being Germany, Austria, Switzerland, and Italy (see volume III, chapter 3). Be-

19 Campbell (1994).
20 Massey et al. (1999).
21 *Newsweek* (1993).
22 Sources collected and elaborated by Soysal (1994: 23); see also Stalker (1994).
23 Soysal (1994: 22).
24 *The Economist* (Feb 20, 1999: 45).

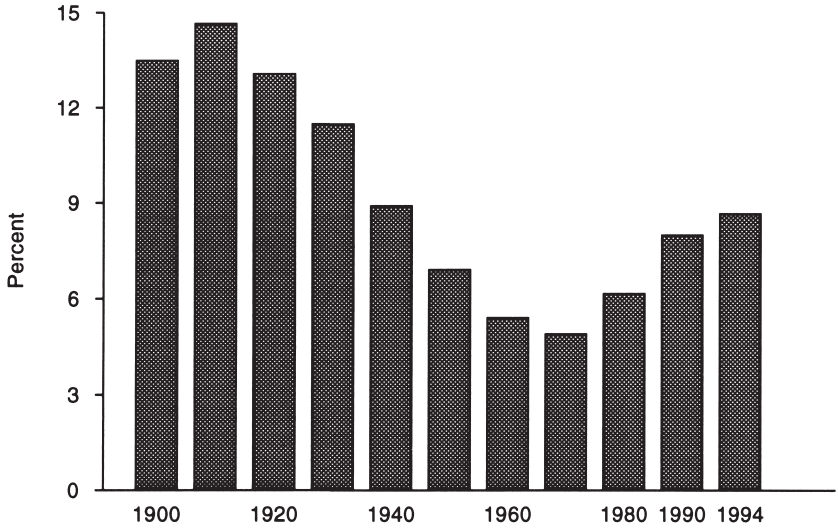

Figure 4.1 Percentage of the United States' population that is foreign-born, 1900–1994
Source: US Bureau of the Census

cause of its restrictive naturalization laws, Germany reached the level of about 10 percent of foreigners in its population, to which should be added undocumented residents. As for the United States, where a significant new wave of immigration did indeed occur during the 1980s and 1990s (about 1 million new immigrants per year in the 1990s), it was always an immigrant society, and current trends are in a line of long-term, historical continuity (see figure 4.1).[25] What has changed, in both contexts, is the ethnic and cultural composition of immigration, with a decreasing proportion of immigrants of European stock in America, and with a higher proportion of African, Asian, and Muslim immigrants in European countries. What is also happening is that because of differential birth rates between the native population and the residents and citizens of immigrant origin, affluent societies are becoming more ethnically diverse (figure 4.2). The visibility of immigrant workers, and their descendants, has increased because of their concentration in the largest metropolitan areas and in a few regions.[26] As a result of both features, in the 1990s ethnicity and cultural diversity became a major social problem in Europe, a new issue in Japan,

25 Borjas et al. (1991); Bouvier and Grant (1994); Stalker (1994).
26 Machimura (1994); Stalker (1994).

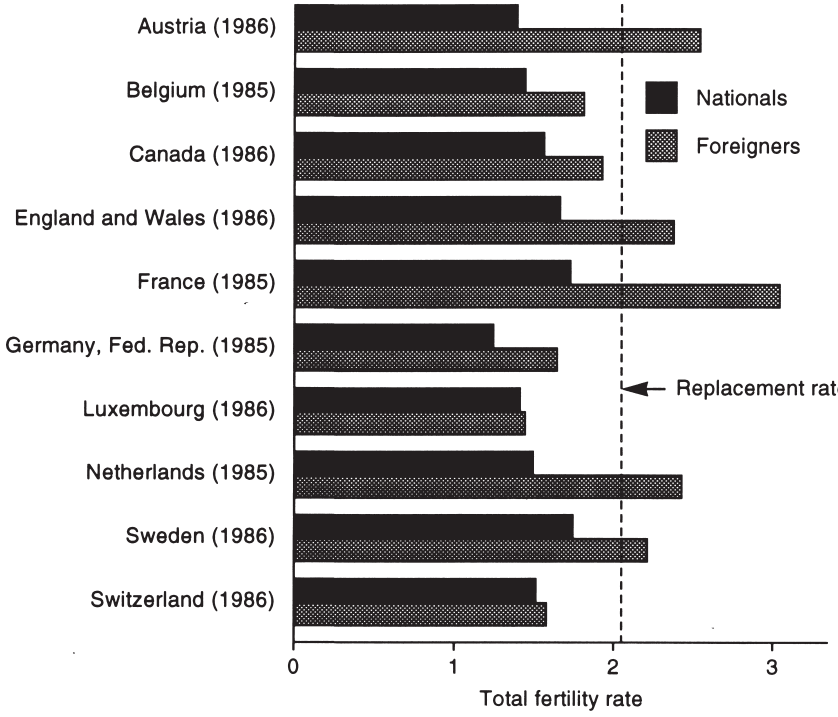

Figure 4.2 Total fertility rates for nationals and foreigners in selected OECD countries
Source: SOPEMI/OECD, elaborated by Stalker (1994)

and continued to be, as they always were, at the top of the American agenda. Massey and his co-authors have also shown the growing role of migrations in Asia, Africa, the Middle East, and Latin America. Overall, the UNDP's *Human Development Report* estimated in 1999 that worldwide there were between 130 and 145 million legal immigrant workers, up from 84 million in 1975, to which many more millions of undocumented workers should be added.[27] Yet, this is still a small fraction of the global labor force, and while immigrant workers are an increasingly important component in the labor market of many countries, particularly in the United States, Canada, Australia, Switzerland, and Germany, this does not mean that the labor force has become global. There is indeed a global market for a tiny fraction of the labor force, concerning the highest-skilled professionals in innovative

27 UNDP (1999).

R&D, cutting-edge engineering, financial management, advanced business services, and entertainment, who shift and commute between nodes of the global networks that control the planet.[28] Yet while this integration of the best talent in the global networks is critical for the commanding heights of the informational economy, the overwhelming proportion of labor, in developed as well as in developing countries, remains largely nation-bound. Indeed, for two-thirds of workers in the world, employment still means agricultural employment, rooted in the fields, usually in their region.[29] Thus, in the strictest sense, with the exception of the highest level of knowledge generators/symbol manipulators (whom I call below the *networkers*, *commanders*, and *innovators*), there is not, and will not be in the foreseeable future, a unified global labor market, in spite of emigration flows to OECD countries, to the Arabian peninsula, and to the metropolitan centers in the Asian Pacific. More important for movements of people are massive displacements of population because of war and hunger.

However, there is an historical tendency toward increasing interdependence of the labor force on a global scale, through three mechanisms: global employment in the multinational corporations and their associated cross-border networks; impacts of international trade on employment and labor conditions, both in the North and in the South; and effects of global competition and of the new mode of flexible management on each country's labor force. In each case, information technology is the indispensable medium for the linkages between different segments of the labor force across national boundaries.

As stated in chapter 2, foreign direct investment has become the driving force of globalization, more significant than trade as a conductor of trans-border interdependence.[30] The most significant agents of the new pattern of foreign direct investment are multinational corporations and their associated networks: together they organize the core labor force in the global economy. The number of multinational firms increased from 7,000 in 1970 to 37,000 in 1993, with 150,000 affiliates around the world, and to 53,000 with 415,00 affiliates in 1998. Although they employed directly "only" 70 million workers in 1993, these workers produced one-third of the world's total private output. The global value of their sales in 1992 was US$5,500 billion, a figure 25 percent greater than the total value of world trade. The labor force located in different countries depends on the division of labor between distinct functions and strategies of these multinational networks. Thus, most of the labor

28 Johnston (1991).
29 ILO (1994).
30 Tyson et al. (1988); Bailey et al. (1993); UNCTAD (1993, 1994).

force does not circulate in the network, but becomes dependent on the function, evolution, and behavior of other segments in the network. This results in a process of hierarchical, segmented interdependence of the labor force, under the impulse of relentless movements by firms in the circuits of their global network.

The second major mechanism of global labor interdependence concerns the impacts of trade on employment, both in the North and in the South.[31] On the one hand, the combination of North-bound exports, foreign direct investment, and growth of domestic markets in the South has triggered a gigantic wave of industrialization in some developing countries.[32] Simply accounting for the direct impact of trade, Wood[33] estimates that between 1960 and 1990 20 million manufacturing jobs have been created in the South. In Guandong province's Pearl River Delta alone, between 5 and 6 million workers were hired in factories in semi-rural areas between the mid-1980s and the mid-1990s.[34] But while there is agreement on the significance of the new process of industrialization triggered in Asia and Latin America by the new outward orientation of developing economies, an intense debate has raged on the actual impact of trade on employment and labor conditions in OECD countries. The White Paper of the Commission of European Communities (1994) considered global competition to be a significant factor in the rise of unemployment in Europe. In sharp contrast, the 1994 employment study of the OECD secretariat rejects this relationship, arguing that imports from industrializing countries account for only 1.5 percent of total demand in the OECD area. Some noted economists, such as Paul Krugman and Robert Lawrence,[35] have proposed empirical analyses according to which the impact of trade on employment and wages in the United States is very small. Yet their analysis has been submitted to serious criticism, both methodological and substantive, by Cohen, Sachs and Shatz, and Mishel and Bernstein, among others.[36] Indeed, the complexity of the new global economy is not easily captured by traditional trade and employment statistics. UNCTAD and the ILO estimate that intra-firm trade represents the equivalent of about 32 percent of world trade. Such exchanges do not take place through the market, but are internalized (through ownership) or quasi-internalized (through networks).[37] It is this kind of trade

31 Mishel and Bernstein (1993); Rothstein (1993).
32 Patel (1992); ILO (1993, 1994); Singh (1994).
33 Wood (1994).
34 Kwok and So (1995).
35 Krugman (1994a); Krugman and Lawrence (1994).
36 See, for instance, Cohen (1994); Mishel and Bernstein (1994).
37 Bailey et al. (1993); UNCTAD (1993); Campbell (1994).

that affects the labor force in OECD countries most directly. Subcontracting of services by companies around the globe, using telecommunications linkages, further integrates the labor force without displacing it or trading its output. But even using standard trade statistics, it seems that the impact of trade on the labor force has been underestimated by some economic analyses. Perhaps a balanced view of this matter is the empirical study by Adrian Wood on the impact of trade on employment and inequality between 1960 and 1990.[38] According to his calculations (which revise, on the basis of a sound methodological critique, usual estimates), skilled workers in the North greatly benefited from global trade on two grounds: first, they took advantage of higher economic growth brought about by increased trade; secondly, the new international division of labor gave their firms, and themselves, a comparative advantage in higher value-added products and processes. On the other hand, unskilled workers in the North suffered considerably because of the competition with producers in lower-cost areas. Wood estimates that overall demand for unskilled labor was reduced by 20 percent. When government and firms could not change the conditions of labor contracts, as in the European Union, unskilled labor became too costly with reference to commodities traded with newly industrializing countries. Unemployment of unskilled labor followed, which was, by comparative standards, too expensive for its low skills. Because skilled workers, by contrast, were still in demand, wage inequality surged in the OECD area.

Yet the new international division of labor theory that underlies the analyses of the differential impact of trade and globalization on the labor force relies on an assumption that has been questioned by empirical observation of production processes in newly industrializing areas, namely the persistence of a productivity gap between workers and factories in the South and the North. The pioneering research by Harley Shaiken on American automobile and computer plants and on Japanese consumer electronic plants in northern Mexico shows that the productivity of Mexican workers and factories is comparable to that of American plants.[39] Mexican production lines are not at a lower technological level than those in the United States either in process (CAM manufacturing) or products (engines, computers), yet they operate at a fraction of the cost north of the Rio Grande. In another typical example of new labor interdependence, Bombay and Bangalore have become major subcontractors of software for companies around the globe, using the work of thousands of highly skilled Indian engin-

38 Wood (1994).
39 Shaiken (1990).

eers and computer scientists who receive about 20 percent of the wage paid in the United States for similar jobs.[40] Similar trends were taking place in finance and business services in Singapore, Hong Kong, and Taipei.[41] In sum, the more the process of economic globalization deepens, the more the interpenetration of networks of production and management expands across borders, and the closer the links become between the conditions of the labor force in different countries, placed at different levels of wages and social protection, but decreasingly distinct in terms of skills and technology.

Thus, a wide range of opportunities opens up for companies in advanced capitalist countries, concerning their strategies toward labor, both skilled and unskilled. They can:

- downsize the firm, keeping the indispensable highly skilled labor force in the North, and importing inputs from low-cost areas; or,
- subcontract part of the work to their transnational establishments and to the auxiliary networks whose production can be internalized in the network enterprise system; or,
- use temporary labor, part-time workers, or informal firms as suppliers in the home country; or,
- automate or relocate tasks and functions for which the standard labor market prices are considered too high *vis-à-vis* alternative formulae; or,
- obtain from their labor force, including the core labor force, acquiescence to more stringent conditions of work and pay as a condition for the continuation of their jobs, thus reversing social contracts established under circumstances more favorable for labor.

In the real world, this range of possibilities translates into the actual use of all of them, depending upon firms, countries, and periods of time. Thus, although global competition may not affect directly the majority of the labor force in OECD countries, its indirect effects entirely transform the condition of labor and labor institutions everywhere.[42] Furthermore, the alignment of labor conditions across countries does not take place only because of competition from low-cost areas: it also forces Europe, America, and Japan to converge. The pressures toward greater flexibility of the labor market and toward the reversal of the welfare state in Western Europe come less from the pressures derived from East Asia than from the comparison with the

40 Balaji (1994).
41 Tan and Kapur (1986); Fouquin et al. (1992); Kwok and So (1995).
42 Rothstein (1994); Sengenberger and Campbell (1994).

United States.[43] It will become increasingly difficult for Japanese firms to continue life employment practices for the privileged 30 percent of its labor force if they have to compete in an open economy with American companies practicing flexible employment (see chapter 3).[44] Lean production, downsizing, restructuring, consolidation, and flexible management practices are induced and made possible by the intertwined impact of economic globalization and diffusion of information technologies. The indirect effects of such tendencies on the conditions of labor in all countries are far more important than the measurable impact of international trade or cross-border direct employment.

Thus, while there is not a unified global labor market, and therefore not a global labor force, there is indeed global interdependence of the labor force in the informational economy. Such interdependence is characterized by the hierarchical segmentation of labor not between countries but across borders.

The new model of global production and management is tantamount to the simultaneous integration of work process and disintegration of the workforce. This model is not the inevitable consequence of the informational paradigm but the result of an economic and political choice made by governments and companies selecting the "low road" in the process of transition to the new, informational economy, mainly using productivity increases for short-term profitability. These policies contrast sharply, in fact, with the possibilities of work enhancement and sustained, high productivity opened up by the transformation of the work process under the informational paradigm.

The Work Process in the Informational Paradigm

The maturation of the information technology revolution in the 1990s has transformed the work process, introducing new forms of social and technical division of labor. It took the 1980s for micro-electronics-based machinery to fully penetrate manufacturing, and it was only in the 1990s that networked computers widely diffused throughout the information-processing activities at the core of the so-called services sector. By the mid-1990s the new informational paradigm, associated with the emergence of the network enterprise, was well in place and set for its unfolding.[45]

There is an old and honorable tradition of sociological and organ-

43 Navarro (1994b).
44 NIKKEIREN (1993); Joussaud (1994).
45 For a documented view of developments in the diffusion of information technology in the workplace up to 1995, see *Business Week* (1994a, 1995a).

izational research on the relationship between technology and work.[46] Thus, we know that technology *per se* is not the cause of the work arrangements to be found in the workplace. Management decisions, systems of industrial relations, cultural and institutional environments, and government policies are such fundamental sources of labor practices and production organization that the impact of technology can only be understood in complex interaction within a social system comprising all these elements. Furthermore, the process of capitalist restructuring decisively marked the forms and outcomes of introducing information technologies into the work process.[47] The means and ways of this restructuring were also diverse depending upon countries' technological capability, political culture, and labor traditions. Thus, the new informational paradigm of work and labor is not a neat model but a messy quilt, woven from the historical interaction between technological change, industrial relations policy, and conflictive social action. To find patterns of regularity behind this confusing scene, we must have the patience to abstract successive layers of social causation, to first deconstruct, then reconstruct the emerging pattern of work, workers, and labor organization that characterize the new, informational society.

Let us start with information technology. Mechanization first, automation later, have been transforming human labor for decades, always triggering similar debates around issues of workers' displacement, deskilling versus reskilling, productivity versus alienation, management control versus labor autonomy.[48] To follow a French "*filière*" of analysis over the past half-century, Georges Friedmann criticized "*le travail en miettes*" (piecemeal work) of the Taylorist factory; Pierre Naville denounced the alienation of workers under mechanization; Alain Touraine, on the basis of his pioneering sociological study in the late 1940s on the technological transformation of Renault factories, proposed his typology of work processes as A/B/C (craft, assembly line, and innovation work); Serge Mallet announced the birth of "a new working class" focused on the capacity to manage and operate advanced technology; and Benjamin Coriat analyzed the emergence of a post-Fordist model in the labor process, on the basis of linking up flexibility and integration in a new model of relationships between production and consumption. At the end of this intellectual itinerary, impressive on many grounds, one fundamental idea emerges: automation, which received its full meaning only with the deployment of

46 For a review of relevant literature, see Child (1986); see also Burawoy (1979); Noble (1984); Buitelaar (1988); Appelbaum and Schettkat (1990).
47 Shaiken (1985); Castano (1994a).
48 Hirschhorn (1984).

information technology, increases dramatically the importance of human brain input into the work process.[49] While automated machinery, and later computers, have indeed been used for transforming workers into second-order robots, as Braverman argued,[50] this is not the corollary of technology, but of a social organization of labor that stalled (and still does) the full utilization of the productive capacity generated by the new technologies. As Harley Shaiken, Maryellen Kelley, Larry Hirschhorn, Shoshana Zuboff, Paul Osterman, and others have shown in their empirical work, the broader and deeper the diffusion of advanced information technology in factories and offices, the greater the need for an autonomous, educated worker able and willing to program and decide entire sequences of work.[51] Notwithstanding the formidable obstacles of authoritarian management and exploitative capitalism, information technologies call for greater freedom for better-informed workers to deliver the full promise of their productivity potential. The networker is the necessary agent of the network enterprise made possible by new information technologies.

In the 1990s several factors accelerated the transformation of the work process: computer technology, network technologies, the Internet, and its applications, progressing by quantum leaps, became increasingly cheaper and better, thus being affordable and manageable on a large scale; global competition triggered a technology/management race between companies all over the world; organizations evolved and adopted new shapes that were generally based on flexibility and networking; managers, and their consultants, finally understood the potential of new technology and how to use it, although more often than not they constrained such potential within the limits of the old set of organizational goals (such as a short-term increase of profits calculated on a quarterly basis).

The massive diffusion of information technologies has caused rather similar effects in factories, offices, and service organizations.[52] These effects are not, as was forecast, the shift toward indirect work at the expense of direct work which would become automated. On the contrary, the role of direct work has increased because information technology has empowered the direct worker at the shopfloor level (be it in the process of testing chips or underwriting insurance policies). What *tends* to disappear through integral automation are the routine,

49 Touraine (1955); Friedmann (1956); Friedmann and Naville (1961); Mallet (1963); Pfeffer (1998); Coriat (1990).

50 Braverman (1973).

51 Hirschhorn (1984); Japan Institute of Labour (1985); Shaiken (1985, 1993); Kelley (1986, 1990); Zuboff (1988); Osterman (1999). For a discussion of the literature, see Adler (1992); for a comparative approach, see Ozaki et al. (1992).

52 Quinn (1988); Bushnell (1994).

repetitive tasks that can be precoded and programmed for their execution by machines. It is the Taylorist assembly line that becomes an historic relic (although it is still the harsh reality for millions of workers in the industrializing world). It should not be surprising that information technologies do precisely that: replace work that can be encoded in a programmable sequence and enhance work that requires analysis, decision, and reprogramming capabilities in real time at a level that only the human brain can master. Every other activity, given the extraordinary rate of progress in information technology and its constant lowering in price per information unit, is potentially susceptible to automation, and thus the labor engaged in it is expendable (although workers as such are not, depending upon their social organization and political capacity).

The informational work process is determined by the characteristics of the informational production process. Keeping in mind the analyses presented in previous chapters on the informational, global economy, and on the network enterprise as its organizational form, this process can be summarized as follows:

1 Value added is mainly generated by innovation, both of process and products. New designs of chips, new software-writing, largely condition the fate of the electronics industry. The invention of new financial products (for example, the creation of the "derivatives market" on the stock exchanges during the late 1980s) are at the roots of the boom (however risky) of financial services, and of the prosperity (or collapse) of financial firms, and of their clients.
2 Innovation is itself dependent upon two conditions: research potential and specification capability. That is, new knowledge has to be discovered, then applied to specific purposes in a given organizational/institutional context. Custom design was critical for micro-electronics in the 1990s; instant reaction to macro-economic changes is fundamental in managing the volatile financial products created in the global market.
3 Task execution is more efficient when it is able to adapt higher-level instructions to their specific application, and when it can generate feedback effects into the system. An optimum combination of worker/machine in the execution of tasks is set to automate all standard procedures, and to reserve human potential for adaptation and feedback effects.
4 Most production activity takes place in organizations. Since the two main features of the predominant organizational form (the network enterprise) are internal adaptability and external flexibility, the two key features for the work process will be: the ability to

generate flexible strategic decision-making; and the capacity to achieve organizational integration between all elements of the production process.

5 Information technology becomes the critical ingredient of the process of work as described because:

- it largely determines innovation capability;
- it makes possible the correction of errors and generation of feedback effects at the level of execution;
- it provides the infrastructure for flexibility and adaptability throughout the management of the production process.

This specific production process introduces a *new division of labor* that characterizes the emerging informational paradigm. The new division of labor can be better understood by presenting a typology constructed around three dimensions. *The first dimension refers to the actual tasks performed in a given work process. The second dimension concerns the relationship between a given organization and its environment, including other organizations. The third dimension considers the relationship between managers and employees in a given organization or network. I call the first dimension value-making, the second dimension relation-making, and the third dimension decision-making.*

In terms of *value-making*, in a production process organized around information technology (be it goods production or service delivery), the following fundamental tasks, and their corresponding workers, can be distinguished:

- strategic decision-making and planning by the *commanders*;
- innovation in products and process by the *researchers*;
- adaptation, packaging, and targeting of innovation by the *designers*;
- management of the relationships between the decision, innovation, design, and execution, taking into consideration the means available to the organization to achieve the stated goals, by the *integrators*;
- execution of tasks under their own initiative and understanding by the *operators*;
- execution of ancillary, preprogrammed tasks that have not been, or cannot be, automated, by what I dare to call the "*operated*" (or human robots).

This typology must be combined with another referring to the need

and capacity of each task (and its performer) to link up with other workers in real time, be it within the same organization or in the overall system of the network enterprise. According to this relational capacity we may distinguish between three fundamental positions:

- the *networkers*, who set up connections on their initiative (for example, joint engineering with other departments of companies), and navigate the routes of the network enterprise;
- the *networked*, workers who are on-line but without deciding when, how, why, or with whom;
- the *switched-off* workers, tied to their own specific tasks, defined by non-interactive, one-way instructions.

Finally, in terms of the capacity to input the *decision-making process* we can differentiate between:

- the *deciders*, who make the decision in the last resort;
- the *participants*, who are involved in decision-making;
- the *executants*, who merely implement decisions.

The three typologies do not coincide, and the difference in the relational dimension or in the decision-making process can occur, and indeed does in practice, at all levels of the value-making structure.

This construction is not an ideal type of organization, or some futuristic scenario. It is a synthetic representation of what seems to be emerging as the main task-performing positions in the informational work process, according to empirical studies on the transformation of work and organizations under the impact of information technologies.[53] Yet my argument is certainly not that all or most work processes and workers in our society can be reduced to these typologies. Archaic forms of socio-technical organization do survive, and will for a long, long time remain in many countries, in the same way as pre-industrial, handicraft forms of production were combined with mechanization of industrial production for an extended historical period. But it is critical to distinguish the complex and diverse forms of work and workers in our observation from the emerging patterns of production and management that, because they are rooted in a dynamic socio-technical system, will tend to become dominant through the dynamics of competition and demonstration effects. My hypothesis is

53 See, among others, Hartmann (1987); Wall et al. (1987); Buitelaar (1988); Hyman and Streeck (1988); ILO (1988); Carnoy (1989); Mowery and Henderson (1989); Wood (1989); Dean et al. (1992); Rees (1992); Tuomi (1999).

that the work organization sketched in this analytical scheme represents the emerging informational work paradigm. I shall illustrate this emerging paradigm by referring briefly to some case studies on the impacts of computer-aided manufacturing and office automation on work, in order to make somewhat concrete the analytical construction I have proposed.

Thus, Harley Shaiken in 1994 studied the practice of so-called "high performance work organization" in two up-to-date American automobile factories: the GM–Saturn complex on the outskirts of Nashville, Tennessee, and the Chrysler Jefferson North Plant on the east side of Detroit.[54] Both are cases of successful, highly productive organizations which have integrated the most advanced computer-based machinery in their operation, and have simultaneously transformed the organization of work and management. While acknowledging differences between the two plants, Shaiken points to the critical factors accounting for high performance in both of them, on the basis of new technological tools. The first is the high level of skills of an experienced industrial labor force, whose knowledge of production and products was critical to modifying a complex process when necessary. In order to develop these skills, at the heart of the new work system there is regular work training on special courses outside the plant and on the job. Saturn workers spend 5 percent of their annual working time in training sessions, most of them in the work development center, a facility adjacent to the plant.

The second factor fostering high performance is increased worker autonomy, as compared to other factories, allowing for shopfloor cooperation, quality circles, and feedback from workers in real time during the production process. Both plants organize production in work teams, with a flat occupational classification system. Saturn had eliminated the position of first line supervisor, and Chrysler was moving in the same direction. Workers are able to work with considerable freedom, and are encouraged to increase formal interaction in the performance of their tasks.

Workers' involvement in the upgraded process is dependent on two conditions that were met in both factories: job security and labor union participation in negotiating and implementing the reorganization of work. The building of the new Chrysler plant in Detroit was preceded by a "modern operating agreement," emphasizing managerial flexibility and workers' input. Of course, this is not an ideal world, exempt from social conflicts. Shaiken observed the existence of tensions, and potential sources of labor disputes, between labor and

54 Shaiken (personal communications, 1994, 1995); see also Shaiken (1995).

management, as well as between the local union (increasingly behaving as a factory union, in the case of Saturn), and the United Auto Workers leadership. Yet the nature of the informational work process calls for cooperation, teamwork, workers' autonomy and responsibility, without which new technologies cannot be used to their full potential. The networked character of informational production permeates the whole firm, and requires constant interaction and processing of information between workers, between workers and management, and between humans and machines.

As for office automation, it has gone through three different phases, largely determined by available technology.[55] In the first phase, characteristic of the 1960s and 1970s, mainframe computers were used for batch processing of data; centralized computing by specialists in data-processing centers formed the basis of a system characterized by the rigidity and hierarchical control of information flows; data entry operations required substantial efforts since the goal of the system was the accumulation of large amounts of information in a central memory; work was standardized, routinized, and, in essence, deskilled for the majority of clerical workers, in a process analyzed, and denounced, by Braverman in his classic study.[56] The following stages of automation, however, were substantially different. The second phase, in the early 1980s, was characterized by the emphasis on the use of microcomputers by the employees in charge of the actual work process; although they were supported by centralized databases, they interacted directly in the process of generating information, although often requiring the support of computer experts. By the mid-1980s, the combination of advances in telecommunications, and the development of microcomputers, led to the formation of networks of workstations and literally revolutionized office work, although the organizational changes required for the full use of new technology delayed the widespread diffusion of the new model of automation until the 1990s. In this third phase of automation, office systems were integrated and networked, with multiple microcomputers interacting among themselves and with mainframes, forming an interactive web that is capable of processing information, communicating, and making decisions in real time.[57] Interactive information systems, not just computers, are the basis of the automated office, and of the so-called "alternative officing" or "virtual offices," networking tasks performed in distant locations. There might be a fourth phase of office automation brewing up in the tech-

55 Zuboff (1988); Dy (1990).
56 Braverman (1973).
57 Strassman (1985).

nological cauldrons of the turn of the century: the mobile office, performed by individual workers provided with portable, powerful information processing/transmitting devices.[58] If it does develop, as seems likely, it will enhance the organizational logic I have described under the concept of the network enterprise, and it will deepen the process of transformation of work and workers along the lines proposed in this chapter.

The effects of these technological changes on office work are not yet fully identified, because empirical studies, and their interpretation, are running behind the fast process of technological change. However, during the 1980s, a number of doctoral students at Berkeley, whose work I followed and supervised, were able to produce a number of detailed monographs documenting the trends of change that seem to be confirmed by the evolution in the 1990s.[59] Particularly revealing was the doctoral dissertation by Barbara Baran on the impact of office automation on the work process in some large insurance companies in the United States.[60] Her work, as well as other sources, showed a tendency for firms to automate the lower end of clerical jobs, those routine tasks that, because they can be reduced to a number of standard steps, can be easily programmed. Also, data entry was decentralized, gathering the information and entering it into the system as close as possible to the source. For instance, sales accounting is now linked to scanning and storage at the cashier's point-of-sale machine. ATMs (automated teller machines) constantly update bank accounts. Insurance claims are directly stored in memory with regard to all elements that do not call for a business judgment, and so on. The net result of these trends is the possibility of eliminating most mechanical, routine clerical work. On the other hand, higher-level operations are concentrated in the hands of skilled clerical workers and professionals, who make decisions on the basis of the information they have stored in their computer files. So, while at the bottom of the process there is increasing routinization (and thus automation), at the middle level there is reintegration of several tasks into an informed decision-making operation, generally processed, evaluated, and performed by a team made up of clerical workers with increasing autonomy in making decisions. In a more advanced stage of this process of reintegration of tasks, middle managers' supervision also disappears, and controls and safety procedures are standardized in the computer. The critical linkage then

58 Thach and Woodman (1994).

59 Particularly, I relied on work performed for their doctoral dissertations at Berkeley by Lionel Nicol (1985), Carol Parsons (1987), Barbara Baran (1989), Penny Gurstein (1990), and Lisa Bornstein (1993).

60 Baran (1989).

becomes the one between professionals, evaluating and making decisions on important matters, and informed clerks making decisions on day-to-day operations on the basis of their computer files and their networking capabilities. Thus the third phase of office automation, instead of simply rationalizing the task (as was the case in batch-processing automation) rationalizes the process, because the technology allows the integration of information from many different sources and its redistribution, once processed, to different, decentralized units of execution. So, instead of automating discrete tasks (such as typing, calculating), the new system rationalizes an entire procedure (for example, new business insurance, claims processing, underwriting), and then integrates various procedures by product lines or segmented markets. Workers are then functionally reintegrated instead of being organizationally distributed.

A similar trend has been observed by Hirschhorn in his analyses of American banks, and by Castano in her study of Spanish banking.[61] While routine operations have been increasingly automated (ATMs, telephone information services, electronic banking), the remaining bank clerks are increasingly working as sales persons, to sell financial services to customers, and as controllers of the repayment of the money they sell. In the United States the federal government plans to automate tax and social security payments by the end of the century, thus extending a similar change of the work process to public sector agencies.

However, the emergence of the informational paradigm in the work process does not tell the whole story of labor and workers in our societies. The social context, and particularly the relationship between capital and labor according to specific decisions by the management of firms, drastically affects the actual shape of the work process and the consequences of the change for workers. This was particularly true during the 1980s when the acceleration of technological change went hand in hand with the process of capitalist restructuring, as I have argued above. Thus, the classic study by Watanabe [62] on the impact of the introduction of robots into the automobile industry in Japan, the United States, France, and Italy, showed substantially different impacts of a similar technology in the same industry: in the United States and Italy, workers were displaced, because the main goal of introducing new technology was to reduce labor costs; in France, job loss was lower than in the two other countries because of government policies to cushion the social impacts of modernization; and in Japan, where

61 Hirschhorn (1985); Castano (1991).
62 Watanabe (1986).

companies were committed to life-tenured employment, employment actually increased, and productivity shot up, as a result of retraining and higher teamwork effort which increased the competitiveness of firms and took market share away from their American counterparts.

Studies conducted on the interaction between technological change and capitalist restructuring during the 1980s also showed that more often than not technologies were introduced, first of all, to save labor, to subdue unions, and to trim costs, rather than to improve quality or to enhance productivity by means other than downsizing. Thus, another of my former students, Carol Parsons, studied in her Berkeley doctoral dissertation the socio-technological restructuring of metalworking and garment industries in America.[63] In the metalworking sector, among the firms surveyed by Parsons, the most-often cited purpose for the introduction of technology was the reduction of direct labor. Furthermore, instead of retooling their factories, firms often closed plants that were unionized and opened new ones, generally without a union, even if firms did not change region for their new location. As a result of the restructuring process, employment fell substantially in all metalworking industries, with the exception of office equipment. In addition, production workers saw their relative numbers reduced *vis-à-vis* managers and professionals. Within production workers there was a polarization between craft workers and unskilled laborers, with assembly-line workers being substantially squeezed by automation. A similar development was observed by Parsons in the garment industry in relation to the introduction of micro-electronics-based technology. Direct production workforce was rapidly being phased out, and the industry was becoming a dispatching center connecting the demand of the American market with manufacturing suppliers all over the world. The net result was a bipolar labor force composed of highly skilled designers and telecommunicating sales managers on the one hand, and low-skilled, low-paid manufacturing workers, located either offshore or in American, often illegal, domestic sweatshops. This is a strikingly similar model to the one I described in chapter 3 for Benetton, the worldwide knitwear networked firm, considered to be the epitome of flexible production.

Eileen Appelbaum[64] found similar trends in the insurance industry, whose dramatic technological changes I have described above on the basis of Barbara Baran's work. Indeed, the story concerning technological innovation, organizational change, and work reintegration in the insurance industry must be completed with the observation of

63 Parsons (1987).
64 Appelbaum (1984).

massive layoffs and underpayment of skilled work in the same industry. Appelbaum links the process of rapid technological change in the insurance industry to the impact of deregulation and global competition in the financial markets. As a result, it became critical to ensure the mobility of capital and the versatility of labor. Labor was both trimmed and reskilled. Unskilled data entry jobs, where ethnic minority women were concentrated, were projected to be all but eliminated by automation by the end of the century. On the other hand, the remaining clerical positions were reskilled, by integrating tasks into multi-skilled, multi-functional jobs susceptible to greater flexibility and adaptation to the changing needs of an increasingly diversified industry. Professional jobs were also polarized between less-skilled tasks, taken on by upgraded clerical workers, and highly specialized tasks that generally required college education. These occupational changes were specified by gender, class, and race: while machines mainly replaced ethnic minority, less-educated women at the bottom of the scale, educated, mainly white women began replacing white men in the lower professional positions, yet for lower pay and reduced career prospects than those which men used to have. Multi-skilling of jobs and individualization of responsibility were often accompanied by ideologically tailored new titles (for example, "assistant manager" instead of "secretary"), thus enhancing the potential for commitment of clerical workers without correspondingly increasing their professional rewards.

Thus, new information technology is redefining work processes, and workers, and therefore employment and occupational structure. While a substantial number of jobs are being upgraded in skills, and sometimes in wages and working conditions in the most dynamic sectors, a large number of jobs are being phased out by automation in both manufacturing and services. These are generally jobs that are not skilled enough to escape to automation but are expensive enough to be worth the investment in technology to replace them. Increasing educational qualifications, either general or specialized, required in the reskilled positions of the occupational structure further segregate the labor force on the basis of education, itself a highly segregated system because it roughly corresponds institutionally to a segregated residential structure. Downgraded labor, particularly in the entry positions for a new generation of workers made up of women, ethnic minorities, immigrants, and young people, is concentrated in low-skill, low-paid activities, as well as in temporary work and/or miscellaneous services. The resulting bifurcation of work patterns and polarization of labor is not the necessary result of technological progress or of inexorable evolutionary trends (for example, the rise of the "post-industrial society" or of the "service economy"). It is socially determined and managerially

designed in the process of the capitalist restructuring taking place at the shopfloor level, within the framework and with the help of the process of technological change at the roots of the informational paradigm. Under these conditions, work, employment, and occupations are transformed, and the very notion of work and working time may be changed for ever.

The Effects of Information Technology on Employment: Toward a Jobless Society?

The diffusion of information technology in factories, offices, and services has reignited a centuries-old fear by workers of being displaced by machines, thus becoming irrelevant for the productivist logic that still dominates our social organization. While the Information Age version of the Luddite movement that terrorized English industrialists in 1811 has not appeared yet, increasing unemployment in Western Europe in the 1980s and 1990s prompted questions about the potential disruption of labor markets, and therefore of the whole social structure, by the massive impact of labor-saving technologies.

The debate on this question has raged over the past decade, and is far from generating a clear-cut answer.[65] On the one hand, it is argued that historical experience shows the secular transfer from one kind of activity to another as technological progress replaces labor with more efficient tools of production.[66] Thus, in Britain, between 1780 and 1988 the agricultural labor force was reduced by half in absolute numbers, and fell from 50 to 2.2 percent of the total labor force; yet productivity per capita increased by a factor of 68, and the increase in productivity allowed for the investment of capital and labor in manufacturing, then in services, so as to employ an increasing population. The extraordinary rate of technological change in the American economy during the twentieth century also massively displaced labor from agriculture, but the number of total jobs created by the US economy climbed from about 27 million in 1900 to 133 million in 1999. On this view, most traditional manufacturing jobs will know the same fate as agricultural jobs, but new jobs are being created, and will be created, in high-technology manufacturing (see table 4.23 in Appendix A) and, more significantly, in "services."[67] As evidence of

65 For a balanced and thorough analysis of unemployment trends in the 1980s and 1990s, see Freeman and Soete (1994).

66 Jones (1982); Lawrence (1984); Cyert and Mowery (1987); Hinrichs et al. (1991); Bosch et al. (1994); Commission of the European Communities (1994); OECD (1994b).

67 OECD (1994b).

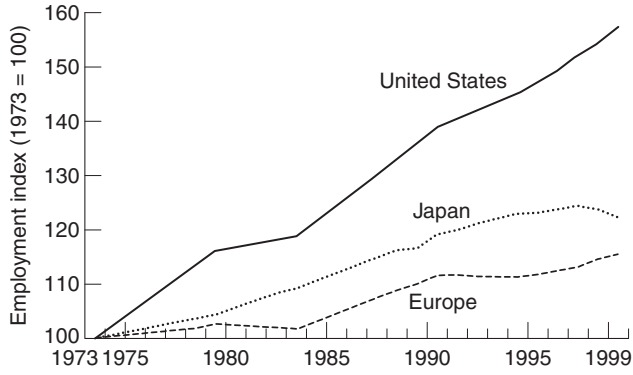

Figure 4.3 Index of employment growth by region, 1973–1999
Source: Data from OECD, compiled and elaborated by Carnoy (2000)

the continuity of this technical trend, it is easy to point to the experience of the most technologically advanced industrial economies, Japan and the United States: they are precisely the ones which created most jobs during the 1980s and 1990s.[68] According to the 1994 White Paper of the European Commission on *Growth, Competitiveness, and Employment*, between 1970 and 1992, the US economy grew in real terms by 70 percent, and employment by 49 percent. Japan's economy grew by 173 percent, and its employment by 25 percent, while the European Community's economy grew by 81 percent, but with an employment increase of only 9 percent.[69] And what the Commission does not say is that almost all of this new employment was created by the public sector: private employment creation in the European Community remained at a standstill during the 1980s. In the 1990s, the gap in employment creation between Europe, on the one hand, and the US, and Japan increased (see figure 4.3). Indeed, between 1975 and 1999 the United States created about 48 million new jobs and Japan 10 million. On the other hand, the European Union created only 11 million new jobs in these 24 years, and most of them, until the late 1990s, were in the public sector. Furthermore, between January 1, 1993 and January 1, 2000, the United States created over 20 million new jobs, while the absolute number of jobs in the European Union declined between 1990 and 1996. Moreover, employment started to grow in Europe in 1997–9, at the time when European countries stepped up the diffusion of information technologies in their firms, while pro-

68 OECD *Employment Outlook* (various years).
69 Commission of the European Communities (1994: 141).

ceeding with reforms in those institutional aspects of the labor market that were stalling job creation. In October 1999, for the first time in the decade, the unemployment rate in the European Union as a whole went below the 10 percent mark. Growth employment performance was in fact highly differentiated between European countries: in fact, in 1999, double-digit unemployment existed only in Spain, Italy, France, Germany, Finland, and Belgium, while the other European countries had unemployment rates below 8 percent, and some of them (The Netherlands, Switzerland, Norway) had unemployment rates lower than the United States. The skills profile of the new jobs created was, on average, of a higher level than that of the average skills of the overall labor force. Thus, for the United States, table 4.24 (in Appendix A), elaborated by Martin Carnoy, shows that the proportion of high-wage jobs increased from 24.6 percent in 1960 to 33 percent in 1998, a far greater increase than the often publicized growth of jobs at the bottom of the scale, which went up from 31.6 to 32.4 percent, confirming the decline of the middle, but mainly to the benefit of the top of the occupational scale. A study conducted in 1999 by the US Labor Department on the profile of new jobs created in the 1990s found that a great majority of the new jobs were in occupations that paid more than the national median wage of $13 an hour.[70] According to an OECD study, the variation in percentage in net job creation in 1980–95 for OECD countries, was of 3.3 percent in high-technology sectors, of –8.2 percent in medium-technology sectors, and of –10.9 percent in low-technology sectors.[71] Looking into the future, the 1997 Tregouet report, commissioned by the French Senate's Commission of Finance concluded that "as the information society gains strength, half of the occupations needing to be filled 20 years from now do not yet exist; they will essentially involve adding knowledge and information."[72]

A fundamental feature characterizing the new labor market of the past two decades is the massive incorporation of women into paid work: the rate of participation of women in the labor force for ages 15–64 increased from 51.1 percent in 1973 to 70.7 percent in 1998, for the United States; from 53.2 to 67.8 percent for the UK; from 50.1 to 60.8 percent for France; from 54 to 59.8 percent for Japan; from 50.3 to 60.9 percent for Germany; from 33.4 to 48.7 percent for Spain; from 33.7 to 43.9 percent for Italy; from 63.6 to 69.7 percent for Finland; and from 62.6 to 75.5 percent for Sweden, the country with the largest women's labor force participation rate in the

70 *The New York Times* (December 4, 1999: B14).
71 OECD (1997: 34).
72 Cited by Saussois (1998: 4).

world.[73] Yet the pressure of this substantial increase in labor supply did not create high unemployment in the US and Japan as it did *in some* Western European countries. The US, in the midst of a dramatic technological retooling, registered in November 1999 its lowest unemployment rate in 30 years at 4.1 percent. Japan, in spite of a prolonged recession in the 1990s, was still keeping its unemployment rate below 5 percent, while modifying its traditional pattern of labor relations, as I will discuss below. And The Netherlands, a technologically advanced economy, after modifying its labor institutions, reduced its unemployment rate to about 3 percent by the end of 1999.

Thus, all evidence points to the fact that high unemployment in developed countries was mainly a problem for some (but not all) European countries during the early stages of their transition to the new economy. This problem was mainly caused not by the introduction of new technologies, but by mistaken macro-economic policies and by an institutional environment that discouraged private job creation, while technological innovation and diffusion did not have a direct effect on job creation or destruction, at an aggregate level. Thus, Martin Carnoy elaborated tables 4.25 and 4.26 (see Appendix A) on the basis of OECD data, relating, for 21 countries, various indicators of information technology intensity with employment growth and unemployment in the mid-1990s. According to his calculations, there is no statistically significant relationship between technological diffusion and the evolution of employment in 1987–94. In fact, the only relationship (but not statistically significant) is between the level of IT spending per worker in 1994 and the unemployment rate. But the relationship is negative, indicating the possibility of a positive effect of technology on job creation.[74] As this, and other analyses indicate,[75] institutional variation seems to account for levels of unemployment, while effects of technological levels do not follow a consistent pattern. If any pattern did emerge from international data it would be in the opposite direction of Luddite predictions: higher technological level is generally associated with lower unemployment rate. Critics' objections, such as the argument of discouraged workers who are not counted in unemployment statistics, simply do not stand up to empirical scrutiny. A 1993 OECD study of discouraged workers between 1983 and 1991 evaluated these workers at about 1 percent of the labor force in 1991. When discouraged workers are added to unemployed workers, the unemployment rate in most OECD countries in 1991 would increase

73 OECD, *Employment Outlook* (various years).
74 Carnoy (2000: 2, 26).
75 Freeman and Soete (1994); OECD (1994c).

to about 8 percent. But, under the new calculations, the adjusted rate of unemployment would have fallen anyway in 1997 in the US, the UK, Japan, The Netherlands, Australia, and Canada; that is, the countries which were creating employment under new technological and organizational conditions.[76] But the definitive argument is to calculate the ratio between employment and the population at large for ages 15–64, the working age (see table 4.27). That is, everyone, discouraged or not, in prison or not, is counted in this way. If we proceed along these lines, between 1973 and 1998, in the United States the ratio of employed men over total male population went slightly down from 82.8 to 80.5 percent. But it sky-rocketed for women, climbing from 48 to 67.4 percent. On the other hand, it declined significantly for men in all European countries, in Canada, and Australia, while increasing for women in all countries, in some of them significantly (Canada), or meteorically (The Netherlands, from 28.6 to 59.4 percent). Japan stays in the middle with a clear decline of employment ratio for men, and a moderate increase for women. Thus, on the one hand, the US performance stands the test of the employment ratio/population evolution. On the other hand, what is really going on is a remarkable trend: the substitution of women for men in large segments of the labor market, under conditions, and with modalities, which will be analyzed more thoroughly in volume II, chapter 4.

Yet the prophets of mass unemployment, led by the honorable Club of Rome, argue that such calculations are based on a different historical experience that underestimates the radically new impacts of technologies, whose effects are universal and pervasive because they relate to information processing. Thus, so the argument goes, if manufacturing jobs go the way farmers did, there will not be enough service jobs to replace them because service jobs themselves are being rapidly automated and phased out. They predicted that because this trend was accelerating in the 1990s, mass unemployment would follow.[77] The obvious consequence of this analysis is that our societies would have to choose between massive unemployment, with its corollary, the sharp

76 Carnoy (2000: 2, 26).

77 King (1991); Aznar (1993); Aronowitz and Di Fazio (1994); Rifkin (1995). The most salient characteristic of all these writings announcing the jobless society is that they do not provide any consistent, rigorous evidence for their claims, relying on isolated press clippings, random examples of firms in some countries and sectors, and "commonsense" arguments on the "obvious" impact of computers on jobs. There is no serious analysis to explain, for instance, the high rate of job creation in the United States and Japan, as compared to Western Europe; and hardly any reference to the explosion of employment growth, particularly in manufacturing, in East and South-East Asia. Since most of these writers relate themselves to the "political left," their credibility must be challenged before their unfounded theses lead labor and the political left to a new dead end in the best tradition of ideological self-destructiveness.

division of society between the employed and the unemployed/occasional workers, or else a redefinition of work and employment, opening the way to a full restructuring of social organization and cultural values.

Given the importance of the matter, international institutions, governments, and researchers have made extraordinary efforts to assess the impact of new technologies. Dozens of technically sophisticated studies have been conducted in the past 20 years, particularly during the 1980s, when there was still hope that the data could provide the answer. Reading these studies reveals the difficulty of the search. It is obvious that introducing robots on to an assembly line reduces human working time for a given level of output. But it does not follow that this reduces employment for the firm or even for the industry. If the superior quality and productivity achieved by introducing electronic machinery increased competitiveness, both the firm and the industry would need to increase employment to supply the broader demand resulting from a larger market share. Thus, the question is raised at the level of the nation: the new growth strategy would imply increased competitiveness at the cost of reducing employment in some sectors, while using the surplus thus generated to invest and create jobs in other sectors, such as business services or environmental technology industries. In the last resort, the net employment results will depend on inter-nation competition. Trade theorists would then argue that there is no zero-sum game, since an expansion of global trade will benefit most of its partners by increasing overall demand. According to this line of argument, there would be a potential reduction of employment as a consequence of the diffusion of new information technologies only if:

- expansion in demand does not offset the increase in labor productivity; *and*
- there is no institutional reaction to such a mismatch by reducing working time, not jobs.

This second condition is particularly important. After all, the history of industrialization has shown a long-term increase in unemployment, production, productivity, real wages, profits, and demand, while significantly reducing working time, on the basis of progress in technology and management.[78] Why should it not be the case in the current stage of techno-economic transformation? Why would information technologies be more destructive for overall employment than mecha-

78 OECD (1994c).

nization or automation were during the earlier decades of the twentieth century? Let us check the empirical record.

Facing a plethora of studies on different countries and industries in the 1980s, the International Labour Office commissioned some literature reviews that would indicate the state of knowledge on the relationship between micro-electronics and employment in various contexts. Among these reviews two stand out as well documented and analytical: those by Raphael Kaplinsky[79] and by John Bessant.[80] Kaplinsky emphasized the need to distinguish the findings at eight different levels: process level, plant level, firm level, industry level, region level, sector level, national level, and meta level (meaning the discussion of differential effects related to alternative socio-technical paradigms). After reviewing the evidence for each one of these levels, he concluded:

> Insofar as the individual studies offer any clear statement on the issue, it would appear that the quantitative macro and micro studies are drawn to fundamentally different conclusions. Process and plant level investigations generally seem to point to a significant displacement of labour. On the other hand, national level simulations more often reach the conclusion that there is no significant employment problem on hand.[81]

Bessant dismisses as excessive what he calls the "repeated scares about automation and employment" that have been stated since the 1950s. Then, after closer examination of the study findings, he writes that "it became increasingly clear that the pattern of employment effects associated with microelectronics would vary widely." According to evidence reviewed by Bessant, on the one hand, micro-electronics displaces some jobs in some industries. But, on the other hand, it will also contribute to creating jobs, and it will also modify the characteristics of such jobs. The overall equation must take into consideration several elements at the same time:

> new employment generated by new product industries based on microelectronics; new employment in advanced technologies generated in existing industries; employment displaced by process changes in existing industries; employment displaced in industries whose products are being replaced by those based on microelectronics, such as telecommunications equipment; employment lost through a lack of overall competitiveness caused by non-adoption of microelectronics. All things

79 Kaplinsky (1986).
80 Bessant (1989).
81 Kaplinsky (1986: 153).

> considered, across the whole spectrum the pattern is one of both losses and gains, with overall relatively small change in employment.[82]

Looking at studies of specific countries during the 1980s, the findings are somewhat contradictory although, overall, the same pattern of indetermination seems to emerge. In Japan, a 1985 study of the Japan Institute of Labour, concerning the employment and work effects of new electronic technologies in industries as diverse as automobiles, newspaper, electrical machinery, and software, concluded that "in any of the cases, the introduction of new technologies neither aimed at reducing the size of the work force in practice nor reduced it subsequently."[83]

In Germany, a major research effort, the so-called Meta Study, was commissioned by the Minister of Research and Technology during the 1980s to conduct both econometric and case-study research on the impacts of technological change on employment. Although the diversity of studies included in the research program does not allow a firm conclusion, the synthesis by its authors concluded that it is "the context" that counts for the variation in observed effects. In any case, technological innovation was understood to be an accelerating factor of existing trends in the labor market, rather than its cause. The study forecast that in the short term unskilled jobs would be displaced, although enhanced productivity would probably result in greater job creation in the long term.[84]

In the United States, Flynn analyzed 200 case studies of the employment impacts of process innovations between 1940 and 1982.[85] He concluded that, while process innovations in manufacturing eliminated high-skill jobs and helped to create low-skill jobs, the opposite was true for information processing in offices, where technological innovation suppressed low-skill jobs and created high-skill ones. Thus, according to Flynn, the effects of process innovation were variable, depending upon specific situations of industries and firms. At the industry level, again in the US, the analysis by Levy and co-workers of five industries showed different effects of technological innovation: in iron mining, coal mining, and aluminium, technological change increased output and resulted in higher employment levels; in steel and automobiles, on the other hand, growth of demand did not match reduction of labor per unit of output and job losses resulted.[86] Also in

82 Bessant (1989: 27, 28, 30).
83 Japan Institute of Labour (1985: 27).
84 Schettkat and Wagner (1990).
85 Flynn (1985).
86 Levy et al. (1984).

the United States, the analysis by Miller in the 1980s of the available evidence on the impact of industrial robotics concluded that most of the displaced workers would be reabsorbed into the labor force.[87]

In the UK, the study by Daniel on the employment impacts of technology in factories and offices concluded that there would be a negligible effect. Another study by the London Policy Studies Institute on a sample of 1,200 firms in France, Germany, and the UK estimated that, on average, for the three countries considered, the impact of micro-electronics amounted to a job loss equivalent to, respectively, 0.5, 0.6, and 0.8 percent of annual decrease of employment in manufacturing.[88]

In the synthesis of studies directed by Watanabe on the impacts of robotization in the automobile industry in Japan, the United States, France, and Italy, the total job loss was estimated at between 2 and 3.5 percent, but with the additional caveat of the differential effects I mentioned above, namely the increase in employment in Japanese factories because of their use of micro-electronics to retrain workers and enhance competitiveness.[89] In the case of Brazil, Silva found no effect of technology on employment in the automobile industry, although employment varied considerably depending on the levels of output.[90]

In the study I directed on the impacts of new technologies on the Spanish economy in the early 1980s we found no statistical relationship between employment variation and technological level in the manufacturing and service sectors. Furthermore, a study within the same research program conducted by Cecilia Castano on the automobile and banking industry in Spain found a trend toward a positive association between the introduction of information technology and employment. An econometric study by Saez on the evolution of employment in Spain, by sector in the 1980s, also found a positive statistical relationship between technological modernization and employment gains, due to increased productivity and competitiveness.[91]

Studies commissioned by the International Labour Office on the UK, on the OECD as a whole, and on South Korea seem also to point to the lack of systematic links between information technology and employment.[92] The other variables in the equation (such as the countries' industrial mix, institutional contexts, place in the international division of labor, competitiveness, management policies, and so on) overwhelm, by and large, the specific impact of technology.

87 Office of Technology Assessment (1984, 1986); Miller (1989: 80).
88 Northcott (1986); Daniel (1987).
89 Watanabe (1987).
90 Cited in Watanabe (1987).
91 Castells et al. (1986); Saez et al. (1991); Castano (1994b).
92 Pyo (1986); Swann (1986); Ebel and Ulrich (1987).

Yet the argument has often been advanced that observed trends during the 1980s did not fully represent the extent of the employment impact of information technologies because their diffusion into the whole economy and society was still to come.[93] This forces us to venture on to the shaky ground of projections dealing with two uncertain variables (new information technologies and employment) and their even more uncertain relationship. Nevertheless, there have been a number of fairly sophisticated simulation models that have shed some light on the issues under discussion. One of them is the model built by Blazejczak, Eber, and Horn to evaluate the macro-economics impacts of investment in R&D in the West German economy between 1987 and 2000. They built three scenarios. Only under the most favorable circumstances does technological change increase employment by enhancing competitiveness. Indeed, they conclude that employment losses are imminent unless compensatory demand effects occur, and this demand cannot be generated only by better performance in international trade. Yet according to the projections in their model, "at the aggregate level demand effects do in fact compensate a relevant part of the predicted employment decrease."[94] Thus, it is likely that technological innovation will negatively affect employment in Germany, but at a rather moderate level. Here again, other elements such as macroeconomic policies, competitiveness, and industrial relations seem to be much more important as factors determining the evolution of employment.

In the United States, the most widely cited simulation study was that performed in 1984 by Leontieff and Duchin to evaluate the impact of computers on employment for the period 1963–2000 using a dynamic input–output matrix of the US economy.[95] Focusing on their intermediate scenario, they found that 20 million fewer workers would

93 See, for instance, the apocalyptic prophecies of Adam Schaff (1992). It is surprising, to say the least, to see the credit given in the media to books such as Rifkin (1995), announcing "the end of work," published in a country, the United States, where between 1993 and 1996 over 8 million new jobs were created. A different matter is the quality of and pay for these jobs (although their skills profile was higher than that of overall employment structure). Work and employment are indeed being transformed, as this book tries to argue. But the number of paid jobs in the world, notwithstanding the Western European malaise, linked to institutional factors, is at its highest peak in history and going up. And rates of participation in the labor force by the adult population are increasing everywhere because of the unprecedented incorporation of women into the labor market. To ignore these elementary data is to ignore our society.

94 One of the most systematic efforts at forecasting the economic and employment effects of new technologies was the "Meta Study" conducted in Germany in the late 1980s. The main findings are presented in Matzner and Wagner (1990). See especially the chapter "Sectoral and Macroeconomic Impacts of Research and Development on Employment" in Blazejczak et al. (1990: 231).

95 Leontieff and Duchin (1985).

be required in relation to the number of workers that would have to be employed to achieve the same output while keeping the level of technology constant. This figure, according to their calculations, represented a drop of 11.7 percent in required labor. However, the impact is strongly differentiated among industries and occupations. Services, and particularly office activities, were predicted to suffer greater job losses than manufacturing as a result of massive diffusion of office automation. Clerical workers and managers would see their prospects of employment significantly reduced while those for professionals would increase substantially, and craftsmen and operatives would maintain their relative position in the labor force. The methodology of the Leontieff–Duchin study has, however, been strongly criticized because it relies on a number of assumptions which, on the basis of limited case studies, maximize the potential impact of computer automation while limiting technological change to computers. Indeed, from the vantage point of 2000, we can now assert the failure of Leontieff and Duchin's predictions. But this is not only an empirical observation. The failure was inscripted in the analytical model. As argued by Lawrence, the fundamental flaw in this, and other models, is that they assumed a fixed level of final demand and output.[96] This is precisely what past experience of technological innovation seems to reject as the most likely hypothesis.[97] If the economy does not grow, it is obvious that labor-saving technologies will reduce the amount of working time required. But in the past, rapid technological change has generally been associated with an expansionary trend that, by increasing demand and output, has generated the need for more working time in absolute terms, even if it represents less working time per unit of output. However, the key point in the new historical period is that in an internationally integrated economic system, expansion of demand and output will depend on the competitiveness of each economic unit and on their location in a given institutional setting (also called a nation). Since quality and production costs, the determinants of competitiveness, will largely depend on product and process innovation, it is likely that faster technological change for a given firm, industry, or national economy will result in a higher, not a lower, employment level. This is in line with the findings of Young and Lawson's study on the effect of technology on employment and output in US between 1972 and 1984.[98] In 44 of the 79 industries they examined, the labor-saving effects of new technologies were more than compensated for by

96 Lawrence (1984); Cyert and Mowery (1987).
97 Lawrence (1984); Landau and Rosenberg (1986); OECD (1994b).
98 Young and Lawson (1984).

higher final demand, so that, overall, employment expanded. At the level of national economies, studies on the newly industrialized countries of the Asian Pacific have also shown a dramatic increase in employment, particularly in manufacturing, following the technological upgrading of industries that enhanced their international competitiveness.[99]

In a more analytical vein, reflecting on the empirical findings in different European countries, the intellectual leader of the "regulation school," Robert Boyer, summarized his argument on the matter in several key points:[100]

1 All other variables being constant, technological change (measured by R&D density) improves productivity and obviously reduces the level of employment for any given demand.
2 However, productivity gains can be used to reduce relative prices, thus stimulating demand for a given product. If price elasticities are greater than one, a decline in price parallel to a rise in production will in fact enhance employment.
3 If prices are constant, productivity increases could be converted into real wage or profit increases. Consumption and/or investment will then be higher with stepped-up technological change. If price elasticities are high, employment losses will be compensated by extra demand from both old and new sectors.
4 Yet the critical matter is the right mix between process innovation and product innovation. If process innovation progresses faster, a decline in employment will occur, all other factors being equal. If product innovation leads the pace, then newly induced demand could result in higher employment.

The problem with such elegant economic analyses is always in the assumptions: all other factors are never equal. Boyer himself acknowledges this fact, and then examines the empirical fit of his model, observing, again, a wide range of variation between different industries and countries. While Boyer and Mistral found a negative relationship between productivity and employment for the OECD as a whole in the period 1980–86, a comparative analysis by Boyer on OECD countries identified three different patterns of employment in areas with similar levels of R&D density.[101]

99 Rodgers (1994).
100 Boyer (1990).
101 Boyer (1988b); Boyer and Mistral (1988).

1 In Japan an efficient model of mass production and consumption was able to sustain productivity growth and employment growth, on the basis of enhanced competitiveness.
2 In the United States, there was an impressive rate of job creation, but by concentrating on generating large numbers of low-wage, low-productivity jobs in traditional service activities.
3 In Western Europe, most economies entered a vicious circle: to cope with increased international competition, firms introduced labor-saving technologies, thus increasing output but leveling off the capacity to generate jobs, particularly in manufacturing. Technological innovation does *not* increase employment. Given the European characteristics of what Boyer calls "the mode of regulation" (for example, government economic policies and business strategies on labor and technology), innovation is likely to destroy employment in the European context. Yet innovation is increasingly required by competition.

In fact, the US experience of the 1980s is not representative of what happened in the 1990s, as I mentioned above. Nor was the Japanese experience. So, the necessary correction to Boyer and Mistral's dated study is that in the 1990s, while the largest European economies continued to lag in job creation until 1997, Japan kept a moderate growth of employment, and the US performed at an even higher level, increasing the number of jobs substantially while upgrading their quality – albeit at the price of stagnation of real average wages until 1996. In the late 1990s, after reforming its labor institutions, most European countries were also substantially reducing unemployment. Even Spain, the worse performer in job creation, reduced its unemployment rate from 22 percent in 1996 to 15.3 percent by the end of 1999, at the price of curtailing employment stability for most workers.

The employment study conducted by the OECD secretariat in 1994, after examining historical and current evidence on the relationship between technology and employment, concluded that:

> Detailed information, mainly from the manufacturing sector, provides evidence that technology is creating jobs. Since 1970 employment in high technology manufacturing has expanded, in sharp contrast to stagnation of medium and low technology sectors and job losses in low-skill manufacturing – at around 1% per year. Countries that have adapted best to new technologies and have shifted production and exports to rapidly growing high tech markets have tended to create more jobs. . . Japan realized a 4% increase in manufacturing employment in the 1970s and 1980s compared with a 1.5% increase in the US. Over the same period the European Community, where exports were increasingly spe-

cialized in relatively low-wage, low-tech industries, experienced a 20% drop in manufacturing employment.[102]

In sum, it seems, as a general trend, *that there is no systematic structural relationship between the diffusion of information technologies and the evolution of employment levels in the economy as a whole.* Jobs are being displaced and new jobs are being created, but the quantitative relationship between the losses and the gains varies among firms, industries, sectors, regions, and countries, depending upon competitiveness, firms' strategies, government policies, institutional environments, and relative position in the global economy. The specific outcome of the interaction between information technology and employment is largely dependent upon macro-economic factors, economic strategies, and sociopolitical contexts.[103]

The evolution of the level of employment is not a given, which would result from the combination of stable demographic data and a projected rate of diffusion of information technology. It will largely depend on socially determined decisions on the uses of technology, on immigration policy, on the evolution of the family, on the institutional distribution of working time in the life-cycle, and on the new system of industrial relations.

Thus, information technology *per se* does not cause unemployment, even if it obviously reduces working time per unit of output. But, under the informational paradigm, the kind of jobs change, in quantity, in quality, in the nature of the work being performed, and in the gender of who works where and how. Thus, a new production system requires a new labor force; those individuals and groups unable to acquire informational skills could be excluded from work or downgraded as workers. Also, because the informational economy is a global economy, widespread unemployment concentrated in some segments of the population (for example, French youth) and in some regions (such as Asturias) could indeed become a threat in the OECD area if global competition is unrestricted, and if the "mode of regulation" of capital–labor relations is not transformed.

The hardening of capitalist logic since the 1980s has fostered social polarization in spite of occupational upgrading. This tendency is not irreversible: it can be rectified by deliberate policies aimed at rebalancing the social structure. But left to themselves, the forces of unfettered competition in the informational paradigm will push employment and social structure toward dualization. Finally, the flexibility of labor

102 OECD (1994b: 32).
103 Carnoy (2000).

processes and labor markets induced by the network enterprise, and allowed by information technologies, profoundly affects the social relationships of production inherited from industrialism, introducing a new model of flexible work, and a new type of worker: the flex-timer.

Work and the Informational Divide: Flex-timers

Linda's new working life is not without its drawbacks. Chief among them is a constant cloud of anxiety about finding the next job. In some ways Linda feels isolated and vulnerable. Fearful of the stigma of having been laid off, for example, she doesn't want her last name to appear in this article.

But the freedom of being her own boss makes up for the insecurity. Linda gets to build her schedule around her son's. She gets to pick her own assignments. And she gets to be a pioneer of the new work force.

(*Newsweek*, June 14, 1993: 17)

I began to think that when I get older, if anyone asked what I have done with my life, all I could tell them about was work. I just decided that would have been a big waste, so I broke free.

(Yoshiko Kitani, a 30-year-old business graduate, after quitting her secure job at a Japanese publishing company in Yokohama in 1998, hiring herself out through temporary agencies)

In a job like this [a temp job] it takes a certain time to learn the programs and to get a feel for what you are doing. But by the time you feel you know what you are doing, because the rules are the way they are, your time is up.

(Yoshiko Kitani, 10 months later)[104]

A new specter haunts Europe (not America, and not so much Japan): the emergence of a jobless society under the impact of information technologies in factories, offices, and services. Yet, as is usually the case with specters in the electronic age, in close-up it appears to be more a matter of special effects than a terrifying reality. The lessons of history, current empirical evidence, employment projections in OECD countries, and economic theory do not support these fears in the long term, notwithstanding painful adjustments in the process of transition to the informational paradigm. Institutions and social organizations of work seem to play a greater role than technology in inducing job creation or destruction. However, if technology *per se* does not create

104 Reported by French (1999).

or destroy employment, it does profoundly transform the nature of work and the organization of production. The restructuring of firms and organizations, allowed by information technology and stimulated by global competition, is ushering in a fundamental transformation of work: *the individualization of labor in the labor process*. We are witnessing the reversal of the historical trend of salarization of work and socialization of production that was the dominant feature of the industrial era. The new social and economic organization based on information technologies aims at decentralizing management, individualizing work, and customizing markets, thereby segmenting work and fragmenting societies. New information technologies allow at the same time for the decentralization of work tasks and for their coordination in an interactive network of communication in real time, be it between continents or between floors of the same building. The emergence of lean production methods goes hand in hand with widespread business practices of subcontracting, outsourcing, offshoring, consulting, downsizing, and customizing.

Competition-induced, technology-driven trends toward flexibility underlie the current transformation of working arrangements. In his thorough examination of the emergence of flexible patterns of work, Martin Carnoy differentiates four elements in this transformation.

1 *Working time*: flexible work means work which is not constrained by the traditional pattern of 35–40 hours work per week in a full-time job.
2 *Job stability*: flexible work is task-oriented, and does not include a commitment to future employment.
3 *Location*: while the majority of workers still work regularly at the workplace of their company, an increasing proportion of workers work outside their workplace for part or all of their working time, whether at home, on the move, or in the location of a different company for whom the worker's company subcontracts.
4 *The social contract between employeer and employee*: the traditional contract is/was based on commitment by the employer to workers' well-defined rights, standardized level of compensation, options for training, social benefits, and a predictable career pattern (in some countries based on seniority), while, on the employee's side, it is/was expected that the employee would be loyal to the company, persevere in the job, and have a good disposition to work overtime if necessary – without compensation in the case of managers, with extra pay in the case of production workers.[105]

105 Carnoy (2000).

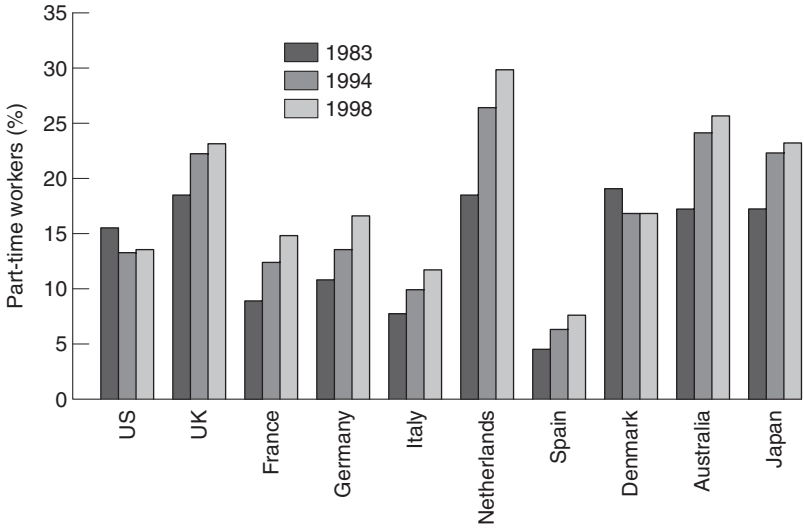

Figure 4.4 Part-time workers in employed labor force in OECD countries, 1983–1998
Source: Data from OECD, compiled and elaborated by Carnoy (2000)

This pattern of employment, that, together with Carnoy, I will call *standard*, is declining around the world, in favor of flexible work, which develops simultaneously along the four dimensions mentioned above. Let us first examine the trends for OECD countries for the 1980s and 1990s, on the basis of OECD data elaborated by Carnoy and displayed in figures 4.4–4.7. Between 1983 and 1998, part-time workers (the large majority of them, women) increased their numbers and their share significantly in all the countries analyzed except in the United States and in Denmark. They represented over 20 percent of the workforce in the UK, Australia, and Japan, and they reached over 30 percent in The Netherlands. The proportion of temporary workers increased in all countries analyzed, with the exception of The Netherlands. In the United States, temporary work was growing but remained at a very low level in 1994, an observation that I will examine in some detail. In Spain there was a substantial growth of temporary employment during the 1990s, to reach about one-third of the workforce in 1994.

Turning to self-employment, the data show a tendency to increase in the proportion of the labor force leaving salaried status in most countries between 1983 and 1993. Different data sources seem to indicate an accentuation of this trend in the late 1990s.[106] The trend was

106 Carnoy (2000); Gallie and Paugham (2000).

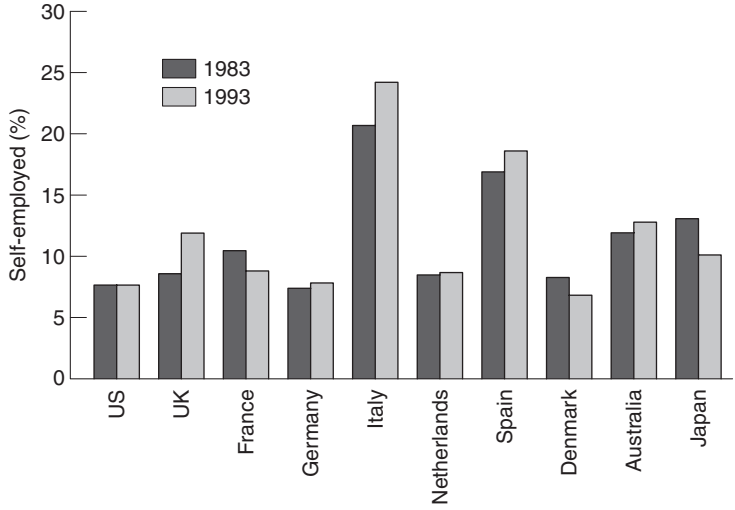

Figure 4.5 Self-employed workers in employed labor force in OECD countries, 1983–1993
Source: Data from OECD, compiled and elaborated by Carnoy (2000)

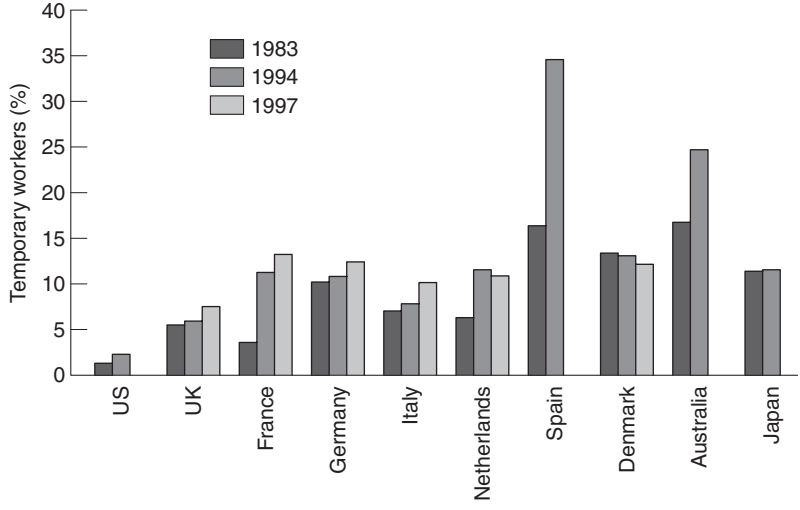

Figure 4.6 Temporary workers in employed labor force in OECD countries, 1983–1997
Source: Data from OECD, compiled and elaborated by Carnoy (2000)

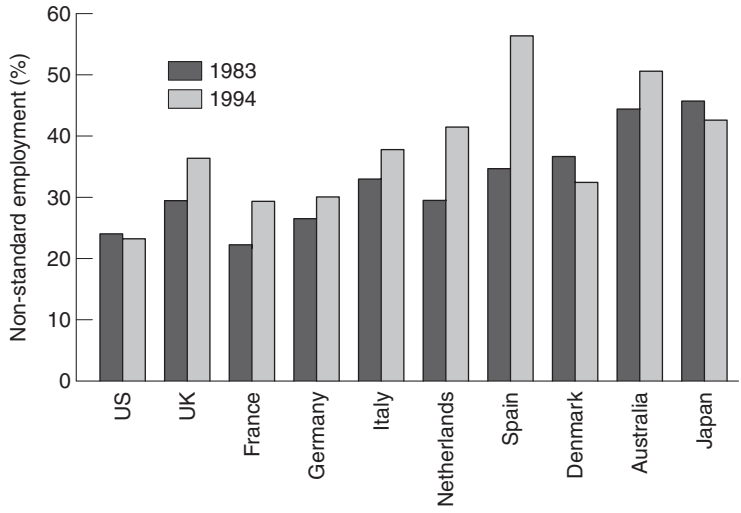

Figure 4.7 Non-standard forms of employment in employed labor force in OECD countries, 1983–1994
Source: Data from OECD, compiled and elaborated by Carnoy (2000)

particularly intense in Italy (reaching almost one-quarter of the labor force), and in the UK, while it was stable, at a low level, in the United States – a counter-intuitive finding, taking into consideration the image of American small business entrepreneurialism.

It appears that economies in various countries try different forms of flexibility in working arrangements, depending on their labor legislation, social security, and tax systems. Thus, it seems analytically useful to proceed, as Martin Carnoy did, combining different forms of non-standard employment in a single measure, while acknowledging partial overlapping of categories which, in any case, does not invalidate comparison between countries. The results, displayed in figure 4.7 show a significant increase in non-standard employment with the exception of Denmark and the United States. With Spain standing out as the least standardized country in employment patterns in the OECD, all countries under consideration, except the United States, have over 30 percent of their labor force employed in flexible working arrangements.

The US exception seems to indicate that when there is labor flexibility in the institutions of the country, non-standard forms of employment are not deemed necessary. This would be reflected in a lower average tenure in the job in the US than in other countries. Indeed, this is what in general terms, we observe: in 1995 the average number of

years in the job in the United States was 7.4, in contrast to 8.3 for the UK, 10.4 for France, 10.8 for Germany, 11.6 for Italy, 11.3 for Japan, 9.6 for The Netherlands, and 9.1 for Spain (but still higher than Canada, 7.9, and Australia, 6.4)[107] Furthermore, in spite of the institutionally embedded labor flexibility, non-standard forms of employment are also significant in the United States. In 1990 self-employment accounted for 10.8 percent of the workforce, part-time for 16.9 percent, and "contract" or temporary work for about 2 percent, adding up to 29.7 percent of the labor force, although, again, categories overlap to some extent. According to a different estimate, the contingent workforce with no benefits, no job security, and no career amounted in the US in 1992 to about 25 percent of the labor force, up from 20 percent in 1982. The projections were for this type of labor to increase to 35 percent of the US labor force in the year 2000.[108] Mishel and co-workers, on the basis of data from the US Bureau of Labor Statistics, showed that employment in the temporary help industry in the US increased from 417,000 workers in 1982 to 2,646,000 in 1997 (see figure 4.8).[109] Furthermore, the Bureau of Labor Statistics estimated that between 1996 and 2006 temporary employment in the United States would grow by 50 percent. Outsourcing, facilitated by on-line transactions, concerns not just manufacturing but increasingly services. In a 1994 survey of 392 of America's fastest growing firms, 68 percent of them were subcontracting payroll services, 48 percent tax compliance services, 46 percent claim benefits administration, and the like.[110]

While the size of the US economy makes patterns of change difficult to observe until they reach a critical mass, the picture we obtain is very different when we look at California, the economic and technological powerhouse of America. In 1999, the Institute of Health Policy Studies of the University of California at San Francisco, in cooperation with the Field Institute, conducted a study on work arrangements and living conditions on a representative sample of California workers, the second survey of a three-year longitudinal study.[111] They defined "traditional jobs" as holding a single, full-time, day-shift job year round, as a permanent employee, paid by the firm for which the job is done, and not working from home or as an independent contractor – a definition very close to the one employed by Carnoy and myself. Under such a definition, 67 percent of California workers *did not* hold a traditional job. Adding the criterion of tenure, and calculating the proportion of

107 OECD, *Employment Outlook* (various years), compiled by Carnoy (2000).
108 Jost (1993).
109 Mishel et al. (1999).
110 Marshall (1994).
111 UCSF/Field Institute (1999).

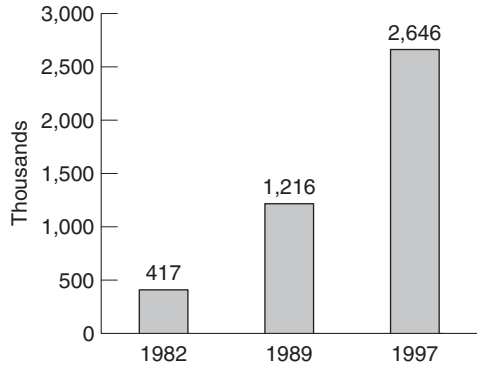

Figure 4.8 Employment in the temporary help industry in the United States, 1982–1997
Source: Data from the US Bureau of Labor Statistics, elaborated by Mishel et al. (1999)

workers with traditional jobs with three or more years of tenure, the proportion of workers in these standard jobs shrinks to 22 percent (see figures 4.9 and 4.10). Incidentally, a measure of the disappearance of the traditional male-worker dominated household is that when we add to this percentage the criterion of only one wage earner in the household, the proportion dwindles to 8 percent (7 percent male-headed, 1 percent female-headed). I must add, however, one correction. Since the notion of day-shift does not enter in my definition of non-traditional work, I obtained a recalculation of these data from the research team, deducting night-shift workers. Under the new calculations, with my restrictive definition, 57 percent, rather than 67 percent, is the proportion of workers in non-standard forms of employment. On the basis of the same survey we learn that only 49 percent of workers worked the traditional 35–40 hours a week, with about one-third of them working more than 45 hours, and 18 percent less than 35 hours. The median length of time with their current employer was four years, with 40 percent of the workers having less than two years in their current work; 25 percent of workers did not work year-round, while those who both worked year-round and worked a regular week of 35–40 hours were only 35 percent. The higher the professional level, the longer the working time: while 29 percent of all workers worked over 40 hours a week, among those at the top of the salary scale ($60,000+), the proportion climbed to 58 percent. By and large, this is not a disgruntled lot: 59 percent of all workers reported increasing their earnings, and 39 percent either were promoted or moved to a better job.

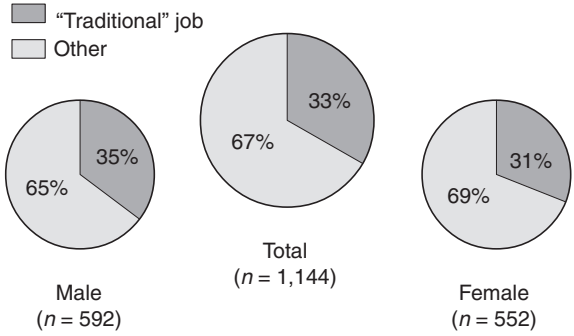

Figure 4.9 Percentage of working-age Californians employed in "traditional" jobs, 1999 ("traditional" is defined as holding a single, full-time, day-shift job year round, as a permanent employee, paid by the firm for which the work is done and not working from home or as an independent contractor)
Source: University of California, San Francisco and The Field Institute, 1999

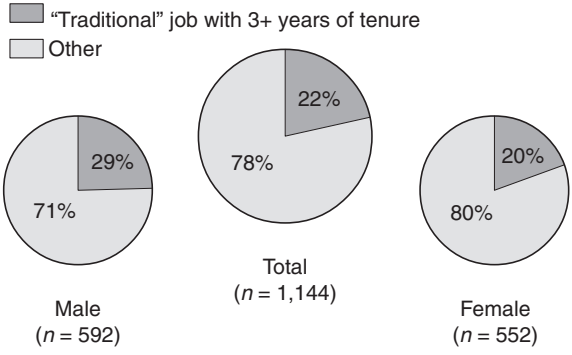

Figure 4.10 Distribution of working-age Californians by "traditional" job status and length of tenure in the job, 1999 ("traditional" job is as defined in figure 4.9)
Source: University of California, San Francisco and The Field Institute, 1999

The California model of flexible employment is even more distinct in Silicon Valley, the center of the new economy. Chris Benner has shown the emergence of a multiplicity of forms of flexible employment in the 1990s.[112] According to his estimates, between 1984 and 1997 in Santa Clara County (which is the heart of the so-called Silicon Valley), employment of temporary workers increased by 159 percent,

112 Benner (2000).

of part-time workers by 21 percent, of business services (a proxy for contracted services) by 152 percent, and self-employment by 53 percent. Thus he estimates that up to 80 percent of the net new jobs in the country during this period were in non-standard employment. He also estimates that the size of what he calls the "contingent labor force" as a proportion of the total labor force of Silicon Valley in 1997 could be evaluated at between 34 and 51 percent of the total labor force (depending upon the extent of double counting because of overlapping categories). Benner discovered the critical role of labor-market intermediaries in providing the flexible labor force for Silicon Valley. Not only traditional agencies, but all kinds of organizations, and institutions, including workers' guilds and the labor unions themselves (in the old tradition of the longshoremen union's hiring halls, translated into the information economy).[113]

The booming new economy in the United States was in fact facing a labor shortage at the turn of the century. To deal with it, companies, particularly in the high-technology and information sectors, were resorting to non-traditional incentives to retain their workers, including the distribution of stock options among their professional employees, a preferred form of compensation in the Internet start-up firms. Companies in all industries were also using an immigrant labor force on a large scale, both in highly skilled occupations and in unskilled jobs. And temporary employment, hired through labor intermediaries, was soaring in the United States as a whole. Just-in-time labor seems to be substituting for just-in-time supplies as the key resource of the informational economy.[114]

In the European context, an interesting close-up to detect emerging new patterns of work is the so-called Dutch model that provided a stellar performance in job creation and economic growth, without losing social protection, in the 1990s. Faced with rampant unemployment in the 1980s, the Dutch government, business, and labor reached a series of agreements to restructure the labor market. Under these agreements, labor unions consented to moderate wage increases in return for preserving core jobs in the industry. But in addition to this agreement (which is common in labor–business negotiations in all countries), the Dutch unions also agreed to the expansion, on the periphery of the labor force, of new, flexible forms of employment, mainly part-time work, and temporary contracts. The government also created programs to stimulate small business initiatives. The key element in this model, however is, that, unlike in the United States, part-timers

113 Benner et al. (1999).
114 *Business Week* (1999c).

and temporary workers are still fully protected under national health, disability, unemployment, and pension plans. And women, the main recipients of new, part-time jobs, can count on subsidized day care for their children. As a result of this strategy, the unemployment rate in The Netherlands, at a time of intense technological innovation, went down from an average 9 percent in the 1980s to 3 percent by the end of 1999. In macro-economic terms, The Netherlands enjoyed in the 1990s increased private investment, economic growth, employment growth, and moderate, but positive, wage growth. This model of negotiated flexibilization of labor markets and working conditions, together with a definition of institutional and fiscal responsibility in the social welfare systems, seems also to underlie the positive experience of balanced economic growth, with low unemployment, of Sweden, Denmark, and Norway.[115]

The mobility of labor concerns both unskilled and skilled workers. While a core labor force is still the norm in most firms, subcontracting and consulting is a fast-growing form of obtaining professional work. Not only the firm benefits from flexibility. Many professionals add to their main job (full- or part-time) consulting venues which help both their income and their bargaining power. The logic of this highly dynamic work system interacts with the labor institutions of each country: the greater the constraints to such flexibility, and the greater the bargaining power of the labor unions, the lesser will be the impact on wages and benefits, and the greater will be the difficulty for newcomers to enter the core labor force, thus limiting job creation.

While the social costs of flexibility can be high, a growing stream of research emphasizes the transformative value of new work arrangements for social life, and particularly for improved family relationships, and greater egalitarian patterns between genders.[116] A British researcher, P. Hewitt,[117] reports on the growing diversity of working formulae and schedules, and the potential offered by work-sharing between those currently employed full-time and those barely employed *within the same household*. Overall, *the traditional form of work, based on full-time employment, clear-cut occupational assignments, and a career pattern over the life-cycle is being slowly but surely eroded away*.

Japan is different, although not as much as observers usually think. Any analytical framework aimed at explaining new historical trends in the organization of work, and their impact on employment structure, must be able to account for "Japanese exceptionalism:" it is too

115 Carnoy (2000).

116 Bielenski (1994); for social problems associated with part-time work, see Warme et al. (1992); Carnoy (2000).

117 Hewitt (1993). This interesting study is pointedly cited by Freeman and Soete (1994).

important an exception to be left aside as an oddity for comparative theory. Therefore, let us consider the matter in some detail. At the end of 1999, in spite of a prolonged recession that halted Japanese growth for most of the 1990s, the Japanese unemployment rate, while reaching a record high level for the past two decades, was still below 5 percent. Indeed, the main concern of Japanese labor planners is the potential shortage of Japanese workers in the future, given the aging of the demographic structure and Japanese reluctance about foreign immigration.[118] Furthermore, the *chuki koyo* system, which provides assurance of long-term employment for the core labor force of large companies, while coming under increasing pressure, as I will show below, was still in place. Thus, it would seem that Japanese exceptionalism belies the general trend toward flexibility of the labor market and the individualization of work that characterizes the other informational, capitalist societies.[119] In fact, I would argue that while Japan has indeed created a highly original system of industrial relations and employment procedures, flexibility has been a structural trend of such a system for the past two decades, and it is increasing along with the transformation of the technological basis and occupational structure.[120]

The Japanese employment structure is characterized by extraordinary internal diversity, as well as by a complex pattern of fluid situations that resist generalization and standardization. The very definition of the *chuki koyo* system needs precision.[121] For most workers under this system it means simply that they can work until retirement in the same company, under normal circumstances, as a matter of custom, not of right. This employment practice is in fact limited to large companies (those with over 1,000 employees), and in most cases concerns only the male, core labor force. In addition to their regular workers, companies also employ at least three different kinds of workers: part-time workers, temporary workers, and workers sent to the company by another company, or by a recruiting agent ("dispatched workers"). None of these categories has job security, retirement benefits, or is entitled to receive the customary annual bonuses to reward productivity and commitment to the company. In addition, very often workers, particularly older men, are reallocated to other jobs in other companies within the same corporate group (*shukko*). This includes the practice of separating married men from their families (*tanshin-funin*) because of difficulties in finding housing and, most of all, because of

118 NIKKEIREN (1993).
119 Kumazawa and Yamada (1989).
120 Kuwahara (1989).
121 Inoki and Higuchi (1995).

the family's reluctance to relocate children to a different school in the middle of their education. *Tanshin-funin* is said to affect about 30 percent of managerial employees.[122] Nomura estimates that long-term job security in the same company applies only to about one-third of Japanese employees, including public sector employees.[123] Joussaud provides a similar estimate.[124] In addition, the incidence of job tenure varies widely, even for men, depending on age, level of qualification, and size of company. Table 4.28 (in Appendix A) provides an illustration of the profile of *chuki koyo* in 1991–2.

The critical point in this labor market structure concerns the definition of part-time. According to the government's labor status definitions, "part-time" workers are those considered as such by the company.[125] In fact, they work almost full-time (6 hours a day, compared to 7.5 hours for regular workers), although the number of working days in a month is slightly less than for regular workers. Yet they receive, on average, about 60 percent of a regular worker's salary, and about 15 percent of the annual bonus. More importantly, they have no job security, so they are hired and fired according to the company's convenience. Part-timers and temporary workers provide the required labor flexibility. Their role has substantially increased since the 1970s, when the oil shock induced major economic restructuring in Japan. In the 1975–90 period, the number of part-time workers increased by 42.6 percent for male workers and by 253 percent for female workers. Indeed, women account for two-thirds of part-timers. Women are the skilled, adaptable workers who provide flexibility to Japanese labor management practices. This is in fact an old practice in Japanese industrialization. In 1872, the Meiji government recruited women to work in the nascent textile industry. A pioneer was Wada Ei, daughter of a samurai from Matsuhiro, who went to work in the Tomioka silk-reeling mill, learned the technology, and helped to train women in other mills. In 1899, women accounted for 70 percent of workers in spinning mills, and outnumbered male workers in the iron mills. However, at times of crisis women would be fired, while men would be kept as long as possible, emphasizing their role as the last-resort breadwinners of the family. In the past three decades, this historical pattern of gender-based division of labor has hardly changed, although a 1986 equal opportunity law corrected some of the most blatant legal discriminations. Women's participation in the labor force in 1990 featured a rate of 61.8 percent (compared to 90.2 percent for men),

122 Collective Author (1994).
123 Nomura (1994).
124 Joussaud (1994).
125 Collective Author (1994); Shinotsuka (1994).

lower than in the US, but similar to that of Western Europe. Yet their working status varies widely with age and marriage. Thus, 70 percent of the women who are hired in conditions roughly comparable with men (*sogoshoku*) are under 29 years of age, while 85 percent of part-timers are married. Women massively enter the labor force in their early twenties, stop working after marriage to raise their children, and return later to the labor force as part-timers. This structure of the occupational life-cycle is reinforced by the Japanese tax code, which makes it more advantageous for women to contribute in a relatively small proportion to the family income than to add a second salary. The stability of the Japanese patriarchal family, with a low rate of divorce and separation and strong intergenerational solidarity,[126] keeps men and women together in the same household, avoiding the polarization of social structure as the result of this obvious pattern of labor market dualism. Uneducated youth and elderly workers of small and medium companies are the other groups accounting for this segment of unstable employees, whose boundaries are difficult to establish because of the fluidity of labor status in Japanese networks of firms.[127] Figure 4.11 attempts to represent schematically the complexity of the Japanese labor market structure.

At the turn of the century, there were signs that the Japanese model of labor market was on its way to structural transformation. Shaken by recession, faced with renewed global competition, abroad and at home, and trying to catch up their technological lagging in network technologies, Japanese firms seemed to be ready to trim and select their labor. Young workers, particularly women, also seemed ready to adopt a new attitude towards companies whose loyalty did not seem any longer to be reliable. Companies were laying off workers, and replacing permanent jobs with temporary ones: millions of workers were part-time or temporary. The *chuki koyo* system was quickly becoming the status of just a fraction of the Japanese labor force. According to the Ministry of Labor, in 1997, 789,000 Japanese found their jobs through employment agencies. This concerned professionals as well as manual workers. Japan's leading job placement agency, Pasona, reported that since the beginning of the 1990s, the number of requests from companies to agencies of temporary labor increased from 100,000 to 1 million a year. Companies were putting pressure on the government to ease the rules that limited labor mobility for the core labor force. The government was slow to respond to these pressures, fearing threats to social stability. Thus, temporary agencies were forbidden to

126 Gelb and Lief Palley (1994).
127 Takenori and Higuchi (1995).

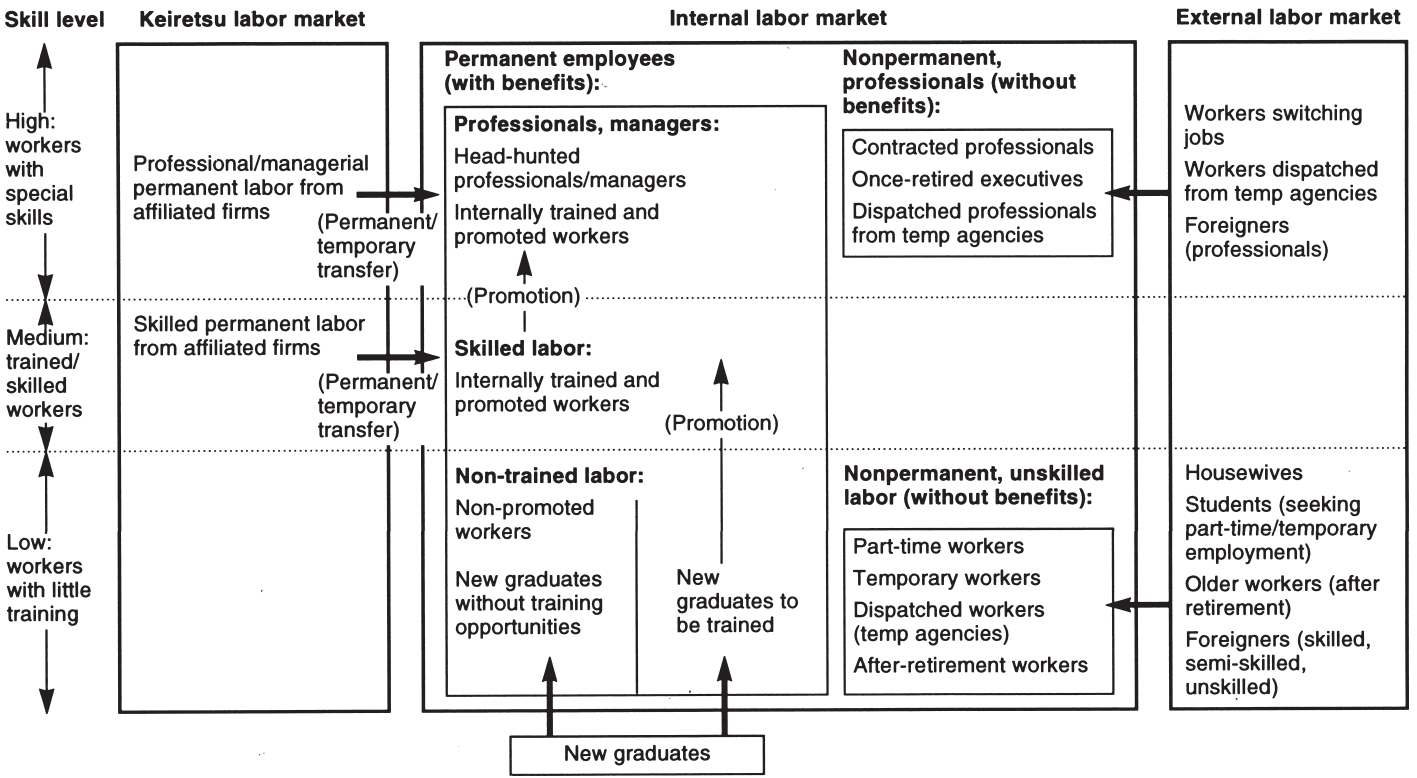

Figure 4.11 The Japanese labor market in the postwar period
Source: Elaborated by Yuko Aoyama, based on information from Japan's Economic Planning Agency, *Gaikokujin rodosha to shakai no shinro*, 1989, p. 99, figure 4.1

find a job for anyone within the first year of leaving the education system, and re-hiring in the same job was prohibited. On the other hand, in 1998, only one-third of the college graduates were able to find a full-time job in their first year in the labor market. The strategic planning institutions of government were increasingly aware of the need to move beyond the fiction of stable, tenured employment which was gradually becoming the exception rather than the rule. Thus in 1999, MITI issued a report advising companies, for the first time, to move toward non-tenured employment for most of their workers.[128]

Thus, it seems that Japan has been practicing for some time the dual labor market logic that is spreading in Western economies. By so doing, it has combined the benefits of the commitment of a core labor force with the flexibility of a peripheral labor market. The former has been essential because it has guaranteed social peace through cooperation between management and company unions; and because it has increased productivity by accumulating knowledge in the firm, and quickly assimilating new technologies. The latter has allowed for quick reaction to changes in labor demand, as well as to competitive pressures from offshored manufacturing in the 1980s. In the 1990s, figures for foreign immigration and day laborers started to rise, introducing additional choice and flexibility in the lower-skilled segments of the workforce. Altogether, Japanese firms seemed to be able to cope with competitive pressures by retraining their core labor force and adding technology, while multiplying their flexible labor, both in Japan and in their globalized production networks. However, since this labor practice relies essentially on the occupational subservience of highly educated Japanese women, which will not last for ever, I propose the hypothesis that it is just a matter of time until the hidden flexibility of the Japanese labor market diffuses to the core labor force, calling into question what has been the most stable and productive labor relations system of the late industrial era.[129]

Thus, overall, there is indeed a fundamental transformation of work, workers, and working organizations in our societies, but it cannot be apprehended in the traditional categories of obsolete debates over the "end of work" or the "deskilling of labor."[130] The prevailing model for labor in the new, information-based economy is that of a *core labor force*, formed by information-based managers and by those whom Reich calls "symbolic analysts," and a *disposable labor force* that can be automated and/or hired/fired/offshored, depending upon market

128 French (1999).
129 Kuwahara (1989); Whitaker (1990).
130 Rifkin (1995).

demand and labor costs. Furthermore, the networked form of business organization allows outsourcing and subcontracting as forms of externalizing labor in a flexible adaptation to market conditions. Analysts have rightly distinguished between various forms of flexibility in wages, geographical mobility, occupational status, contractual security, and task performance, among others.[131] Often all these forms are lumped together in a self-serving strategy to present as inevitable what is in fact a business or policy decision. Yet it is true that current technological trends foster all forms of flexibility, so that in the absence of specific agreements on stabilizing one or various dimensions of work, the system will evolve into multifaceted, generalized flexibility for workers and working conditions, both for highly skilled and unskilled workers. This transformation has shaken our institutions, inducing a crisis in the relationship between work and society.

Information Technology and the Restructuring of Capital–Labor Relations: Social Dualism or Fragmented Societies?

The diffusion of information technology in the economy does not directly induce unemployment. Instead, given the right institutional and organizational conditions, it seems to create more jobs in the long run. The transformation of management and work upgrades the occupational structure to a greater extent in that it increases the number of low-skill jobs. Increasing global trade and investment do not seem to be, by themselves, major causal factors in eliminating jobs and degrading work conditions in the North, while they contribute to creating millions of jobs in newly industrializing countries. And yet the process of historical transition toward an informational society and a global economy is characterized by the deterioration of living and working conditions for a significant proportion of labor.[132] This deterioration takes different forms in different contexts: the rise of unemployment in Europe; declining real wages (at least until 1996), increasing inequality, and job instability in the United States; underemployment and stepped-up segmentation of the labor force in Japan; informalization and downgrading of newly incorporated urban labor in industrializing countries; and increasing marginalization of the agricultural labor force in stagnant, underdeveloped economies. As argued above, these trends do not stem from the structural logic of the

131 Reich (1991); Freeman and Soete (1994).
132 Harrison (1994); ILO (1994).

informational paradigm, but are the result of the current restructuring of capital–labor relations, helped by the powerful tools provided by new information technologies, and facilitated by a new organizational form, the network enterprise. Furthermore, although the potential of information technologies could have provided for higher productivity, higher living standards, and higher employment simultaneously, once certain technological choices are in place, technological trajectories are "locked in,"[133] and the informational society could become at the same time (without the technological or historical necessity to be so) a dual society.

Alternative views prevailing in the OECD, IMF, and government circles in major Western countries have suggested that observed trends of rising unemployment, underemployment, income inequality, poverty, and social polarization are by and large the result of a skills mismatch, worsened by the lack of flexibility in the labor markets.[134] According to these views, while the occupational/employment structure is upgraded in terms of the educational content of the skills required for the informational jobs, the labor force is not up to the new tasks, either because of the low quality of the educational system or because of the inadequacy of this system to provide the new skills needed in the emerging occupational structure.[135]

In their report to the ILO's research institute, Carnoy and Fluitman have submitted this broadly accepted view to a devastating critique. After extensively reviewing the literature and evidence on the relationship between skills, employment, and wages in the OECD countries, they conclude that:

> Despite the apparent consensus around the supply-side, skill mismatch argument, the supporting evidence for it is extremely thin, especially in terms of improved education and more and better training solving either the problem of open unemployment (Europe) or the problem of wage distribution (US). It is much more convincing, we argue, that better education and more training could, in the longer run, contribute to higher productivity and economic growth rates.[136]

In the same sense, David Howell has shown for the US that while there has been an increasing demand for higher skills, this is not the cause of

133 Arthur (1989).
134 This is the view usually expressed by Alan Greenspan, chairman of the US Federal Reserve Board, and by the International Monetary Fund and other international expert circles. For an economic discourse articulating this thesis, see Krugman (1994a); and Krugman and Lawrence (1994).
135 Cappelli and Rogovsky (1994).
136 Carnoy and Fluitman (1994).

the substantial decline in average wages for American workers between 1973 and 1990 (a fall from a weekly wage of $327 to $265 in 1990, measured in 1982 dollars). Nor is the skill mix the source of increasing income inequality. In his study with Wolff, Howell shows that while the share of low-skilled workers in the US decreased across industries, the share of low-wage workers increased in these same industries. Several studies also suggest that higher skills are in demand, although not in shortage, but higher skills do not necessarily translate into higher wages.[137] Thus, in the US, while decline in real wages was more pronounced for the lowest-educated, salaries for the college-educated also stagnated between 1987 and 1993.[138]

The direct consequence of economic restructuring in the United States is that in the 1980s and the first half of the 1990s family income plummeted. Wages and living conditions continued to decline until 1996 in spite of a strong economic recovery in 1993.[139] Furthermore, half a century after Gunnar Myrdal pointed to the "American Dilemma," Martin Carnoy, in a powerful book, documented that racial discrimination continues to increase social inequality, contributing to marginalizing a large proportion of America's ethnic minorities.[140] However, in 1996–2000, the sustained boom led by information technology and the new economy changed the trend, and increased average real wages at about 1.2 percent per year. And the rise in the minimum wage in 1996 halted the long-term deterioration of their income for the bottom 20 percent of Americans. The population below the poverty line decreased slightly, although over 20 percent of American children were still living in poverty at the end of the century. Income and assets inequality were at an all-time high. In 1995, the top 1 percent of American households earned 14.5 percent of total income, while the income share of the bottom 90 percent was 60.8 percent. The assets distribution was even more skewed: the top 1 percent of households owned 38.5 percent of net worth, while the bottom 90 percent were left with 28.2 percent. Indeed, 18.5 percent of households had zero or negative net wealth. Much has been made of the shareholders democracy in the new forms of capitalism, but table 4.29 shows the extreme concentration of stock ownership in 1995, even when we include stock plans, mutual funds, individual retirement accounts, and other instruments of popular capitalism.

137 Howell and Wolff (1991); Mishel and Teixeira (1991); Howell (1994).
138 Center for Budget and Policy Priorities, Washington, DC, cited by *The New York Times* (October 7, 1994: 9); see also Murphy and Welch (1993); Bernstein and Adler (1994).
139 Mishel and Bernstein (1994).
140 Carnoy (1994); for the persistence of racial inequality in the professional class in the new economy companies, see Harper-Anderson (forthcoming).

While America is an extreme case of income inequality and declining real wages among the industrialized nations, its evolution is significant because it does represent the flexible labor market model at which most European nations, and certainly European firms, are aiming.[141] And the social consequences of such a trend are similar in Europe. Thus, in Greater London between 1979 and 1991 real disposable income of households in the lowest decile of income distribution declined by 14 percent, and the ratio of real income of the richest decile over the poorest almost doubled in the decade, from 5.6 to 10.2.[142] Poverty in the UK substantially increased during the 1980s and early 1990s.[143] And for other European countries, taking the incidence of child poverty as an indicator of the evolution of poverty, on the basis of data collected by Esping-Andersen, between 1980 and the mid-1990s child poverty increased by 30 percent in the US, by 145 percent in the UK, by 31 percent in France, and by 120 percent in Germany.[144] Inequality and poverty increased during the 1990s in the US, and in most of Europe.[145] I take the liberty of referring the reader to volume III, chapter 2, for a summary presentation of data and sources on inequality and poverty, both for the United States and for the world at large.

The new vulnerability of labor under conditions of unrestrained flexibility does not concern only the unskilled labor force. The core labor force, while better paid and more stable, is subjected to mobility by shortening the period of the working life in which professionals are recruited to the core of the enterprise. Martin Carnoy summarizes this trend:

> In the United States and in the OECD's other more flexible labor markets, downsizing is becoming a regular part of work life. Older workers are particularly vulnerable when firms "rationalize" their labor forces. Downsizing is largely a euphemism for reducing the number of "obsolete", higher-priced older employees, usually in their mid to late forties and early fifties, replacing them with younger, more recently educated, and lower-wage workers. Older workers, unlike their younger counterparts, suffer long periods of unemployment and sharp wage declines once re-employed . . . Not only are the wages of young age cohorts decreasing, but the period of the average male worker's "prime" working life, defined by upward wage mobility, is becoming shorter. This is apparently true for college as well as high school graduates, which means

141 Sayer and Walker (1992).
142 Lee and Townsend (1993: 18–20).
143 Hutton (1995).
144 Esping-Anderson (1999).
145 Mishel et al. (1999); Bison and Esping-Anderson (2000).

> that even well-educated (high skill) workers are now subject to this broader meaning of job insecurity: workers are not only subject to shorter job tenure but to flattening or even declining incomes as they hit middle age.[146]

The logic of this highly dynamic labor market model interacts with the specificity of labor institutions in each country. Thus, a study of German labor relationships shows that reduction of labor as a result of the introduction of computerized machinery in the 1980s was inversely related to the level of workers' protection provided by the unions in the industry. On the other hand, firms with high levels of protection were also those with the highest change in innovation. This study shows that there is not necessarily a conflict between upgrading the technological basis of the firm and keeping most of the workers, generally retraining them. These firms were also those with the highest level of unionization.[147] The study by Harley Shaiken on Japanese automobile companies in the United States, and on the Saturn automobile plant in Tennessee, reaches similar conclusions, showing the effectiveness of workers' input and unions' participation in the successful introduction of technological innovations, while limiting labor losses.[148]

This institutional variation is what explains the difference we have shown between the United States and the European Union. Social restructuring takes the form of pressuring wages and labor conditions in the US. In the European Union, where labor institutions defend better their historically conquered positions, the net result is increasing unemployment, because of limited entry to young workers and because of the early exit from the labor force for the oldest, or for those trapped in noncompetitive sectors and firms.[149] As for industrializing countries, they have been featuring for at least three decades a model of articulation between the formal and informal urban labor markets that is tantamount to the flexible forms diffused in the mature economies by the new technological/organizational paradigm.[150]

Why and how has this restructuring of the capital–labor relationship taken place at the dawn of the Information Age? It resulted from historical circumstances, technological opportunities, and economic imperatives. To reverse the profit squeeze without triggering inflation, national economies and private firms have acted on labor costs since

146 Carnoy (2000: 48).
147 Warnken and Ronning (1990).
148 Shaiken (1993, 1995).
149 Bosch (1995).
150 Portes et al. (1989); Gereffi (1993).

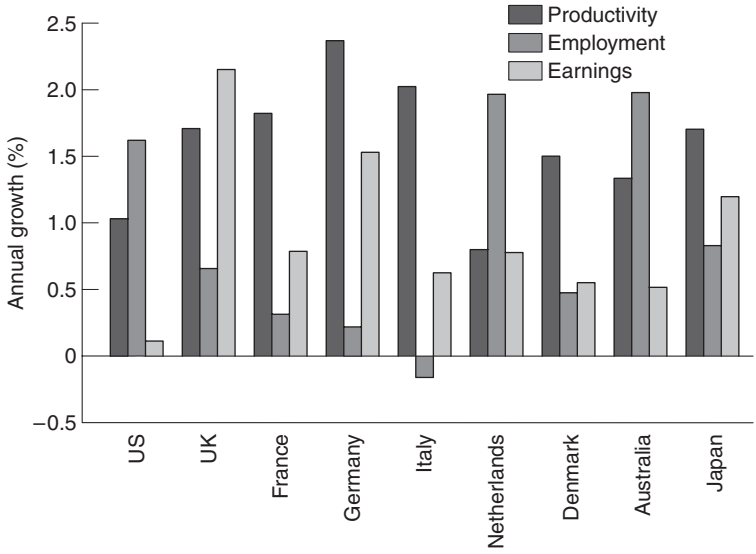

Figure 4.12 Annual growth of productivity, employment, and earnings in OECD countries, 1984–1998
Source: Data from OECD, compiled and elaborated by Carnoy (2000)

the early 1980s, either by increasing productivity without employment creation (main European economies) or by lowering the cost of a plethora of new jobs (US) (see figure 4.12). Labor unions, the main obstacle to one-sided restructuring strategy, were weakened by their inability to adapt to representing new kinds of workers (women, youth, immigrants), to acting in new workplaces (private sector offices, high-technology industries), and to functioning in the new forms of organization (the network enterprise on a global scale).[151] When necessary, politically induced offensive strategies helped the historical/structural trends working against the unions (for example, Reagan and the air traffic controllers, Thatcher and the coal miners). But even socialist governments in France and Spain went on changing the conditions of the labor market, thus weakening the unions, when the pressures of competition made it difficult to depart sharply from the new management rules of the global economy.

What made this historical redefinition of the relationship between

151 For assessments of the decline of traditional unionism under new economic/technological conditions, see Carnoy et al. (1993a); see also Gourevitch (1984); Adler and Suarez (1993).

capital and labor possible was the use of powerful information technologies and of organizational forms facilitated by the new technological medium. The ability to assemble and disperse labor on specific projects and tasks anywhere, anytime, created the possibility for the coming into being of the virtual enterprise as a functional entity. From then on, it was a matter of overcoming institutional resistance to the development of such logic, and/or of obtaining concessions from labor and unions under the potential threat of virtualization. The extraordinary increase in flexibility and adaptability permitted by new technologies opposed the rigidity of labor to the mobility of capital. It followed a relentless pressure to make the labor contribution as flexible as it could be. Productivity and profitability were enhanced, yet labor lost institutional protection and became increasingly dependent on individual bargaining conditions in a constantly changing labor market.

Society became divided, as it has been for most of human history, between winners and losers of the endless process of individualized, unequal bargaining. But this time there were few rules about how to win and how to lose. Skills were not enough, since the process of technological change accelerated its pace, constantly superseding the definition of appropriate skills. Membership of corporations, or even countries, ceased to have its privileges because stepped-up global competition kept redesigning the variable geometry of work and markets. Never was labor more central to the process of value-making. But never were the workers (regardless of their skills) more vulnerable to the organization, since they had become lean individuals, farmed out in a flexible network whose whereabouts were unknown to the network itself.

Thus, on the surface, societies were/are becoming dualized, with a substantial top and a substantial bottom growing at both ends of the occupational structure, so shrinking the middle, at a pace and in a proportion that depend upon each country's position in the international division of labor and on its political climate. But down in the deep of the nascent social structure, a more fundamental process has been triggered by informational work: the disaggregation of labor, ushering in the network society.

Appendix A:

Statistical Tables for Chapter 4

Table 4.1 United States: percentage distribution of employment by industrial sector and intermediate industry group, 1920–1991

		(a) 1920–70						(b) 1970–91				
	Industry	*1920*	*1930*	*1940*	*1950*	*1960*	*1970*	*1970*	*1980*	*1985*	*1990*	*1991*
I	Extractive	28.9	25.4	21.3	14.4	8.1	4.5	4.6	4.5	4.0	3.5	3.5
	Agriculture	26.3	22.9	19.2	12.7	7.0	3.7	3.7	3.6	3.1	2.8	2.9
	Mining	2.6	2.5	2.1	1.7	1.1	0.8	0.8	1.0	0.9	0.6	0.6
II	Transformative	32.9	31.6	29.8	33.9	35.9	33.1	33.0	29.6	27.2	25.6	24.7
	Constructive	^	6.5	4.7	6.2	6.2	5.8	6.0	6.2	6.5	6.5	6.1
	Utilities	^	0.6	1.2	1.4	1.4	1.4	1.1	1.2	1.2	1.1	1.1
	Manufacturing	^	24.5	23.9	26.2	28.3	25.9	25.9	22.2	19.5	18.0	17.5
	Food	^	2.3	2.7	2.7	3.1	2.0	1.9	1.9	1.7	1.6	1.5
	Textiles	^	4.2	2.0	2.2	3.3	3.0	1.3	0.8	0.7	0.6	0.6
	Metal	^	7.7	2.9	3.6	3.9	3.3	3.1	2.7	2.0	1.8	1.7
	Machinery	^	^	2.4	3.7	7.5	8.3	5.1	5.2	4.5	3.8	3.7
	Chemical	^	1.3	1.5	1.7	1.8	1.6	1.5	1.6	1.3	1.3	1.3
	Misc. mfg	^	9.0	11.8	12.3	8.7	7.7	12.9	10.0	9.4	8.9	8.6
III	Distributive services	18.7	19.6	20.4	22.4	21.9	22.3	22.4	21.0	20.9	20.6	20.6
	Transportation	7.6	6.0	4.9	5.3	4.4	3.9	3.9	3.7	3.5	3.5	3.6
	Communication	^	1.0	0.9	1.2	1.3	1.5	1.5	1.5	1.5	1.3	1.4
	Wholesale	11.1	12.6	2.7	3.5	3.6	4.1	4.0	3.9	4.1	3.9	4.0
	Retail	^	^	11.8	12.3	12.5	12.8	12.9	11.9	11.9	11.8	11.7
IV	Producer services	2.8	3.2	4.6	4.8	6.6	8.5	8.2	10.5	12.7	14.0	14.0
	Banking	^	1.3	1.1	1.1	1.6	2.6	2.2	2.6	2.9	2.9	2.8
	Insurance	^	1.1	1.2	1.4	1.7	1.8	1.8	1.9	1.9	2.1	2.1
	Real estate	^	0.6	1.1	1.0	1.0	1.0	1.0	1.6	1.7	1.8	1.8

	Engineering	^	–	1.3	0.2	0.3	0.4	0.4	0.6	0.7	0.7	0.7
	Accounting	^	–	^	0.2	0.3	0.4	0.4	0.5	0.5	0.5	0.6
	Misc. business serv.	^	0.1	^	0.6	1.2	1.8	1.8	2.6	4.0	4.9	5.0
	Legal services	^	–	^	0.4	0.5	0.5	0.5	0.8	0.9	1.0	1.1
V	Social services	8.7	9.2	10.0	12.4	16.3	21.9	22.0	23.7	23.6	24.9	25.5
	Medical, health serv.	^	–	2.3	1.1	1.4	2.2	2.4	2.3	3.6	4.3	4.5
	Hospital	^	–	^	1.8	2.7	3.7	3.7	5.3	4.0	4.0	4.1
	Education	^	–	3.5	3.8	5.4	8.6	8.5	8.3	7.8	7.9	8.0
	Welfare, relig. serv.	^	–	0.9	0.7	1.0	1.2	1.2	1.6	2.2	2.6	2.7
	Nonprofit org.	^	–	^	0.3	0.4	0.4	0.4	0.5	0.4	0.4	0.4
	Postal service	^	0.6	0.7	0.8	0.9	1.0	1.0	0.7	0.7	0.7	0.7
	Government	^	2.2	2.6	3.7	4.3	4.6	4.5	4.7	4.7	4.8	4.8
	Misc. social services	^	6.3	–	0.1	0.2	0.3	0.3	0.4	0.2	0.2	0.2
VI	Personal services	8.2	11.2	14.0	12.1	11.3	10.0	10.0	10.5	11.7	11.5	11.7
	Domestic serv.	^	6.5	5.3	3.2	3.1	1.7	1.7	1.3	1.2	0.9	0.9
	Hotel	^	2.9	1.3	1.0	1.0	1.0	1.0	1.1	1.4	1.5	1.6
	Eating, drinking places	^	^	2.5	3.0	2.9	3.3	3.2	4.4	4.9	4.8	4.9
	Repair services	^	–	1.5	1.7	1.4	1.3	1.4	1.3	1.5	1.4	1.4
	Laundry	^	–	1.0	1.2	1.0	0.8	0.8	0.4	0.4	0.5	0.4
	Barber, beauty shops	^	0.9	–	–	0.8	0.9	0.9	0.7	0.8	0.7	0.7
	Entertainment	^	0.9	0.9	1.0	0.8	0.8	0.8	1.0	1.2	1.3	1.3
	Misc. personal serv.	^	–	1.6	1.2	0.4	0.3	0.3	0.3	0.4	0.4	0.4

^ Signifies that the figure is included in the above category.
The numbers may not add up due to rounding.
Sources: (a) Singelmann (1978); (b) 1970: Population Census; 1980–91: *Current Population Survey*, Bureau of Labor Statistics; Labor statistics: *Employment and Earnings* (various issues)

Table 4.2 Japan: percentage distribution of employment by industrial sector and intermediate industry group, 1920–1990

		(a) 1920–70						(b) 1970–90			
	Industry	*1920*	*1930*	*1940*	*1950*	*1960*	*1970*	*1970*	*1980*	*1985*	*1990*
I	Extractive	56.4	50.9	46.3	50.3	34.1	19.6	19.8	11.2	9.5	7.2
	Agriculture	54.9	49.9	44.0	48.6	32.9	19.4	19.4	11.0	9.3	7.1
	Mining	1.5	1.0	2.2	1.7	1.2	0.3	0.4	0.2	0.2	0.1
II	Transformative	19.6	19.8	24.9	21.0	28.5	34.2	34.1	33.7	33.4	33.7
	Construction	2.7	3.3	3.0	4.3	6.2	7.6	7.6	9.7	9.1	9.6
	Utilities	0.3	0.4	0.4	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Manufacturing	16.6	16.1	21.6	16.1	21.7	26.0	26.0	23.4	23.7	23.6
	Food	2.0	1.8	1.4	2.2	2.1	2.1	2.1	2.1	2.2	2.3
	Textiles	5.0	4.8	3.9	3.1	3.2	2.7	2.7	1.7	1.5	1.2
	Metal	1.0	0.8	1.4	1.6	2.9	1.5	4.0	3.6	3.2	3.2
	Machinery	0.4	0.7	2.9	1.6	3.1	4.9	5.0	4.6	5.9	5.9
	Chemical	0.4	0.6	1.1	1.2	1.2	1.3	1.3	1.1	1.0	1.1
	Misc. mfg	7.8	7.4	10.9	6.4	9.2	13.5	10.9	10.3	10.0	10.0
III	Distributive services	12.4	15.6	15.2	14.6	18.6	22.5	22.4	25.1	24.8	24.3
	Transportation	3.5	3.2	3.4	3.5	4.0	5.1	5.1	5.1	5.0	5.0
	Communication	0.4	0.7	0.9	1.0	1.1	1.2	1.1	1.2	1.1	1.0
	Wholesale	8.5	11.6	10.9	2.3	4.7	6.1	6.1	6.9	7.2	7.1
	Retail	^	^	^	7.8	8.9	10.2	10.2	11.9	11.5	11.2
IV	Producer services	0.8	0.9	1.2	1.5	2.9	5.1	4.8	7.5	8.6	9.6
	Banking	0.4	0.5	0.6	0.7	1.2	1.4	1.4	2.8	3.0	1.9
	Insurance	0.1	0.2	0.3	0.2	0.5	0.7	0.7	^	^	1.3
	Real estate	–	–	0.1	0.0	0.2	0.5	0.5	0.8	0.8	1.1
	Engineering	0.0	–	0.3	0.3	1.0	0.5	0.5	–	–	0.8

	Accounting	–	–	^	^	^	0.2	0.2	–	–	0.3
	Misc. business serv.	0.2	0.2	^	^	^	1.7	1.4	3.9	4.8	4.0
	Legal services	0.1	0.0	0.0	0.2	0.1	0.1	0.1	–	–	0.1
V	Social services	4.9	5.5	6.0	7.2	8.3	10.1	10.3	12.9	13.5	14.3
	Medical, health serv.	0.4	0.3	0.4	1.1	0.3	0.2	0.4	2.9	3.4	1.5
	Hospital	0.3	0.5	0.7	^	1.3	1.8	1.8	^	^	2.2
	Education	0.9	1.3	1.5	2.2	2.4	2.7	2.9	3.6	3.7	4.5
	Welfare, relig. serv.	0.6	0.6	0.6	0.3	0.6	0.7	0.7	1.3	1.3	1.4
	Nonprofit org.	0.1	–	0.7	0.2	0.2	0.5	1.0	1.1	1.1	1.1
	Postal service	2.2	2.5	1.9	3.3	3.1	3.3	–	–	–	–
	Government	^	^	^	^	^	^	3.4	3.6	3.6	3.4
	Misc. social services	0.3	0.3	0.3	0.1	0.6	0.9	0.0	0.5	0.4	0.4
VI	Personal services	5.7	7.3	6.3	5.3	7.6	8.5	8.5	9.6	10.1	10.2
	Domestic serv.	2.5	2.7	2.2	0.8	0.7	0.3	0.3	0.1	0.1	0.1
	Hotel	0.5	0.5	0.5	0.5	0.8	0.9	0.9	1.0	1.1	1.1
	Eating, drinking places	1.4	2.4	1.8	1.1	2.2	3.1	3.0	4.1	4.3	4.1
	Repair services	0.0	0.1	–	0.9	0.7	0.9	0.9	1.1	0.9	1.0
	Laundry	0.1	0.2	0.2	0.2	0.4	0.5	0.5	1.6	1.7	0.6
	Barber, beauty shops	0.5	0.7	0.6	0.6	1.1	1.1	1.1	^	^	1.1
	Entertainment	0.4	0.3	0.8	0.5	0.7	0.7	0.8	0.9	1.0	1.3
	Misc. personal serv.	0.2	0.3	0.3	0.7	1.0	1.0	1.0	0.9	0.9	0.9
	Unclassifiable	–	–	–	–	–	–	–	–	–	0.6

^ Signifies that the figure is included in the category immediately above.
The numbers may not add up due to rounding.
Source: (a) Singelmann (1978); (b) Population Census, Bureau of Statistics

Table 4.3 Germany: percentage distribution of employment by industrial sector and intermediate industry group, 1925–1987

		(a) 1925–70					(b) 1970–87	
	Industry	*1925*	*1933*	*1950*	*1961*	*1970*	*1970*	*1987*
I	Extractive	33.5	31.5	16.1	9.0	5.1	8.7	4.1
	Agriculture	30.9	29.1	12.9	6.8	3.8	7.5	3.2
	Mining	2.6	2.4	3.2	2.2	1.3	1.2	0.9
II	Transformative	38.9	36.3	47.3	51.3	49.0	47.1	40.3
	Construction	5.3	6.1	9.3	8.5	8.0	7.7	7.1
	Utilities	0.6	0.6	0.8	1.2	0.8	0.8	1.0
	Manufacturing	33.0	31.6	37.1	41.6	40.2	38.6	32.2
	Food	4.3	5.1	4.6	3.1	3.8	3.6	2.9
	Textiles	3.7	3.5	3.5	5.1	2.2	2.4	1.1
	Metal	3.7	4.5	2.3	3.7	3.7	4.7	4.3
	Machinery	2.9	3.4	3.0	5.0	4.8	9.5	4.9
	Chemical	1.1	1.1	1.7	2.4	2.7	2.4	2.7
	Misc. mfg	17.3	14.0	22.0	22.3	23.0	16.0	16.2
III	Distributive services	11.9	12.8	15.7	16.4	16.4	17.9	17.7
	Transportation	4.0	4.2	5.1	4.5	3.9	5.4	5.9
	Communication	–	–	–	0.5	–	^	^
	Wholesale	7.9	8.6	10.6	3.9	4.4	4.2	3.2
	Retail	^	^	^	7.5	8.6	8.2	8.6
IV	Producer services	2.1	2.7	2.5	4.2	5.1	4.5	7.3
	Banking	0.7	0.6	0.7	1.2	1.7	1.7	2.4
	Insurance	0.4	0.6	0.8	0.7	1.0	0.9	1.0
	Real estate	0.0	0.6	0.1	0.3	0.4	0.3	0.4
	Engineering	0.1	0.1	0.2	0.4	0.6	0.6	0.7

	Accounting	0.5	0.3	0.3	1.0	0.7	–	–
	Misc. business serv.	^	^	^	^	^	0.9	2.8
	Legal services	0.3	0.6	0.5	0.6	0.8	–	–
V	Social services	6.0	6.8	11.1	12.5	17.4	15.7	24.3
	Medical, health serv.	0.4	1.3	2.4	2.5	3.2	3.1	5.4
	Hospital	0.6	^	^	^	^	–	–
	Education	1.1	1.2	1.5	2.1	3.0	3.0	4.9
	Welfare, relig. serv.	0.5	0.8	1.0	0.9	0.4	0.9	1.5
	Nonprofit org.	–	–	–	–	0.4	0.4	0.2
	Postal service	1.1	1.1	1.5	1.7	1.8	–	–
	Government	2.1	2.2	4.1	5.3	8.6	7.7	9.5
	Misc. social services	0.1	0.2	0.6	–	–	0.5	2.8
VI	Personal services	7.7	7.8	6.9	6.4	7.4	6.1	6.3
	Domestic serv.	4.4	4.0	3.2	1.5	0.5	0.4	0.2
	Hotel	2.1	2.4	2.2	2.6	2.9	2.8	2.7
	Eating, drinking places	^	^	^	^	^	^	^
	Repair services	–	–	–	–	1.1	1.0	1.1
	Laundry	0.2	–	–	0.6	0.5	0.5	0.2
	Barber, beauty shops	0.4	0.7	0.8	0.9	0.9	0.9	1.0
	Entertainment	0.4	0.5	0.1	–	0.4	0.4	0.9
	Misc. personal serv.	0.1	0.2	0.6	0.8	0.4	0.1	0.1

^ Signifies that the figure is included in the category immediately above.
The numbers may not add up due to rounding.
Sources: (a) Singelmann (1978); (b) *Statistiches Bundesamt, Volkszählung*

Table 4.4 France: percentage distribution of employment by industrial sector and intermediate industry group, 1921–1989

		(a) 1921–68						(b) 1968–89					
	Industry	*1921*	*1931*	*1946*	*1954*	*1962*	*1968*	*1968*	*1970*	*1975*	*1980*	*1985*	*1989*
I	Extractive	43.6	38.3	40.2	30.9	23.0	17.0	15.6	13.5	10.3	8.7	7.6	6.4
	Agriculture	42.4	36.6	38.8	28.6	20.6	15.9	14.8	12.9	9.9	8.4	7.4	6.3
	Mining	1.2	1.7	1.4	2.3	2.4	1.1	0.2	0.6	0.4	0.3	0.2	0.1
II	Transformative	29.7	32.8	29.6	35.2	37.7	39.3	39.4	38.0	37.3	34.8	30.9	29.5
	Construction	3.0	4.2	5.1	7.4	8.7	10.3	9.5	9.5	8.9	8.5	7.1	7.2
	Utilities	0.2	0.0	0.6	0.7	0.8	0.8	0.8	0.8	0.8	0.9	1.0	1.0
	Manufacturing	26.4	28.5	23.8	27.2	28.0	26.0	27.0	27.7	27.6	25.5	22.9	21.3
	Food	2.3	2.6	2.2	3.2	3.1	3.0	3.0	3.0	2.9	2.9	2.9	2.8
	Textiles	9.4	4.4	2.5	6.0	4.9	2.3	3.8	3.6	3.1	2.5	2.1	1.7
	Metal	0.6	2.1	7.3	0.9	1.1	1.5	5.0	5.1	5.0	4.3	3.6	3.5
	Machinery	–	–	^	0.9	1.2	1.3	4.9	5.3	5.6	5.2	4.8	4.5
	Chemical	0.9	1.1	1.1	1.3	1.4	1.5	1.8	1.9	1.9	1.8	1.7	1.6
	Misc. mfg	13.2	18.3	10.7	14.9	16.3	18.5	8.4	8.8	9.1	8.7	7.7	7.3
III	Distributive services	14.4	13.6	15.1	14.2	16.4	15.5	18.8	18.7	19.2	19.9	20.2	20.5
	Transportation	5.6	5.1	6.1	4.2	4.3	4.3	4.2	4.1	4.1	4.1	4.2	4.3
	Communication	0.7	^	^	1.3	1.7	0.1	1.8	1.8	2.0	2.1	2.3	2.2
	Wholesale	8.1	8.5	9.1	2.3	3.2	3.6	3.7	3.8	4.0	4.4	4.4	4.5
	Retail	^	^	^	6.5	7.3	7.5	9.1	9.0	9.2	9.3	9.3	9.5
IV	Producer services	1.6	2.1	1.9	2.6	3.2	5.5	5.0	5.5	6.5	7.8	8.5	10.0
	Banking	0.6	0.9	1.2	0.8	1.1	2.0	1.3	1.4	1.8	2.0	2.8	2.0
	Insurance	0.2	0.3	0.4	0.5	0.7	0.8	0.5	0.5	0.6	0.7	0.7	0.8
	Real estate	0.0	0.0	0.0	0.4	0.2	0.4	0.1	0.2	0.3	0.3	0.3	0.3
	Engineering	0.5	0.7	–	0.9	1.1	0.3	–	–	–	–	–	–

	Accounting	^	^	–	^	^	1.6	–	–	–	–	–	–
	Misc. business serv.	^	^	–	^	^	^	3.1	3.4	3.8	4.9	5.3	6.9
	Legal services	0.3	0.3	0.3	–	–	0.4	–	–	–	–	–	–
V	Social services	5.3	6.1	6.8	9.4	12.3	14.5	15.1	15.6	16.4	17.1	19.8	19.5
	Medical, health serv.	0.9	1.1	1.2	2.2	2.9	1.0	–	–	–	–	–	–
	Hospital	^	^	^	^	^^	2.2	–	–	–	–	–	–
	Education	1.3	1.4	1.5	2.4	3.5	4.4	–	–	–	–	–	–
	Welfare, relig. serv.	0.5	0.5	0.7	0.6	1.1	1.1	–	–	–	–	–	–
	Nonprofit org.	–	–	–	–	1.0	0.7	–	–	–	–	–	–
	Postal service	2.3	2.8	3.2	4.0	3.4	1.8	–	–	–	–	–	–
	Government	^	^	^	^	^	3.3	–	–	–	–	–	–
	Misc. social services	0.2	0.2	0.1	0.2	0.4	0.0	–	–	–	–	–	–
VI	Personal services	5.6	7.2	6.4	7.4	7.4	7.9	8.2	8.7	10.2	11.6	13.1	14.1
	Domestic serv.	3.7	3.8	1.3	3.1	3.0	2.7	–	–	–	–	–	–
	Hotel	1.5	2.8	1.4	1.5	1.6	0.9	2.7	2.7	2.7	2.8	3.1	3.5
	Eating, drinking places	^	^	^	1.4	1.2	1.8	^	^	^	^	^	^
	Repair services	–	–	–	–	0.3	1.1	–	–	–	–	–	–
	Laundry	–	–	0.2	1.0	1.2	0.5	–	–	–	–	–	–
	Barber, beauty shops	0.3	–	–	^	^	0.7	–	–	–	–	–	–
	Entertainment	0.1	0.2	0.3	0.4	0.2	0.2	–	–	–	–	–	–
	Misc. personal serv.	0.0	0.5	0.5	–	0.0	0.0	5.6	6.0	7.4	8.8	10.0	10.6

^ Signifies the figure is included in the category immediately above.
The numbers may not add up due to rounding.
1989 figures are preliminary. Communication includes postal services.
Miscellaneous services includes all non-profit services in 1968–89.
Sources: (a) Singelmann (1978); (b) INSEE, *Annuaire statistique de la France*

Table 4.5 Italy: percentage distribution of employment by industrial sector and intermediate industry group, 1921–1990

		(a) 1921–61				(b) 1961–90			
	Industry	*1921*	*1931*	*1951*	*1961*	*1961*	*1971*	*1981*	*1990*
I	Extractive	57.1	48.1	42.9	29.8	29.8	17.2	11.7	9.5
	Agriculture	56.7	47.7	42.5	29.1	29.1	17.2	11.4	9.5
	Mining	0.4	0.4	0.4	0.7	0.7	–	0.3	–
II	Transformative	24.3	29.0	31.8	40.0	39.9	44.3	40.5	29.7
	Constructive	4.1	6.0	7.6	12.0	12.0	10.8	9.4	7.0
	Utilities	0.3	0.6	0.5	0.6	0.6	0.9	0.9	0.8
	Manufacturing	19.9	22.4	23.7	27.4	27.3	32.7	30.2	21.8
	Food	1.2	1.5	2.4	2.4	–	–	1.8	1.6
	Textiles	3.2	4.2	3.7	3.4	–	–	6.3	5.0
	Metal	1.8	4.4	1.2	1.5	–	–	7.0	4.7
	Machinery	1.5	^	1.4	1.8	–	–	4.8	3.3
	Chemical	0.4	1.0	1.1	1.4	–	–	1.4	1.3
	Misc. mfg	11.8	11.3	13.9	16.9	–	–	8.8	5.9
III	Distributive services	8.6	10.1	10.6	13.0	15.3	18.7	16.2	25.8
	Transportation	3.9	4.2	3.4	4.1	4.9	5.3	4.9	5.2
	Communication	0.4	0.5	0.6	0.8	^	^	1.5	1.3
	Wholesale	4.3	5.4	1.2	1.4	10.3	13.4	3.6	17.3
	Retail	^	^	5.4	6.7	^	^	6.1	^
IV	Producer services	1.2	1.8	1.9	2.0	–	–	4.6	–
	Banking	0.2	0.5	0.8	0.9	1.1	1.5	1.7	1.8
	Insurance	^	0.1	0.1	0.2	^	^	0.5	^
	Real estate	^	^	^	0.0	–	–	0.0	–
	Engineering	0.8	^	^	0.3	–	–	1.4	–

	Accounting	^	1.0	0.7	^	–	–	0.4	–
	Misc. business serv.	^	^	^	0.2	–	–	0.1	–
	Legal services	0.2	0.2	0.3	0.4	–	–	0.4	–
V	Social services	4.1	5.1	7.9	9.3	–	–	19.1	–
	Medical, health serv.	0.6	0.8	1.1	0.7	–	–	1.7	–
	Hospital	^	^	^	0.9	–	–	2.6	–
	Education	1.0	1.1	2.0	2.7	–	–	7.4	–
	Welfare, relig. serv.	0.6	0.7	1.2	0.2	–	–	0.2	–
	Nonprofit org.	–	0.1	0.1	–	–	–	0.3	–
	Postal service	1.3	2.1	3.4	4.8	–	–	–	–
	Government	^	^	^	^	6.9	6.5	6.5	15.5
	Misc. social services	0.6	0.3	0.1	–	–	–	0.4	–
VI	Personal services	4.6	5.6	4.7	5.9	–	–	7.9	–
	Domestic serv.	2.4	3.2	2.2	2.2	–	–	1.2	–
	Hotel	0.2	0.6	1.4	0.7	–	–	0.9	4.1
	Eating, drinking places	0.8	0.7	^	1.4	–	–	2.0	^
	Repair services	–	–	–	–	–	–	2.0	–
	Laundry	0.3	0.2	0.1	0.2	–	–	0.3	–
	Barber, beauty shops	0.4	0.7	0.6	0.9	–	–	1.0	–
	Entertainment	0.0	0.1	0.3	0.3	–	–	0.5	–
	Misc. personal serv.	0.5	0.1	0.1	0.2	–	–	0.1	–
	All other services					7.0	11.8		15.6

^ Signifies that the figure is included in the category immediately above.
The numbers may not add up due to rounding.
1990 figures may not be comparable to figures from earlier years due to the difference in sources.
Sources: (a) Singelmann (1978); (b) 1961–81: Istituto Centrale di statistica, *Censimento generale della popolazione*; 1990: Istituto nazionale di statistica, *Annuario Statistico Italiano*, 1991

Table 4.6 United Kingdom: percentage distribution of employment by industrial sector and intermediate industry group, 1921–1992

		(a) England and Wales 1921–71					*(b) UK (employees) 1970–90*					*(c) Great Britain (employees) 1970–92*						*(d) Great Britain (employed) 1971–81*	
Industry		*1921*	*1931*	*1951*	*1961*	*1971*	*1970*	*1975*	*1980*	*1985*	*1990*	*1970*	*1971*	*1980*	*1981*	*1990*	*1992*	*1971*	*1981*
I	Extractive	14.2	11.8	8.9	6.6	4.3	3.6	3.3	4.7	4.4	3.3	3.6	3.4	4.3	4.9	3.2	1.8	4.3	3.9
	Agriculture	7.1	6.1	5.0	3.5	2.6	1.7	1.8	1.6	1.6	1.3	1.7	1.6	1.6	1.6	1.2	1.2	2.7	2.3
	Mining	7.1	5.7	3.9	3.1	1.7	1.9	1.6	3.2	2.8	2.0	1.9	1.9	3.2	3.3	2.0	0.5	1.6	1.6
II	Transformative	42.2	39.3	45.4	46.0	43.8	46.7	40.3	35.7	29.8	27.3	46.6	45.9	35.7	33.7	27.3	26.3	42.8	35.6
	Construction	4.4	5.2	6.5	6.9	7.1	6.3	5.8	5.5	4.8	4.8	6.2	6.0	5.4	5.2	4.8	4.0	7.0	7.0
	Utilities	1.0	1.3	1.7	1.7	1.6	1.7	1.6	–	–	–	1.7	1.7	–	–	–	1.2	1.5	1.5
	Manufacturing	36.8	32.9	37.2	37.4	34.9	38.7	33.0	30.2	25.0	22.5	38.8	38.2	30.3	28.5	22.5	21.1	34.2	27.1
	Food	3.3	3.4	3.0	3.0	3.0	3.9	3.2	3.2	2.8	2.4	3.8	3.8	3.1	3.1	2.9	2.9	3.1	3.0
	Textiles	5.9	5.9	4.5	3.4	2.4	3.1	2.1	1.5	1.1	0.9	3.0	2.8	1.5	1.5	0.9	0.8	2.5	1.3
	Metal	2.8	2.1	2.7	2.7	2.3	5.4	4.6	6.8	3.6	3.1	5.5	5.3	6.9	6.2	3.2	2.7	4.8	4.1
	Machinery	1.6	1.4	3.0	3.2	4.8	9.2	7.7	7.9	6.8	6.1	9.3	9.1	8.0	7.6	6.2	5.8	8.3	7.1
	Chemical	1.1	1.1	2.1	2.3	2.0	2.3	2.1	–	1.6	1.4	2.4	2.4	–	–	1.5	1.4	2.2	1.7
	Misc. mfg	22.1	19.0	21.9	22.8	20.4	14.8	13.1	10.8	9.2	8.6	14.8	14.8	10.8	10.2	8.5	8.0	13.4	10.0
III	Distributive services	19.3	21.6	19.2	19.7	17.9	18.7	18.9	19.9	20.4	20.6	18.8	18.7	20.2	20.4	20.4	20.7	19.3	20.3
	Transportation	7.3	7.0	6.4	5.7	4.8	4.9	4.7	6.5	4.2	4.1	4.9	5.0	6.5	6.6	4.2	4.3	4.8	4.6
	Communication	–	–	–	–	–	2.0	2.0	^	2.0	1.9	2.0	2.1	^	^	1.9	1.9	1.8	1.9
	Wholesale	12.0	14.6	12.8	14.0	3.4	2.3	3.7	4.0	4.5	4.5	2.3	2.4	4.1	4.2	4.3	4.5	2.1	3.9
	Retail	^	^	^	^	9.6	9.5	8.4	9.5	9.7	10.1	9.5	9.3	9.5	9.6	10.1	10.0	10.7	9.8
IV	Producer services	2.6	3.1	3.2	4.5	5.6	5.0	5.7	7.5	9.7	12.0	5.1	5.2	7.5	8.0	12.1	12.3	5.6	7.9
	Banking	0.8	0.8	0.9	1.2	1.6	1.6	1.9	2.0	2.4	2.8	1.6	1.7	2.0	2.2	2.8	2.8	1.6	2.1
	Insurance	0.7	0.9	0.9	1.1	1.2	1.3	1.2	0.9	1.1	1.2	1.3	1.3	1.0	1.0	1.2	1.2	1.2	1.1

	Real estate	–	0.3	0.3	0.3	0.4	0.3	0.4	–	0.6	0.6	0.3	0.3	–	–	0.6	0.7	0.4	0.4
	Engineering	0.2	0.2	0.2	–	0.4	–	–	–	–	–	–	–	–	–	–	–	0.5	–
	Accounting	0.0	0.3	0.3	0.4	0.4	0.4	0.4	–	–	–	0.4	0.4	–	–	–	0.8	0.4	–
	Misc. business serv.	0.4	0.2	0.1	1.1	1.0	1.0	1.4	4.5	5.6	7.4	1.1	1.1	4.5	4.8	7.5	5.9	1.1	4.3
	Legal services	0.4	0.4	0.4	0.4	0.5	0.5	0.5	–	–	–	0.5	0.5	–	–	–	1.0	0.5	–
V	Social services	8.9	9.7	12.1	14.1	19.4	17.7	22.1	24.2	26.8	27.2	17.7	18.3	23.9	24.9	27.2	28.9	18.9	22.8
	Medical, health serv.	1.0	1.1	2.9	3.4	0.8	4.5	5.5	6.8	7.8	8.1	4.4	4.6	6.8	7.1	8.1	8.7	1.0	6.3
	Hospital	^	^	^	^	3.1	–	–	^	^	^	^	^	^	^	^	^	3.2	–
	Education	2.1	2.2	2.4	3.9	5.8	6.4	8.5	7.6	8.1	8.3	6.4	6.7	7.5	7.8	8.2	8.7	6.2	6.7
	Welfare, relig. serv.	0.6	0.6	0.6	0.7	1.0	0.1	0.1	2.5	3.5	3.9	0.1	0.1	2.4	2.6	3.2	3.4	1.1	–
	Nonprofit org.	0.1	0.1	–	0.0	0.2	–	–	–	–	–	–	–	–	–	–	–	0.1	–
	Postal service	1.1	1.2	1.6	1.6	1.8	–	–	–	–	–	–	–	–	–	–	–	–	–
	Government	3.8	4.3	4.2	4.0	6.0	6.2	7.3	7.3	7.4	6.8	6.2	6.4	7.2	7.4	7.0	7.4	6.8	7.2
	Misc. social services	0.2	0.2	0.4	0.6	0.6	0.6	0.6	–	–	–	0.6	0.5	–	–	0.6	0.7	0.4	2.6
VI	Personal services	12.9	14.5	11.3	9.0	9.0	8.1	9.7	8.1	9.0	9.7	8.1	8.1	7.9	8.1	9.8	9.7	8.4	8.9
	Domestic serv.	7.5	8.2	2.4	1.6	1.0	0.4	–	–	–	–	0.4	0.4	–	–	–	–	1.0	0.4
	Hotel	2.4	2.2	4.2	2.7	1.6	1.2	1.1	4.3	4.9	5.6	1.2	1.2	4.3	4.4	1.2	1.3	1.0	4.1
	Eating, drinking places	0.8	1.3	^	^	1.0	1.3	2.5	^	^	^	1.3	1.3	^	^	4.4	4.0	1.9	^
	Repair services	–	–	1.4	1.8	2.1	1.8	1.9	0.9	1.0	1.0	1.8	1.9	0.9	0.9	1.0	1.1	2.1	1.5
	Laundry	0.8	0.9	0.8	0.7	0.4	0.5	0.4	–	–	–	0.5	0.5	–	–	–	–	0.4	–
	Barber, beauty shops	0.3	0.5	0.4	0.7	1.1	0.4	0.4	–	–	–	0.4	0.4	–	–	–	–	0.6	–
	Entertainment	0.7	0.9	1.1	1.0	1.1	1.1	1.3	1.9	2.3	2.3	1.1	1.1	1.9	2.0	2.3	2.3	1.1	1.9
	Misc. personal serv.	0.5	0.3	1.0	0.5	0.8	1.3	2.1	1.0	0.9	0.9	1.3	1.4	0.8	0.8	0.9	0.9	0.2	1.1
	Unclassifiable	–	–	–	–	–	0.2	0.0	0.0	–	–	0.2	0.3	–	–	0.0	0.3	0.7	0.6

^ Signifies that the figure is included in the category immediately above.
The numbers may not add up due to rounding.
The data for Great Britain are of the employed, while the data for United Kingdom are of employees in employment.
Postal service is included in Communication.
From 1980 UK figures, utilities is included under Mining. Chemical is included in Metal in 1980.
Sources: (a) Singelmann (1978); (b)–(d) 1970–92: *Annual Abstract of Statistics*, and Employment Gazette; 1971–81: Office of Population Censuses and Surveys, *Census Reports*

Table 4.7 Canada: percentage distribution of employment by industrial sector and intermediate industry group, 1921–1992

		(a) 1921–71						(b) 1971–92		
Industry		*1921*	*1931*	*1941*	*1951*	*1961*	*1971*	*1971*	*1981*	*1992*
I	Extractive	36.9	34.4	31.7	21.6	14.7	9.1	8.3	7.1	5.7
	Agriculture	35.2	32.5	29.5	19.7	12.8	7.4	6.6	5.3	4.4
	Mining	1.6	1.9	2.2	1.9	1.9	1.7	1.6	1.8	1.3
II	Transformative	26.1	24.7	28.2	33.7	31.1	30.0	27.1	26.8	22.3
	Construction	9.0	6.8	5.3	6.9	7.0	6.9	6.3	6.5	6.3
	Utilities	–	1.5	0.6	1.2	1.1	1.1	1.0	1.1	1.2
	Manufacturing	17.0	16.4	22.3	25.6	23.0	22.0	19.7	19.2	14.9
	Food	1.2	2.2	3.4	3.1	3.7	3.2	2.9	2.7	–
	Textiles	2.7	2.6	3.7	1.6	1.3	0.9	1.0	0.7	–
	Metal	2.9	1.9	2.3	3.9	3.2	1.5	3.0	3.4	–
	Machinery	^	0.7	0.9	^	0.8	1.0	2.3	2.2	–
	Chemical	0.2	0.4	0.8	1.3	1.4	1.0	1.2	1.1	–
	Misc. mfg	10.0	8.6	11.2	15.7	12.6	14.4	9.3	9.0	14.9
III	Distributive services	19.2	18.4	17.7	21.8	23.9	23.0	20.8	22.9	24.0
	Transportation	8.5	7.2	5.8	6.8	6.6	5.4	5.0	4.8	4.1
	Communication	–	0.9	0.7	1.1	2.1	2.1	1.9	2.1	2.1
	Wholesale	10.7	1.6	2.4	3.8	4.7	4.5	4.1	4.8	4.5
	Retail	^	8.7	8.8	10.1	10.5	11.0	9.8	11.1	13.2
IV	Producer services	3.7	3.3	2.7	3.9	5.3	7.3	6.6	9.7	11.3
	Banking	1.2	1.2	0.9	1.3	1.8	2.4	2.2	2.7	3.7
	Insurance	^	1.0	0.9	1.1	1.9	2.2	2.0	0.9	^
	Real estate	^	0.2	0.3	0.4	^	^	^	1.7	2.2
	Engineering	2.3	–	–	0.2	0.4	0.7	0.6	0.9	–

	Accounting	^	0.1	0.1	0.2	0.3	0.4	0.4	0.5	–
	Misc. business serv.	^	0.4	0.2	0.4	0.5	1.1	1.0	2.3	5.4
	Legal services	0.2	0.4	0.3	0.3	0.4	0.5	0.4	0.6	–
V	Social services	7.5	8.9	9.4	11.3	15.4	21.1	22.0	24.0	22.6
	Medical, health serv.	1.1	1.8	2.2	3.1	0.9	1.0	1.8	2.0	9.1
	Hospital	^	^	^	^	3.7	4.7	4.1	4.0	^
	Education	2.0	2.7	2.7	2.9	4.4	7.3	6.0	6.6	7.0
	Welfare, relig. serv.	0.9	1.0	0.7	1.1	1.3	1.4	1.3	1.9	–
	Nonprofit org.	–	–	–	–	–	0.2	0.2	0.2	–
	Postal service	3.0	0.5	0.5	0.6	5.1	5.4	–	–	–
	Government	^	2.6	2.8	3.4	^	^	7.4	7.6	6.5
	Misc. social services	0.5	0.3	0.5	0.2	–	–	1.1	1.6	–
VI	Personal services	6.7	10.2	10.2	7.8	9.5	9.6	7.5	9.5	13.5
	Domestic serv.	–	4.2	4.5	1.6	1.6	0.7	0.6	0.4	–
	Hotel	–	2.8	1.6	1.5	3.9	1.7	1.5	5.7	6.5
	Eating, drinking places	–	^	1.3	1.6	^	2.6	2.2	–	^
	Repair services	–	0.5	1.1	1.1	1.1	0.9	1.0	1.1	–
	Laundry	–	0.5	0.5	0.7	0.6	0.5	0.5	0.3	–
	Barber, beauty shops	–	0.6	0.6	0.5	0.7	0.7	0.6	0.5	–
	Entertainment	–	0.4	0.4	0.5	0.6	1.0	0.9	1.2	–
	Misc. personal serv.	–	1.2	0.2	0.3	1.0	1.5	0.3	0.3	7.0
	Unclassifiable	–	–	–	–	–	–	7.3	–	0.7

^ Signifies that the figure is included in the category immediately above.
The numbers may not add up due to rounding.
1992 figures may not be comparable to the earlier years due to the difference in sources.
Sources: (a) Singelmann (1978); (b) 1971–81: Population Census; 1992: *Statistics Canada*, *The Labour Force*, May

Table 4.8 United States: employment statistics by industry, 1920–1991

	(a) 1920–70						*(b)1970–91*				
	1920	*1930*	*1940*	*1950*	*1960*	*1970*	*1970*	*1980*	*1985*	*1990*	*1991*
Industry (%)	48.0	43.3	37.9	39.2	38.2	33.6	34.0	30.5	27.7	25.8	24.9
Services (%)	52.0	56.7	62.1	60.8	61.8	66.4	66.0	69.5	72.3	74.2	75.1
Goods handling (%)	73.3	69.0	67.4	69.3	65.8	61.1	61.2	57.3	54.7	52.6	51.7
Information handling (%)	26.7	31.0	32.5	30.6	34.0	38.9	39.0	42.7	45.3	47.4	48.3
Services : industry	1.1	1.3	1.6	1.6	1.6	2.0	1.9	2.3	2.6	2.9	3.0
Information : goods	0.4	0.5	0.5	0.4	0.5	0.6	0.6	0.7	0.8	0.9	0.9

Industry = mining, construction, manufacturing.
Services = remaining categories.
Goods handling = mining, construction, manufacturing, transportation, wholesale/retail trade.
Information handling = communications; finance, insurance, and real estate (FIRE); services; government.
Services : industry = ratio between services and industry employment.
Information : goods = ratio between information handling and goods handling employment.
Source: See table 4.1

Table 4.9 Japan: employment statistics by industry, 1920–1990

	(a) 1920–70						*(b) 1970–90*			
	1920	*1930*	*1940*	*1950*	*1960*	*1970*	*1970*	*1980*	*1985*	*1990*
Industry (%)	46.3	40.7	47.8	43.1	43.4	42.1	42.1	37.4	36.3	35.8
Services (%)	53.7	59.3	52.2	56.9	56.6	57.9	57.9	62.6	63.7	64.2
Goods handling (%)	76.8	75.8	77.3	72.9	73.8	73.2	73.0	69.6	67.9	65.9
Information handling (%)	23.2	24.0	22.5	27.1	26.4	27.0	26.9	30.4	31.9	33.4
Services : industry	1.2	1.5	1.1	1.3	1.3	1.4	1.4	1.7	1.8	1.8
Information : goods	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.5

Industry = mining, construction, manufacturing.
Services = remaining categories.
Goods handling = mining, construction, manufacturing, transportation, wholesale/retail trade.
Information handling = communications, finance, insurance, and real estate (FIRE); services; government.
Services : industry = ratio between services and industry employment.
Information : goods = ratio between information handling and goods handling employment.
Source: See table 4.2

Table 4.10 Germany: employment statistics by industry, 1925–1987

	(a) 1925–70					*(b) 1970–87*	
	1925	*1933*	*1950*	*1961*	*1970*	*1970*	*1987*
Industry (%)	59.1	56.6	57.3	56.2	51.2	51.4	41.5
Services (%)	40.9	43.4	42.7	43.8	48.8	48.6	58.5
Goods handling (%)	78.8	77.1	78.1	76.5	71.4	71.6	60.8
Information handling (%)	21.2	22.9	21.9	23.5	29.1	28.4	39.2
Services : industry	0.7	0.8	0.7	0.8	1.0	0.9	1.4
Information : goods	0.3	0.3	0.3	0.3	0.4	0.4	0.6

Industry = mining, construction, manufacturing.
Services = remaining categories.
Goods handling = mining, construction, manufacturing, transportation, wholesale/retail trade.
Information handling = communications; finance, insurance, and real estate (FIRE); services; government.
Services : industry = ratio between services and industry employment.
Information : goods = ratio between information handling and goods handling employment.
Source: See table 4.3

Table 4.11 France: employment statistics by industry, 1921–1989

	(a) 1921–68						*(b) 1968–89*					
	1921	*1931*	*1946*	*1954*	*1962*	*1968*	*1968*	*1970*	*1975*	*1980*	*1985*	*1989*
Industry (%)	53.1	54.3	49.7	51.8	49.5	47.3	43.8	43.4	41.0	37.4	32.5	30.6
Services (%)	46.9	45.7	50.3	48.2	50.5	52.7	56.2	56.6	59.0	62.6	67.5	69.4
Goods handling (%)	79.8	80.2	77.8	73.1	71.2	67.7	67.8	66.8	64.1	60.8	56.3	54.9
Information handling (%)	20.2	19.8	22.4	27.0	29.0	32.3	32.2	33.2	35.9	39.2	43.7	45.1
Services : industry	0.9	0.8	1.0	0.9	1.0	1.1	1.3	1.3	1.4	1.7	2.1	2.3
Information : goods	0.3	0.2	0.3	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.8	0.8

Industry = mining, construction, manufacturing.
Services = remaining categories.
Goods handling = mining, construction, manufacturing, transportation, wholesale/retail trade, hotels/lodging places.
Information handling = communications; finance, insurance, and real estate (FIRE); services; government.
Services : industry = ratio between services and industry employment.
Information : goods = ratio between information handling and goods handling employment.
Source: See table 4.4

Table 4.12 Italy: employment statistics by industry, 1921–1990

	(a) 1921–61				*(b) 1961–90*			
	1921	*1931*	*1951*	*1961*	*1961*	*1971*	*1981*	*1990*
Industry (%)	56.5	55.4	55.3	56.6	56.4	52.5	45.0	31.9
Services (%)	43.5	44.6	44.7	43.4	43.6	47.5	55.0	68.1
Goods handling (%)	76.6	76.2	76.1	75.6	78.8	76.1	63.6	62.2
Information handling (%)	23.4	23.8	23.9	24.4	21.2	23.9	36.4	37.8
Services : industry	0.8	0.8	0.8	0.8	0.8	0.9	1.2	2.1
Information : goods	0.3	0.3	0.3	0.3	0.3	0.3	0.6	0.6

Industry = mining, construction, manufacturing,
Services = remaining categories.
Goods handling = mining, construction, manufacturing, transportation, wholesale/retail trade, hotels/lodging places.
Information handling = communications; finance, insurance and real estate (FIRE); services; government.
Services : industry = ratio between services and industry employment.
Information : goods = ratio between information handling and goods handling employment.
1990 figures may not be comparable to figures from earlier years due to the difference in sources.
Source; See table 4.5

Table 4.13 United Kingdom: employment statistics by industry, 1921–1990

	(a) England and Wales, 1921–71					*(b) UK, 1970–90*				
	1921	*1931*	*1951*	*1961*	*1971*	*1970*	*1975*	*1980*	*1985*	*1990*
Industry (%)	53.0	47.9	51.8	50.9	46.7	49.4	42.6	39.4	33.1	29.6
Services (%)	47.0	52.1	48.2	49.1	53.3	50.6	57.4	60.6	66.9	70.4
Goods handling (%)	76.3	73.3	76.4	74.2	66.6	67.6	61.0	64.0	56.7	54.2
Information handling (%)	23.7	26.7	23.6	25.8	33.3	32.2	39.0	36.0	43.3	45.8
Services : industry	0.9	1.1	0.9	1.0	1.1	1.0	1.3	1.5	2.0	2.4
Information : goods	0.3	0.4	0.3	0.3	0.5	0.5	0.6	0.6	0.8	0.8

Industry = mining, construction, manufacturing.
Services = remaining categories.
Goods handling = mining, construction, manufacturing, transportation, wholesale/retail trade, hotels/lodging places.
Information handling = communications; finance, insurance, and real estate (FIRE); services; government.
Services : industry = ratio between services and industry employment.
Information : goods = ratio between information handling and goods handling employment.
Source: see table 4.6

Table 4.14 Canada: employment statistics by industry, 1921–1992

	(a) 1921–71						*(b) 1971–92*		
	1921	*1931*	*1941*	*1951*	*1961*	*1971*	*1971*	*1981*	*1992*
Industry (%)	42.7	37.2	42.3	42.8	36.6	33.0	29.8	29.0	23.5
Services (%)	57.3	62.8	57.7	57.2	63.4	67.0	70.2	71.0	76.5
Goods handling (%)	72.3	69.6	69.6	71.9	67.4	58.6	52.8	58.1	54.3
Information handling (%)	27.6	30.4	30.4	28.1	32.6	41.4	47.2	41.9	45.7
Services : industry	1.3	1.7	1.4	1.3	1.7	2.0	2.4	2.4	3.3
Information : goods	0.4	0.4	0.4	0.4	0.5	0.7	0.9	0.7	0.8

Industry = mining, construction, manufacturing.
Services = remaining categories.
Goods handling = mining, construction, manufacturing, transportation, wholesale/retail trade, hotels/lodging places.
Information handling = communications; finance, insurance, and real estate (FIRE); services; government.
Services : industry = ratio between services and industry employment.
Information : goods = ratio between information handling and goods handling employment.
1992 figures may not be comparable to figures from previous years due to the difference in sources.
Source: See table 4.7

Table 4.15 Occupational structure of selected countries (%)

Categories	*USA 1991*	*Canada 1992*	*UK 1990*	*France 1989*	*Germany 1987*	*Japan 1990*
Managers	12.8	13.0	11.0	7.5	4.1	3.8
Professionals	13.7	17.6	21.8	6.0	13.9	11.1
Technicians	3.2	^	^	12.4	8.7	^
Subtotal	29.7	30.6	32.8	25.9	26.7	14.9
Sales	11.9	9.9	6.6	3.8	7.8	15.1
Clerical	15.7	16.0	17.3	24.2	13.7	18.6
Subtotal	27.6	25.9	23.9	28.0	21.5	33.7
Crafts and operators	21.8	21.1	22.4	28.1	27.9	31.8
Semi-skilled service workers	13.7	13.7	12.8	7.2	12.3	8.6
Semi-skilled transport workers	4.2	3.5	5.6	4.2	5.5	3.7
Subtotal	17.9	17.2	18.4	11.4	17.3	12.3
Farm workers and managers	3.0	5.1	1.6	6.6	3.1	7.2
Unclassified	—	—	1.0	—	3.0	—

^ Signifies that figure is included in the category immediately above.
The numbers may not add up due to rounding.
Source: Author's elaboration; see Appendix B

Table 4.16 United States: percentage distribution of employment by occupation, 1960–1991 (%)

Occupational category	*1960*	*1970*	*1980*	*1985*	*1990*	*1991*
Managerial	11.1	10.5	11.2	11.4	12.6	12.8
Professional	11.8	14.2	16.1	12.7	13.4	13.7
Technicians	^	^	^	3.0	3.3	3.2
Sales	7.3	6.2	6.3	11.8	12.0	11.9
Clerical	14.8	17.4	18.6	16.2	15.8	15.7
Crafts and operators	30.2	32.2	28.1	23.9	22.5	21.8
Semi-skilled service workers	13.0	12.4	13.3	13.5	13.4	13.7
Semi-skilled transport workers	4.9	3.2	3.6	4.2	4.1	4.2
Farm workers and managers	7.0	4.0	2.8	3.2	2.9	3.0

^ Signifies that figure is included in the category immediately above.
Figures are seasonally adjusted annual data except the 1960 data, which are those of December.
Source: *Labor Statistics: Employment and Earnings* (various issues)

Table 4.17 Japan: percentage distribution of employment by occupation, 1955–1990

Occupational category	*1955*	*1960*	*1965*	*1970*	*1975*	*1980*	*1985*	*1990*
Managerial	2.2	2.1	2.8	2.6	4.0	4.0	3.6	3.8
Professional	4.6	5.0	5.0	5.8	7.0	7.9	9.3	11.1
Technicians	^	^	^	^	^	^	^	^
Sales	13.3	13.4	13.0	13.0	14.2	14.4	14.9	15.1
Clerical	9.0	11.2	13.4	14.8	15.7	16.7	17.7	18.6
Crafts and operators	27.0	29.5	31.4	34.2	33.3	33.1	33.2	31.8
Semi-skilled service workers	5.4	6.7	7.5	7.6	8.8	9.1	8.7	8.6
Semi-skilled transport workers	1.7	2.3	3.7	4.6	4.5	4.5	3.9	3.7
Farm workers and managers	36.7	29.8	23.1	17.3	12.5	10.3	8.7	7.2

^ Signifies that figure is included in the category immediately above.
Sweepers and garbage collectors are included in semi-skilled service category between 1970 and 1980. From 1985, they are included in crafts and operators category.
Source: Statistical Yearbook of Japan, 1991

Table 4.18 Germany: percentage distribution of employment by occupation 1976–1989 (%)

Occupational category	*1976*	*1980*	*1985*	*1989*
Managerial	3.8	3.2	3.9	4.1
Professional	11.0	11.1	12.6	13.9
Technicians	7.0	7.2	7.8	8.7
Sales	7.6	7.6	7.5	7.8
Clerical	13.1	14.2	12.5	13.7
Crafts and operators	31.8	32.0	28.3	27.9
Semi-skilled service workers	12.5	12.5	15.8	12.3
Semi-skilled transport workers	6.3	6.1	5.5	5.5
Farm workers and managers	5.8	4.8	3.9	3.1
Not classifiable	1.1	1.2	2.1	3.0

^ Signifies that figure is included in the category immediately above.
Source: 1976–89: *Statistisches Bundesamt, Statistisches Jahrbuch* (various issues)

Table 4.19 France: percentage distribution of employment by occupation, 1982–1989 (%)

Occupational category	*1982*	*1989*
Managerial	7.1	7.5
Professional	4.8	6.0
Technicians	12.3	12.4
Sales	3.3	3.8
Clerical	22.8	24.2
Crafts and operators	30.9	28.1
Semi-skilled service workers	6.2	7.2
Semi-skilled transport workers	4.6	4.2
Farm workers and managers	8.0	6.6
Not classifiable		

^ Signifies that figure is included in the category immediately above.
Source: 1982: *Enquête sur l'emploi de mars 1982*; 1989 *Enquête sur l'emploi de mars 1989*

Table 4.20 Great Britain: percentage distribution of employment by occupation, 1961–1990 (%)

Occupational category	*1961*	*1971*	*1981*	*1990*
Managerial	2.7	3.7	5.3	11.0
Professional	8.7	8.6	11.8	21.8
Technicians	^	2.4	2.0	^
Sales	9.7	8.9	8.8	6.6
Clerical	13.3	14.1	14.8	17.3
Crafts and operators	43.1	34.2	27.9	22.4
Semi-skilled service workers	11.9	12.7	14.0	12.8
Semi-skilled transport workers	6.5	10.0	9.1	5.6
Farm workers and managers	4.0	2.9	2.4	1.6
Not classifiable		2.6	3.8	1.0

^ Signifies that figure is included in the category immediately above.
Source: Census, 1961, 1971, 1981; 1990: (Spring) *Labour Force Survey 1991*

Table 4.21 Canada: percentage distribution of employment by occupation, 1950–1992 (%)

Occupational category	*1950*	*1970*	*1980*	*1985*	*1992*
Managerial	8.4	10.0	7.7	11.4	13.0
Professional	7.0	13.6	15.6	17.1	17.6
Technicians	1.5	^	^	^	^
Sales	6.9	7.1	10.8	9.6	9.9
Clerical	10.6	14.8	17.5	17.3	16.0
Crafts and operators	28.2	29.6	26.0	22.3	21.1
Semi-skilled service workers	8.8	12.3	13.1	13.7	13.7
Semi-skilled transport workers	6.9	5.3	4.1	3.8	3.5
Farm workers and managers	21.7	7.4	5.3	4.7	5.1

^ Signifies that figure is included in the category immediately above. 1950 figures were taken on March 4, 1950; 1980 and 1985 figures are those of January. 1992 figures are those of July.
Source: *Statistics Canada, The Labour Force* (various issues)

Table 4.22 Foreign resident population in Western Europe, 1950–1990 (in thousands and as % of total population)

	1950		*1970*		*1982*[a]		*1990*	
Country	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*
Austria	323	4.7	212	2.8	303	4.0	512	6.6
Belgium	368	4.3	696	7.2	886	9.0	905	9.1
Denmark	–	–	–	–	102	2.0	161	3.1
Finland	11	0.3	6	0.1	12	0.3	35	0.9
France	1765	4.1	2621	5.3	3680	6.8	3608	6.4
Germany, Fed. Rep.	568	1.1	2977	4.9	4667	7.6	5242	8.2
Greece	31	0.4	93	1.1	60	0.7	70	0.9
Ireland	–	–	–	–	69	2.0	90	2.5
Italy	47	0.1	–	–	312	0.5	781	1.4
Liechtenstein	3	19.6	7	36.0	9	36.1	–	–
Luxembourg	29	9.9	63	18.4	96	26.4	109	28.0
Netherlands	104	1.1	255	2.0	547	3.9	692	46
Norway	16	0.5	–	–	91	2.2	143	3.4
Portugal	21	0.3	–	–	64	0.6	108	1.0
Spain	93	0.3	291	0.9	418	1.1	415	1.1
Sweden	124	1.8	411	1.8	406	4.9	484	5.6
Switzerland	285	6.1	1080	17.2	926	14.7	1100	16.3
United Kingdom	–	–	–	–	2137	3.9	1875	3.3
Total[b]	5100	1.3	10200	2.2	15000	3.1	16600	4.5

[a] 1982 is a reference year, rather than 1980, since the data are better for 1982.
[b] Includes interpolated figures for the missing (—) data.
Source: Fassman and Münz (1992)

Table 4.23 Employment in manufacturing by major countries and regions, 1970–1997 (thousands)

Year	*United States*	*European Union*[a]	*Japan*	*Brazil*	*Mexico*	*China*	*India*[b]	*Republic of Korea*
1970	19,367	38,400	–	2,499	–	–	4,594	887
1975	18,323	36,600	13,400	3,953	–	42,840	5,087	2,678
1980	20,285	35,200	13,670	7,425	2,581	67,140	5,872	2,955
1985	19,245	30,700	14,530	7,907	–	83,490	6,183	3,504
1990	19,076	30,200	15,050	9,410	4,493	96,970	6,118	4,911
1993	18,075	30,344[c]	15,300	8,539	4,960	92,950	n.a.	4,652
1995	18,468	28,000	14,560	8,548	4,932	98,000	6,767	4,773
1997	18,657	29,919	14,420	8,407[c]	6,125	96,100	n.a.	4,474

[a] The European Union includes the Europe 15 (Sweden not included).
[b] Public employees and private employees in establishments with 10 or more employees.
[c] In 1991, the German series changed to include workers from the former Democratic Republic of Germany. This increased the number of manufacturing workers by 2.8 million in 1991. This implies a "real" number of manufacturing workers in the EU (without the DRG) of about 28.8 million by 1993 and by 1997, about 28 million (*c*.1996).
Sources: International Labour Office, *Statistical Yearbook*, 1986, 1988, 1994, 1995, 1996, 1997; OECD, *Labour Force Statistics, 1977–1997* (Paris: OECD, 1998); OECD, *Main Economic Indicators: Historical Statistics, 1962–1991* (Paris: OECD, 1993), compiled and elaborated by Carnoy (2000)

Table 4.24 Employment shares by industry/occupation and ethnic/gender group of all workers in the United States, 1960–1998 (percent)

	1960	*1970*	*1980*	*1988*	*1990*	*1998*
Total employed						
I (High wage)	24.6	25.5	28.2	32.4	32.9	33.0
II (Middle wage)	44.7	43.8	34.4	38.1	38.2	34.6
III (Low wage)	31.6	30.8	37.4	29.5	28.8	32.4
White males						
I	28.4	29.4	32.3	37.2	39.5	37.7
II	48.0	45.8	43.6	39.7	37.2	36.2
III	23.6	24.9	24.2	23.1	23.2	26.0
Black males						
I	7.9	9.1	13.8	16.3	18.0	20.6
II	36.2	45.2	47.9	42.8	40.9	40.5
III	56.0	45.8	38.2	40.9	41.0	38.5
Latino males						
I	10.5	13.9	16.2	16.9	15.6	16.7
II	42.2	45.8	44.2	43.1	38.2	37.9
III	47.2	40.2	39.6	42.0	46.2	45.0
White females						
I	19.2	20.2	24.6	30.5	32.1	35.5
II	47.5	46.0	43.7	39.4	38.8	31.9
III	33.2	33.8	31.7	30.4	29.1	32.3
Black females						
I	9.1	13.5	17.8	18.8	20.4	24.0
II	19.0	33.3	42.2	41.1	40.7	33.9
III	71.8	53.1	40.0	40.2	38.9	40.5
Latina females						
I	5.2	11.5	13.6	17.3	18.2	19.8
II	50.0	52.3	46.1	42.5	43.0	34.1
III	44.9	36.2	40.3	40.3	38.9	45.6

Source: US Department of Commerce, Bureau of the Census, *1 Percent Sample, US Population Census, 1960, 1970*, compiled by Carnoy (2000)

Table 4.25 Information technology spending per worker (1987–1994), employment growth (1987–1994), and unemployment rate (1995) by country

Country	*Information technology spending per worker (US$ PPP)*		*Employment growth 1987–94 (%/yr)*	*Unemployment rate 1995 (%)*
	1987	*1994*		
Australia	647.9	949.4	1.9	8.5
Austria	303.0	540.5	0.8	5.9
Belgium	469.6	945.9	0.5	13
Canada	525.0	772.7	1.6	9.5
Denmark	395.2	717.1	0.2	10
Finland	414.9	650.0	–1.6	17.2
France	540.5	871.6	0.1	11.6
Germany	519.2	722.2	0.7	9.4
Greece	54.9	79.2	0.5	10.0
Ireland	272.7	341.9	0.4	12.9
Italy	428.6	606.1	0.0	12.0
Japan	350.0	604.6	1.2	3.1
Netherlands	578.9	873.0	1.8	7.1
New Zealand	431.6	833.3	0.3	6.3
Norway	410.2	750.0	0.3	4.9
Portugal	186.0	204.5	0.3	7.2
Spain	294.1	440.7	0.6	22.9
Sweden	559.4	891.3	–0.6	7.7
Switzerland	497.1	981.4	1.5	4.2
United Kingdom	595.2	873.0	0.6	8.2
United States	973.0	1487.8	1.8	5.6

Sources: OECD, *Information Technology Outlook, 1995* (Paris: OECD, 1996, figure 2.1); OECD, *Labour Force Statistics, 1974–1994* (for employment growth); OECD, *Employment Outlook* (July 1996) (for unemployment rates), compiled and elaborated by Carnoy (2000)

Table 4.26 Main telephone lines per employee (1986 and 1993) and Internet hosts per 1,000 population (January 1996) by country

	Main telephone lines per employee		
Country	*1986*	*1993*	*Internet Hosts per 1,000 population (Jan. 1996)*
Australia	71.3	118.3	17.5
Austria	154.1	198.6	6.6
Belgium	120.7	169.8	3.1
Canada	123.2	188.0	13.0
Denmark	137.0	182.8	10.0
Finland	106.9	182.2	41.2
France	144.7	200.0	2.4
Germany	122.2	159.7	5.6
Greece	111.2	180.0	0.8
Ireland	49.1	89.5	4.2
Italy	165.6	210.2	1.3
Japan	151.9	235.7	2.2
Netherlands	203.2	238.6	11.4
New Zealand	55.0	159.4	15.4
Norway	105.2	166.7	20.5
Portugal	65.0	154.7	0.9
Spain	155.2	191.7	1.4
Sweden	123.9	226.1	17.2
Switzerland	180.5	222.4	12.4
United Kingdom	99.2	170.8	7.8
United States	147.3	223.4	23.5

Sources: *ITU Statistical Yearbook*, *1995*, pp. 270–5; Sam Paltridge, "How competition helps the Internet," *OECD Observer*, no. 201 (August–September), 1996, p. 201; OECD, *Information Technology Outlook*, 1995, figure 3.5, compiled and elaborated by Carnoy (2000)

Table 4.27 Men's and women's employment/population ratios, 15–64 years old, 1973–1998 (percent)

	Men			*Women*		
Country	*1973*	*1983*	*1998*	*1973*	*1983*	*1998*
Australia	89.9	77.5	75.2	46.4	47.0	59.2
Austria	82.4	79.4	75.9	47.7	47.1	59.0
Belgium	81.6	69.2	67.0	39.9	39.8	47.5
Canada	81.9	77.8	74.7	44.1	55.0	63.3
Denmark	89.0	78.3	80.2	61.2	65.0	70.2
Finland	78.1	77.4	68.2	62.3	69.0	61.2
France	83.8	73.4	66.5	47.9	48.3	52.3
Germany	88.8	76.6	72.5	49.7	47.8	55.6
Greece	81.8	75.3	71.0	31.2	35.6	39.6
Ireland	86.5	73.8	71.4	32.8	33.6	48.2
Italy	81.6	75.7	65.1	29.9	34.2	36.7
Japan[a]	88.8	86.7	81.7	53.4	55.7	57.2
Luxembourg	93.1	84.0	74.6	35.9	40.9	45.6
Netherlands	83.5	69.1	79.9	28.6	34.7	59.4
New Zealand	89.1	80.3	77.1	39.1	42.8	62.1
Norway	85.6	84.4	82.7	49.3	63.0	73.5
Portugal	99.2	82.8	75.8	30.5	49.8	58.1
Spain	90.5	67.9	67.0	32.5	26.5	35.7
Sweden	86.2	83.0	73.5	60.8	73.9	69.4
Switzerland	100.0	92.7	87.2	54.1	54.7	71.0
United Kingdom	90.3	75.9	78.1	52.7	52.6	64.2
United States	82.8	76.5	80.5	48.0	56.2	67.4

[a] Japanese series changes from 1996 to 1998 *Employment Outlook*.
Sources: OECD, *Employment Outlook* (July, 1996, table A); OECD, *Employment Outlook* (June, 1999, table B), compiled and elaborated by Carnoy (2000)

Table 4.28 Percentage of standard workers in the *chuki koyo* system of Japanese firms

(A) Size of the firm, education of workers, and *chuki koyo* membership (% calculated on the total of workers in each cell)

	No. of employees		
	>1,000	*100–999*	*10–99*
Elementary/new junior high	8.4	4.9	3.9
Old junior high/new senior high	24.3	11.7	4.8
Professional high/2-year college	14.1	7.2	2.8
University	53.2	35.0	15.7

(B) Percentage of workers in firms with over 1,000 employees included in *chuki koyo* system, according to their age and education

	Age (years)							
Education	*20–24*	*25–29*	*30–34*	*35–39*	*40–44*	*45–49*	*50–54*	*55–59*
Elementary/new junior high	13.1	13.1	27.9	32.5	25.6	17.1	8.4	6.2
Old junior high/new senior high	53.4	50.3	42.9	52.6	41.4	39.1	24.3	14.3
Professional high/2-year college	50.8	34.1	31.3	37.2	30.9	15.8	14.1	8.6
University	88.9	59.5	57.1	49.9	58.9	53.4	53.2	31.7

Source: Nomura (1994)

Table 4.29 Concentration of stock ownership by income level in the United States, 1995 (percent)

Income level (in thousands)[a]	*Share of households*	*% who own*	*% of stock owned*	
			Shares	*Cumulative*
Publicly traded stock				
Over 250	1.0	56.6	41.9	41.9
100–250	5.4	41.4	23.2	65.1
75–100	5.8	33.9	9.1	74.2
50–75	13.7	24.4	11.2	85.4
25–50	31.1	14.0	8.7	94.1
15–25	19.1	10.4	3.7	97.8
Under 15	23.9	3.4	2.3	100.0
Total	100.0	15.2	100.0	
Stock in pension plans[b]				
Over 250	1.0	65.0	17.5	17.5
100–250	5.4	61.7	31.3	48.8
75–100	5.8	58.9	14.8	63.6
50–75	13.7	50.8	18.1	81.7
25–50	31.1	35.1	14.3	96.0
15–25	19.1	16.8	3.1	99.1
Under 15	23.9	3.2	0.9	100.0
Total	100.0	29.2	100.0	
All stock[c]				
Over 250	1.0	84.6	28.0	28.0
100–250	5.4	80.7	26.2	54.2
75–100	5.8	75.6	11.9	66.1
50–75	13.7	63.7	14.6	80.7
25–50	31.1	47.7	13.0	93.7
15–25	19.1	28.1	4.6	98.3
Under 15	23.9	7.9	1.7	100.0
Total	100.0	40.4	100.0	

[a] Constant 1995 dollars.
[b] All defined contribution stock plans including 401(k) plans.
[c] All stock directly or indirectly held in mutual funds, IRAs, or Keogh plans and defined contribution pension plans.
Source: Unpublished analysis of SCF data by Wolff, compiled and elaborated by Mishel et al. (1999)

Appendix B:

Methodological Note and Statistical References for the Analysis of Employment and Occupational Structure of G-7 Countries, 1920–2005

Three sets of statistics have been compiled to illustrate the development of the service and information sectors. Data have been collected for seven countries (Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States) beginning from the 1920s up to the most recently available date. The following describes each set of statistics compiled for this exercise.

Percentage distribution of employment by industrial sector and intermediate industry group

Employment statistics by industry have been compiled for seven countries. Industries are classified into six industrial sectors and 37 intermediate industry groups, according to the classification developed and used by Singelmann (1978). The six industrial sectors are:

I Extractive
II Transformative
III Distributive services
IV Producer services
V Social services
VI Personal services

Within each sector, two to eight intermediate industry groups are included, as shown in table A4.1. Employment statistics with detailed industrial breakdown, from national census or statistical abstracts, have been aggregated and reclassified into these categories.

Instead of reconstructing the database from the 1920s, we chose to

Table A.4.1 Classification of industrial sectors and intermediate industry groups

I Extractive
- Agriculture
- Mining

II Transformative
- Construction
- Utilities
- Manufacturing
  - Food
  - Textiles
  - Metal
  - Machinery
  - Chemicals
  - Miscellaneous manufacturing

III Distributive services
- Transportation
- Communication
- Wholesale
- Retail

IV Producer services
- Banking
- Insurance
- Real estate
- Engineering
- Accounting
- Miscellaneous business services
- Legal services

V Social services
- Medical, health services
- Hospital
- Education
- Welfare, religious services
- Nonprofit organizations
- Postal service
- Government
- Miscellaneous social services

VI Personal services
- Domestic services
- Hotel
- Eating, drinking places
- Repair services
- Laundry
- Barber, beauty shops
- Entertainment
- Miscellaneous personal services

Source: Singelmann (1978)

build upon Singelmann's work by extending his database beyond 1970. We put the best possible effort into making our classification of industries identical to that used by Singelmann, so that the database would be comparable in time series.

For the purpose of clarification, table A4.2 shows the industrial breakdown we used in updating the employment distribution by industry. The table lists all detailed industrial categories included in each intermediate industrial group for the seven countries. Any major variations from other countries concerning the classification is noted in each statistical table produced. For all countries, figures that represent annual averages of the number of employed persons (including self-employed, nonsalaried employees) by industry have been used for this analysis.

Note that the sectoral categories (categories I through VI) do not take into account detailed industries which may be included in an-

Table A4.2 Classification of industries by countries

	Canada	*France*	*Germany*	*Italy*	*Japan*	*United Kingdom*	*United States*
Agriculture	Agriculture, forestry, fishing, trapping	Agriculture, forestry, fisheries	Agriculture, forestry, fisheries, gardening	Agriculture, forestry, fisheries	Agriculture, forestry fisheries	Agriculture, forestry, fishing	Agriculture, forestry, fisheries
Mining	Mining, quarries oil wells	Solid mineral extraction/coking	Coal mining, ore mining, petroleum/gas extraction	Extraction of combustible solids, liquids	Mining	Coal extraction, solid fuels, electricity/gas	Metal, coal mining, crude petroleum and natural gas extraction
Construction	Construction	Building/civil engineering/ agricole	Construction	Construction	Construction	Construction	Construction
Food	Food/beverage, tobacco	Food, meat/milk	Food, beverage, tobacco	Food, beverage, tobacco	Food, beverage, tobacco, feed	Food, drink, tobacco	Food/kindred prods, tobacco manufactures
Textiles	Textiles, knitting mills	Textiles, clothing	Textiles	Textiles	Textiles	Textiles	Textile mill prods
Metal	Primary metal, metal fabricating	Ferrous metals, steel, construction materials, foundry	Foundry, metal, steel	Nonferrous metal, fabricated metal, foundry	Nonferrous metal, fabricated metal, iron/steel	Metal, nonmetallic mineral prods	Primary metal, fabricated metal
Machinery	Machinery, electrical products	Machinery, electric/electronic prods, household appliances	Machinery, electrical, office equipment	Machinery, electrical/ electronics machinery	Machinery, electrical/ electronic products	Mechanical engineering, data-processing equip., electrical/electronic engineering	Machinery, electrical machinery
Chemical	Chemical petroleum/coal products	Basic chemical/ artificial fibers, pharmaceutical	Chemical/fibers	Chemical	Basic chemical, petroleum/coal prods	Chemical/man-made fibers	Chemical/allied prods, petroleum/coal prods
Miscellaneous manufacturing	Rubber/plastic, leather, clothing, wood, furniture/fixtures, paper, printing/ publishing, transp. equipment, nonmetallic mineral products, misc. manufacturing	Automobiles, ships/aerospace/ military equip., apparel, misc. mfg, wood, plastic, glass, paper/ printing/ publishing, shoe/ leather prods	Stone/clay, rubber, transport equip., aircraft/ shipbldg, wood, plastic, glass, paper, printing/ publishing, leather, music instr., clothing	Leather, transport equip., clothing/ footwear, paper/ printing/ publishing, rubber/plastic, misc. mfg	Apparel/other fabric prods, transp. equip., precision instr., misc. mfg, lumber/wood/ furniture, plastic, rubber, pulp/ paper, printing/ publishing, leather/fur, ceramic/stone/ clay prods	Motor vehicle/ parts, other transp. equip., instrument engineering, footwear/clothing, timber/wood furniture/paper/ printing/publishing, rubber/plastics, other mfg	Transportation equip., apparel, prof. photographic equipment/watches, toys/sporting goods, lumber/wood, furniture/fixtures, stone/clay/glass, paper, publishing/printing, rubber/plastic, leather, misc. mfg

Utilities	Electric power, gas, water utilities	Electricity production/distrib., gas/water distrib.	Electricity, gas, water supply	Electricity, gas, water	Electricity distr., water/gas/heat supply	Gas/electricity/ water	Utilities/sanitary serv.
Transportation	Transportation, storage	Transport	Railways, water transport	Railways, air transport	Railways, road passenger/freight, water/air, other rel. serv., auto. parking	Railways, other inland transport, sea, air transport, supporting serv.	Railroads, bus/urban transit, taxicab trucking, water/air transp., warehousing
Communication	Communications	Telecommunications/ postal services	Communications, postal services	Communications	Communication	Communications/ postal services	Communications, broadcasting
Wholesale	Wholesale trade	Food wholesale, non-food wholesale	Wholesale	Wholesale	Wholesale, warehousing	Wholesale	Wholesale trade
Retail	Retail trade	Food retail, non-food retail, auto repair/sales	Retail	Retail	Retail	Retail	Retail trade
Banking	Banks, credit agencies, security brokers/dealers	Financial organizations	Financial institutions	Financial institutions, securities	Financing/ insurance	Banking/finance	Banking, S&L, credit agencies, security brokerage
Insurance	Insurance carriers/ agencies/real estate	Insurance	Insurance	Insurance	Insurance	Insurance, except social security	Insurance
Real estate	n.a.	Real estate rental/ finance	Real estate, rental	Real estate	Real estate	Owning/dealing real estate	Real estate, real estate insurance law offices
Engineering	Engineering/ scientific services	n.a.	Technical consulting	Technical services	Civil engineering, architecture	n.a.	Engineering/ archictectural/survey
Accounting	Accountants	n.a.	n.a.	Accounting	Accounting	Accounting	Accounting/auditing
Misc. business services	Services to business management	Services to enterprises	Legal/accounting/ other business services	Other business services, renting	Goods rental/ leasing, info. serv./research/ advertising, professional serv.	Business services, renting of movables	Advertising, commercial R&D, personnel supply serv., bus. mgmt consulting, computer serv., detective serv., bus. serv.
Legal services	Office of lawyers/ notaries	n.a.	n.a.	Legal	Legal services	Legal	Legal serv.

	Canada	*France*	*Germany*	*Italy*	*Japan*	*United Kingdom*	*United States*
Medical, health services	Office of physicians/ surgeons, paramedical, dentists, etc.	n.a.	Health/veterinary	Health services, veterinary	Medical/health serv., public health serv.	Medical/other health serv., sanitary serv.	Health serv. except hospitals
Hospital	Hospitals	n.a.	n.a.	Hospitals	Hospitals	n.a.	Hospitals
Education	Education and related services	n.a.	Education, science/research institutions	Education, research, museums, botanical/ zoological gardens	Education, science research institutions	Education, research and development	Schools, libraries, vocational schools, educational serv.
Welfare, religious services	Welfare, religious organizations	n.a	Social serv./ employment offices	Religious organizations	Welfare/social insurance, religion	Other serv. incl. social welfare	Religious organizations
Nonprofit organizations	Labor organizations, trade associations	n.a.	Nonprofit organizations	Economic org., professional associations	Co-ops, pol./bus./ cultural organizations	n.a.	Membership organizations
Postal service	n.a.	n.a	n.a.	Postal services	n.a.	n.a.	Postal serv.
Government	Public administration defense	n.a	Public administration	Public administration, armed forces, international organizations	National gov't serv., local gov't serv., foreign gov'ts/int'l org.	Public administration and defense	Public administration, defense, justice, public order
Misc. social services	Miscellaneous services	n.a.	Trash removal, residential institutions	Other social services	Waste treatment, other services	Other professional/ scientific services	Misc. prof. and related serv.
Domestic services	Private households	n.a.	Private households	Domestic services	Domestic services	n.a.	Private households
Hotel	Hotels/motels lodging houses/ residential clubs, camping grounds	Hotels/cafés/ restaurants	Hotels/ restaurants	Hotels (with or without restaurants)	Hotels/lodging places	Hotels/catering (restaurants, cafés, clubs/canteens)	Hotels/motels, lodging places
Eating, drinking places	Restaurants/ caterers/ taverns	n.a.	n.a.	Restaurants, camping	Eating/drinking places	Restaurants/cafés/ snack bars	Eating/drinking pl.

Repair services	Repair of shoe, auto, jewelry electrical appliance	n.a.	Auto/bicycle repair	Repair	Repair services	Repair of consumer goods/vehicles	Auto, electrical, misc. repair
Laundry	Laundries/ cleaners/presser, self-service laundries	n.a.	Laundry/cleaning	Laundry	Laundry	Laundry/dry cleaning	Laundry/cleaning
Barber, beauty shops	Barber/beauty shops	n.a.	Barber/body care businesses	Barber/beauty shops	Barber/beauty shops	Hairdressing/ manicure	Beauty shops, barber shops
Entertainment	Amusement/ recreational services	n.a.	Culture/sports/ entertainment	Entertainment, cinema, broadcasting, sports	Motion pictures, recreation, broadcasting, amusement	Recreation/cultural services	Entertainment, theaters/movies, bowling alleys/billiard/ pool places
Misc. personal services	Funeral services misc. personal services	All for-profit personal services	Other personal services	Cemetery administration	Misc. personal services	Personal services	Funeral service/ crematories

other sector. For instance, when a country's statistics include eating and drinking places in retail services, but cannot be disaggregated due to the lack of detailed breakdown, the percentage for distributive services (III) becomes overestimated and personal services (VI) becomes underestimated. As a result, proportions for certain industrial sectors may be inflated or deflated.

Also, priority was given to comparability across countries rather than to strict breakdown of detailed industry by our classification. This was done to avoid assigning industries to different categories in each country, which would have disturbed the comparability of the shares of employment in the large categories (I through VI). This was due to the fact that data from some countries combined various sectors and we were unable to disaggregate them. For instance, many countries regarded paper, printing and publishing as one sector, and we have allocated it to miscellaneous manufacturing, although it was theoretically favorable to consider publishing as business services. As a result, we have allocated publishing statistics from all countries under miscellaneous manufacturing, even those countries which provide disaggregated data on publishing, in order to maintain cross-national comparability.

For the same reasons, the following industries are allotted to the following detailed categories.

- products that are made from textiles or fabrics, including apparel, shoes, and clothing are classified as "miscellaneous manufacturing;"
- transport equipment (including automobile, shipbuilding and aerospace industry products) are classified under "miscellaneous manufacturing;"
- scientific equipment, including optical, photography, and precision instruments are classified under "miscellaneous manufacturing;"
- printing and publishing are classified under "miscellaneous manufacturing;"
- depending on the breakdown available in each country, broadcasting (radio and TV) is classified under either "communication" or "entertainment;"
- miscellaneous professional and related services may be classified in any miscellaneous services, depending on the country. After carefully analyzing the data and finding some further disaggregated data, "other professional services" was classified as "business services" for Japan. For the United States, it was classified as "miscellaneous social services."

In addition, the following specificities should be noted for the countries studied.

Canada

The 1971 figures are based on the census data for persons 15 years and over who worked in 1970. The 1981 figures are based on the 20 percent sample data from the 1981 census on the labor force 15 years and over. Due to the unavailability of the breakdown of the labor force in detailed industry from the results of the 1991 census as of November 1992, we have used the latest statistics available (May 1992) from Statistics Canada, published in the monthly report, *The Labour Force*. The figures are derived from the sample of about 62,000 representative households across the country (excluding the Yukon and Northwest Territories). The survey was designed to represent all persons in the population 15 years of age and over residing in the provinces of Canada, with the exception of the following: persons living on Indian reserves; full-time members of the armed forces; and people living in institutions (that is, inmates of penal institutions and patients in hospitals or nursing homes who have resided in the institution for more than six months). The 1992 figures reflect the labor force in May 1992, and have been based on the 1980 Standard Industrial Classification since 1984 (Statistics Canada, 1992).

France

Figures are based on the employed population on December 31 of every year, published in the annual statistical abstract. The 1989 figures are preliminary. Problems have been encountered due to the general lack of detailed breakdown of statistics on service sector employment. Whenever a detailed breakdown of service industries is unavailable, the category "not-for-profit services" is classified as miscellaneous social services, and "for-profit services" is classified as miscellaneous personal services. However, the data from the annual statistical abstract was used instead of the census data since the most recent results currently available to us from the census are those of 1982.

Germany

In this analysis we used the former Federal Republic of Germany prior to unification as a unit of analysis. The figures are based on the census data on the employed for 1970 and 1987. No census was conducted in Germany between these years.

Italy

Figures are based on the census data on labor force in 1971 and 1981; 1990 figures may not be directly comparable to the data in earlier years due to the difference in sources. Since the 1991 census figures were not available at the time of our analysis, the 1990 figures were used as a rough indicator of recent trends.

Japan

Figures are based on the census data from October 1970, 1980, and 1990 on employed persons 15 years of age and over. The 1970 and 1980 figures are that of a 20 percent sample tabulation, and the 1990 figures are that of a 1 percent sample tabulation.

United Kingdom

Figures for England and Wales are used for the years between 1921 and 1971. From 1971 onwards, figures for employees in employment for the whole of the United Kingdom in June every year are used. These figures are chosen in preference to the census data on employed persons due to the unavailability of 1991 census results at the time of our analysis, and the 1971 and 1981 figures available to us do not include the entire United Kingdom. In addition, careful comparisons of the census data on the employed and the Department of Employment data on employees in employment for Great Britain revealed that differences are minor in terms of employment distribution.[152] Thus we have decided that the employees-in-employment figures would serve as a rough estimate of the trends in the United Kingdom between 1970 and 1990. These figures exclude private domestic servants and a small number of employees of agricultural machinery contractors but include seasonal and temporary workers. Family workers are included in the figures for Great Britain but not for Northern Ireland. The figures on the employees in employment also excludes the self-employed. The figures are from censuses of employment conducted in Great Britain by the Department of Employment and for the United Kingdom include information from similar censuses conducted in Northern Ireland by the Department of Manpower Services.

152 There is a tendency, however, for share of agricultural employment to be estimated lower than that of the entire employed population, as shown in table 4.16.

United States

The detailed breakdown of employment from the current population survey for 1970 was not published in the *Employment and Earnings* issues. Thus we have substituted the 1970 data with that of the census, since the intercensal statistics provided by the current population survey are, in general, designed to be comparable with the decennial statistics (see p. vii of 1970 census, volume 2: 7B, Subject Reports: Industrial Characteristics). The US figures are based on all civilians who, during the survey week, did any work at all as paid employees, in their own business, profession, or on their own farm, or who worked 15 hours or more as unpaid workers in an enterprise operated by a member of a family; and all those who were not working but who had jobs or businesses from which they were temporarily absent because of illness, bad weather, vacation, labor–management disputes, or personal reasons, whether they were paid for the time off or were working in other jobs. Members of the armed forces stationed in the United States are also included in the employed total. Each employed person is counted only once. Those who held more than one job are counted in the job at which they worked the greatest number of hours during the survey week. Included in the total are employed citizens of foreign countries who are temporarily in the United States but not living on the premises of an embassy. Excluded are persons whose only activity consisted of work around the house (painting, repairing, or own-home housework) or volunteer work for religious, charitable, and similar organizations (Department of Labor Statistics 1992). Due to the reclassification of the SIC codes for the 1980 census, figures before and after that date may not be strictly comparable.

Employment statistics by industry

Hall proposes two ways of dividing employment sectors: industry versus services, and goods handling versus information handling (Hall 1988). "Industry" includes all mining, construction, and manufacturing sectors, and "services"' includes all remaining categories. "Goods handling" sector includes mining, construction, manufacturing, transportation, wholesale/retail trade; "Information handling" sector includes communications, finance, insurance and real estate (FIRE), all remaining services and government.

In our analysis, employment statistics with Singelmann's classification have been aggregated and reorganized to fit into Hall's

classification.[153] Further, the ratio between services and industry employment, as well as the ratio between information handling and goods handling employment, have been derived from the data used in tables 4.8 through 4.14.

Employment by occupations

Standard occupational classifications of most countries habitually confuse sectoral activities with skill levels, and thus are unfavorable for our use. However, after careful consideration based on the available data from the countries, it became clear that a reconfiguration of occupational classifications would be a major project by itself. Since our primary purpose in this appendix excludes such analysis, we decided to use the existing classification as a rough indicator for the occupational breakdown of these countries. As a result, the following rough breakdown of occupations has been determined:

- managerial
- professional
- technicians
- sales
- clerical
- crafts and operators
- semi-skilled service workers
- semi-skilled transport workers
- farm workers and managers

For most countries, it was impossible to separate professional and technician categories. Also, in some countries, craft workers and operators are mixed, thus we have collapsed these categories into one in order to avoid misleading conclusions from the data. The same applies to the collapse of farm workers and farm managers into one category. "Crafts and operators" also includes laborers, handlers, and miners. Those categorized as service workers have been included in semi-skilled service workers.

The specificity for each country is described as follows:

Canada

Figures are based on the occupational classification of the employed. Professional and technician categories also includes those whose pro-

153 In order to comply with the standard classification of services, eating and drinking places are included in retail trade.

fessions are in natural science, social science, teaching, medicine/health and artistic/recreational. Crafts and operators category also includes mining/quarrying, machining, processing, construction trades, materials handling, and other crafts/equipment operating. Farm workers and managers also includes agriculture, fishing/hunting/trapping and forestry/logging.

France

Figures are based on the occupational classification of the population aged 15 years and over, excluding unemployed, retired, students, and others who have never worked, according to employment surveys, the results of which are included in the statistical abstract. Managerial category also includes high-level public officials and high-level administrative/commercial workers in business enterprises. Professional category includes professors/scientific occupations, information/art, and engineers/technical workers. Technicians includes intermediate professions, workers in religion, and social/health mid-level workers. Clerical category includes civil servants and administrative workers. Crafts and operators category includes qualified and unqualified workers in industries.

Germany

Figures are based on the occupational classification of the employed persons, according to the statistical abstract. Managerial category includes accountants, public officials, and entrepreneurs. Professional category includes engineers, scientists, artists, and health service workers. Crafts and operators includes most industrial workers. Technicians includes social workers. Farm workers and managers category includes workers in forestry and fisheries.

Japan

Figures are based on the occupational classification of employed persons, according to Labour Force Survey, the results of which are included in the statistical abstract. Farm workers and managers includes workers in forestry and fisheries. Semi-skilled service workers category also includes protective service workers. Semi-skilled transport workers includes communications occupations.

United Kingdom

Figures are based on the 10 percent sample of Great Britain, derived from the censuses. Professional category includes judges, economists, environmental health officers, etc. Technicians includes estimators, welfare occupations, medical technicians, draughtsmen, foremen, tracers, supervisors of tracers, and technician engineers. Crafts and operators includes most industrial workers. Semi-skilled transport workers includes warehousemen/storekeepers/packers/bottlers. Semi-skilled service workers includes sport/recreation workers and protective services. The 1990 figures are based on the Labour Force Survey (1990 and 1991) conducted by the Office of Censuses and Surveys. The 1990 figures are not directly comparable to previous years due to the different survey methodology and categories employed. However, since the 1991 census data were not available at the time of this analysis, the 1990 figures provide a rough estimate of employment structure in Great Britain.

United States

Figures are based on the annual averages of employed persons according to the household survey, conducted as part of the Current Population Survey by the Bureau of the Census for the Department of Labor. Managerial category includes executive and administrative occupations. Clerical category includes administrative support. Semi-skilled service worker category includes private household and protective services. Crafts and operators category includes precision production, repair, machine operators/assemblers/inspectors, handlers, equipment cleaners, helpers, and laborers. Semi-skilled transport workers includes material-moving occupations. Farm workers and managers includes forestry and fishing.

Distribution of employment status

The status of employed persons are broadly categorized as employees, self-employed, and family workers. When figures for family workers are not available, they may be included within the self-employed categories. Self-employed generally include employers, unless otherwise noted.

The following lists the specificity for each country.

Canada

Those employers who are paid workers (rather than the self-employed) are included in the employees category.

France

Figures are based on civilian employment, indicated in OECD Labour Force Statistics.

Germany

Figures are based on the annual statistical abstract.

Italy

Figures are based on civilian employment, indicated in OECD Labour Force Statistics.

Japan

Figures are based on the Labour Force Survey on employed persons, included in the annual statistical abstract.

United Kingdom

Figures are based on civilian employment, indicated in OECD Labour Force Statistics.

United States

Figures are based on the annual averages of employed civilians in agriculture and non-agricultural industries.

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