

CHAPTER 8

TECHNICAL EXPERTISE, THE NEW STRATEGIC FACTOR

If Marx had been loyal to core his historical method, he probably would not have predicted that the industrial proletariat would overthrow the bourgeoisie and establish socialism throughout the world. But in any case it would have been difficult for him to foresee that capitalism would change so much during the twentieth century and that a new class - the technobureaucracy - would emerge in association and conflict with the bourgeoisie. His predictions would have been very different and much less optimistic if at least part of the data we have at our disposal today were available at his time.

Today it is relatively easy to substantiate the rise of technobureaucracy's influence. It is a historical phenomenon in our times which can be empirically validated. Nevertheless, it is the inability to distinguish Marx's historical-dialectical method from his analysis of the political and social phenomena of his time that leads a large part of the left throughout the world to deny the emergence of a new class and the definition of a new mode of production.

1. Technical knowledge: the new strategic factor.

The application of the historical-dialectical method to demonstrate the advance of the new technobureaucratic class was performed by an economist who, though influenced by Marx, is strictly heterodox in relation to Marxism. I have already referred to Galbraith's concept of the "strategic factor of production". Applying this notion, Galbraith showed that capitalism became the dominant system throughout the world when, as a result of the Industrial Revolution, capital replaced land as the strategic factor of production. More recently, due to the immense technological progress which is occurring, technical knowledge has begun to replace capital in the role of the strategic factor of production. As the strategic factor of production changes, so does the political and economic system. Capitalist entrepreneurs are being replaced by the "technostructure", that is, by a new class of managers and technical experts.

The relative abundance of capital in the highly developed countries is the basic reason why capital is losing its strategic role. First Galbraith argues that there is a tendency of investments (the demand for capital) to be lower than savings (the supply of capital). This tendency is not merely circumstantial but rather is intrinsic to capitalism. Secondly, access to capital is completely under the control of the enterprises. Contrary of what all orthodox economic theories propose, capital markets have only secondary importance in the capitalization of

enterprises. In general, as more than three-quarters of the capital of modern corporations originates from their own profits, they are self-financing.

A third argument which could have been added by Galbraith to explain the relative abundance of capital in modern industrial society is capital-saving technological progress. Most of this century's innovations do not merely represent savings in labor costs; they also mean savings in capital. Many modern machines not only save labor, but also present a higher ratio between the physical product and the machine, that is to say, a higher product-capital ratio. In extreme, but not uncommon cases, the high level of technological sophistication incorporated in a new machine permits it to increase production, while reducing its costs in absolute terms. This is what happened, for example, with third-generation computers in comparison with second generation ones⁴⁴.

Due to this, capital is losing its strategic character and capitalists are losing relative power and prestige. However, the decline in the importance of capital is a relative phenomenon. It only makes itself felt to the extent that another factor of production becomes strategic. The rise of a new strategic factor, which gains increasing importance in the process of production in the so-called modern industrial societies, is one of the most significant phenomenon of the twentieth century. This new strategic factor is technical and organizational knowledge. Galbraith calls the new strategic factor "specialized talents" and "organized information" (1967: 52). From the emergence of the new strategic factor of production, he concludes:

"This has, indeed, occurred. It is a shift of power as between the factors of production which matches that which occurred from land to capital in the advanced countries beginning two centuries ago. It is an occurrence of the last fifty years and is still going on" (1967: 52).

The division of labour, the increasing specialization and professionalization of society are the vehicle to the transformation of technical and organizational knowledge into political power. The division of labour is the foundation of markets, but it is also of organizational and political power. The knowledge experts dominate is not an 'objective' reflection of reality, but a selection and interpretation, saying what is and what should be; groups or individuals that control knowledge, control power (Rueschemeyer, c 1986).

⁴⁴ - For a discussion of the capital-saving - as well as besides labor-saving - character of recent technological progress, see Bresser-Pereira (1986).

2. A Technological Development Without Precedents

Why is technical-organizational knowledge becoming the strategic factor of production in modern industrial society? On the technical level, the answer is obvious. The world, in this century, is seeing unprecedented technological development. The pace of scientific discovery applicable to production is increasing geometrically. Since mankind harnessed electrical-power, we have entered into a process of exploiting all the potentials of this seemingly inexhaustible new energy source, not only in its enormous power, but also in its immense adaptability. Electricity directly furnishes an enormous quantity of energy, which multiplies many times over not only the human and animal energy of the pre-industrial period, but also that of the mechanical energy which ushered in the Industrial Revolution. In addition, as electricity is extremely sensitive to control, it gave rise to the combustion engine, radio, television, computers, and atomic energy. Just as the steam engine marked the mechanical phase of the first Industrial Revolution, electrical energy marks the second Industrial Revolution at the end of the nineteenth century. Beginning in the mid of the twentieth century we live now the Third Industrial marked by the electronic revolution. This revolution is not limited to computers. In the last twenty years manufacturing is under a profound revolution. New production techniques employing more flexible microelectronic based automation technologies and Just-in-Time devices led to reorganization and transformation of production processes across many industries (Kaounides, 1990).

This geometrical advance in technical knowledge, beginning with man's domination of electrical energy, has naturally make technological knowledge more and more important to production. Whereas at the beginning of the First Industrial Revolution machines were simple imitations of manual production processes, and production techniques were extremely simplified, so that mechanics with only the most elementary education could master them, after the second Industrial Revolution, the machine and control over it have become extremely complex. It is no longer enough to have an old experienced mechanic who learned his profession on the job, to build and run them. Often not even engineers educated in institutes of higher education are equal to the task. To control the most modern technology, highly specialized engineers and scientists are required who continue on in post-graduate study. But even these men alone are unable to construct and operate the new machines, due to their degree of complexity. Rather, this is the task of a team of technical experts.

The recognition of technology as the most decisive factor in economic development is a recent phenomenon. A century ago, this type of analysis could not ordinarily have occurred for the simple reason that technological advances were not as important at that time. We were in the zenith of capitalism. Capital

was essentially and effectively the strategic factor of production and the accumulation of capital was the dynamic factor of development. A century later however, economic conditions have changed. Technology has made so many advances that it has surpassed capital itself in importance. The introduction of electronic technology represented a qualitative leap which was decisive in relation to the old mechanical technology. The increase in efficiency and complexity incorporated into the new technology was so significant that technology itself became the new relatively scarce factor of production. The mastery of technology by a relatively reduced number of men and women conferred increasing importance upon their highly specialized work. The new electronic technology, or simply technical knowledge, has become the new strategic factor of production. Technobureaucratic capitalism is the capitalism of high technology, where technocrats and scientist play a major role.

3. Organizational Knowledge

Not only strictly technical and scientific knowledge, but also organizational knowledge, the knowledge of bureaucrats, define the new strategic factor of production. It would be possible to include organizational knowledge within the concept of technical and scientific knowledge. There is really no essential difference between the two. But it is preferable to include organizational knowledge separately in order to duly emphasize its importance.

I understand organizational knowledge to be the technology needed to administer large modern bureaucratic organizations on the micro-social level of corporations as well as on the macro-social level of the modern state. This includes not only economics and management, which make up its operational nucleus, but also, sociology and psychology, as well as the formal sciences of mathematics, statistics, and operational research. Respectively they represent the social and methodological bases of organizational knowledge.

One of the transformations which the modern world has undergone and which frequently has not received adequate attention is the emergence of the bureaucratic organization as a dominant social phenomenon. The organizational revolution is a process which, in the last one hundred years, has transformed the bureaucratic organization into the dominant type of social system in industrial societies. Throughout the entire pre-industrial period, until the First Industrial Revolution, bureaucratic organizations played only a secondary role within the social system. Traditional, non-rational types of social systems prevailed, such as the tribe, the clan, the feud, the family production unit. Since the existing technology did not demand it, bureaucratic organizations were not necessary.

Of course, there are some classic exceptions. The pharaohs of Egypt and the mandarins of China built large state bureaucracies. The Catholic Church is a renowned example of bureaucracy that has endured for centuries. In the seventeenth and eighteenth centuries, when the first nation-states appeared, their civil services and armies were also examples of bureaucracies. But these bureaucracies had limited economic and social relevance as long as production was not bureaucratically organized. The family unit of production was practically the only system of production known up to mid-nineteenth century.

It was only after the Second Industrial Revolution that the growth of production units determined the rise of large bureaucratic organizations. The economies of scale brought by innovations such as the assembly line, integrated flow production and automation forced enterprises to become larger and more complex. On the other hand, the development of the means of communication, with the computer as its culmination, made efficient administration of larger and larger social systems viable. In this way, the new production technology forced corporations to grow, while the new communications technology allowed these organizations to be managed efficiently. Before the advent of the electronic means of communication, the centralized administration of large organizations was extremely difficult. The system of production was necessarily formed by an infinite number of small, independent production units. Now, with electronic technology, it has become both possible and necessary to concentrate production in large corporations.

Thus the ideal type of bureaucracy, so brilliantly developed by Max Weber (1922), is becoming the dominant system at all levels of social life. Bureaucratic organization - defined as a rational social system administered according the criterion of efficiency, in which precise objectives are identified and the most adequate and efficient means are chosen to achieve them - is becoming the basic form of social organization in our century.

A bureaucratic organization, to the extent that it is a rational social system, is a technical organization which can only be managed by technical experts. To efficiently administer bureaucratic organizations, a great deal of technical knowledge is necessary which is becoming increasingly monopolized by professional managers. On the other hand, to administer society as a whole keeping with economic development, the state takes on a strategic role, and another kind of specialized knowledge is needed which progressively becomes monopolized by economists. Thus, in the bureaucratic world we live in, the management of both bureaucratic organizations and society as a whole falls to professional administrators and economists.

4. Technique as the Dominant Principle of Our Age

In conclusion, we are witnessing a historic process of transformation, in which one factor of production, capital, is becoming less and less strategic, while another factor, technical and organizational knowledge, is acquiring that character. Technology, embodied in other factors of production, always existed. The differentiating element in land, labor, and capital was always technology. The continuous and progressive development of technology, however, has shown a qualitative leap. Technology has ceased to be a mere appendage; it has gained a life and substance of its own.

Technical expertise or know-how has not only become more complex, but also more decisive in the process of economic development. It is not only the new strategic factor of production but has also succeeded in becoming the dominant factor in the age we live in. It has been incorporated to modern life to such an extent that it has acquired an overwhelming role as the determinant of our lives.

Jacques Ellul (1954), in a pioneering work on this question, showed how technical expertise has taken charge of the modern world, becoming the principle formative element in our civilization.

There are two alternative ways to look at technical know-how. According to an optimistic conception, it can be conceived as a neutral element, which has always been utilized by mankind, in accordance with its own free will. From this point of view, know-how would merely be a relation between the worker and his instruments of production. It would be the form by which men and women create and use the means of production. Technical knowledge evolved throughout history, but always under the control of the human will, to which it was always subjugated.

The other alternative is to consider technical expertise as an entity in itself, autonomous from the individual who created it, bringing with it objective characteristics which, far from making it neutral, transform it into a decisive element in history. Jacques Ellul opts decisively for the second alternative, affirming:

"In fact, technique has taken substance, has become a reality in itself. It is no longer merely a means and an intermediary. It is an object in itself, an independent reality with which we must reckon". (1954: 63)

This option is not taken up abstractly but rather from an historical analysis of the problem. While technical expertise has always existed, it has never had the importance it does today. It is only since the beginning of the Modern Age, with the advent of commercial capital, and especially since the Industrial

Revolution, that production techniques have began to lose their traditional nature and gain more rational characteristics. These skills then began to develop at an incredibly faster than in the times of magical or traditional techniques. The development of technical know-how has progressed geometrically.

Know-how, through its quantitative development, has finally taken a qualitative leap. It has gained critical mass and its own logic. It has become universalized and autonomous in relation to man himself, being transforming into the principle formative agent of the world we live in, necessarily progressing geometrically. It has changed from a mere servant of mankind to become its tyrant. Again, in the words of Jacques Ellul, who defines the problem dramatically:

"Herein lies the inversion we are witnessing. Without exception in the course of history, technique belonged to a civilization and was merely an element among a host of non-technical activities. Today technique has taken over the whole of civilization". (1954: 128)

Thus technical skill has become not only the strategic factor of production, but also the defining element in the world in which we live (see, among many others, Chesneaux, 1989). In developing technical skill, mankind created its own little monster; it grew, became independent and ended up devouring its creator. Initially, know-how, though never quite accidental, was a secondary element which modified labor and capital. Yet technological progress was of such power and importance, reaching so far, and technological development achieved such autonomy, that a qualitative leap occurred. Technical skill assumed its own reality. It became an independent factor of production like labor or capital. It has become the most important factor, the relatively scarcest, the strategic factor of production in our times. But even more than this, it has become the principle element in the configuration of the economic infrastructure and cultural superstructure of technobureaucratic capitalism.