

# **HUMAN RESOURCES AND WORK ORGANIZATION IN THE KNOWLEDGE ECONOMY - THE CASE OF THE INDIAN SOFTWARE INDUSTRY**

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**Keywords:** Information technology and late development, international division of labor, labor market mobility, quality of work.

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## **Summary**

The Indian software industry has increasingly been of research interest, since it showed in various ways the potential of a latecomer country to be able to catch-up and become a global player in a high tech industry. However, research was mainly focused on the industrial growth and performance and on the high earning potential of software professionals. Issues such as the international division of labor in the global software production process, and the labor market related questions of quality of work and career development of professionals received limited attention. This paper addresses these issues in the context of the high tech work environment in a latecomer country.

## **1. Introduction**

The emerging 'knowledge-based economy', with its rapid technological changes, is showing far-reaching implications for the global division of labor and the organization of production. Traditional production methods are being replaced by new methods, typically labelled as post-Fordist, or flexible specialized production systems. These systems, which require a polyvalent and multi-functional work force, offer an enriching work environment, as opposed to the deskilled and monotonous work environment of the Fordist era. Given its high labor-intensity and low fixed capital requirements, the information and communication technologies (ICT) sector has become an important part of the industrialization and employment generation initiatives in many developing countries. Underlying these initiatives is the belief that the existing global divisions of

labor can be reconfigured through the promotion of the ICT sector. Moreover, the knowledge-based industries, such as the ICT, could promote employment of women. Unlike traditional manufacturing sectors, where employment has been dominated by male workers, work in the knowledge-based sectors is viewed as less physically ‘tough’ and amenable to flexible work hours and hence, may be described to be gender-neutral. This study examines these propositions through a study of employment and work patterns in the Indian software sector, which is an important component of ICT.

It is interesting to note that a developing country, such as India, could develop a strong software industry and gain global prominence. Much of the Indian software sector caters to export markets, mainly in the industrialized world. In recent years, the governments, both at the national and regional levels, have fostered and promoted this sector both for its economic potential and its potential for the generation of employment. The Indian software industry, therefore, is an interesting sector with which to investigate the process of how latecomer economies can ‘catch up’ with the industrially advanced economies. This study examines the main characteristics of the software industry in India and the issues of human resources and organization of production.

The study is organized as follows. Section 2 discusses the growth of knowledge-intensive production and its organizational implications from a theoretical perspective. Section 3 presents the key characteristics of the Indian software industry along with the various dimensions of work and employment in the industry. Section 4 concludes.

## **2. Knowledge Economy and Organization of Production – A Theoretical framework**

Much has been written on the changes brought about by the communication and information technologies (ICT) on the organization of production in both industrialized and developing countries. These studies have addressed the issues of employment and quality of work and whether such technologies foster equality or reinforce existing polarities between regions, classes and gender. Knowledge-based technologies, such as ICT, because of their proximity to basic science and low capital requirements, are viewed as opening up windows of opportunity for developing countries to ‘catch-up’ with the industrialized world. Further, the nature of the work involved in these industries is expected to provide better employment opportunities for women, compared to the traditional industrial sectors. It is, therefore, imperative in this context to chart the important dimensions of organizational changes that have taken place in recent times, so as to understand the grounds on which these assertions are made.

Technologies are developed and applied under specific social and organizational contexts. To understand the characteristics of the new knowledge-based sectors, or what are often mentioned in relation to post-Fordist organizations, it is essential to elaborate some of the characteristics of the earlier institutional frameworks that fostered and enabled the success of the Fordist mode of production. The aspects that distinguish a Fordist organization from a post-Fordist one are the prevalence of high technical division of labor, the divorce of conception from execution, leading to monotonous routines at work for a majority of the work force, and a hierarchical organizational structure. Productivity and hence, the profit rate, was sought to be raised through scale

economies. Goods were relatively homogeneous and were produced for mass consumption. Wage rates were linked to productivity increases, thereby ensuring a steady market for mass-produced goods. In such organizations, inter-firm mobility was extremely low, and job mobility was primarily internal and dependent on seniority. Further, the majority of the workforce consisted of blue-collared workers employed in large factories. Such a working environment fostered class-consciousness and the formation of worker associations to protect their interests.

However, this seemingly stable arrangement began to reach its optimal productivity levels by the end of the 1960s. Inflexibility of wage rates due to strong worker associations, in conjunction with the inherent limitations to extent of division of labor soon forced decreases in profitability of capital. This crisis in Fordism is held to have set off two crucial processes. Firstly, firms in the industrialized countries began to move out of the confines of the domestic market to explore new markets, especially in the developing economies. Secondly, and more important in the context of this study, they began to relocate the labor-intensive segments of the production process in order to reduce the costs of production.

This collapse of mass markets, leaving in its wake a highly segmented consumption economy, moved organizational priorities away from not only achieving scale economies, but also towards assuring scope economies through greater product differentiation and adaptability to customer preferences. The resultant industrial organization systems best suited to this new production requirement are termed as post-Fordist, or flexible specialisation systems.

## **2.1. Characteristics of Post-Fordist Organizations**

The key features of this system are in contrast to the Fordist type of production organization. These organizational changes are said to have replaced the deskilled, mass production worker with a polyvalent, multi-skilled worker. A professional would be expected to be a producer, technician and an administrator. The volatility in demand would require workers to adapt and switch from one task to another without loss of efficiency. In other words, 'functional flexibility' of the work force is a prime requirement. Job profiles reflect multi-skilling, flexibility and team-orientation as significant requirements. It has been pointed out that the professions are specialized, but require expertise that is less firm-specific, but more profession-specific.

Simultaneously, there has also been an increase in the importance of outsourcing to maintain profitability. Outsourcing of labor-intensive activities to smaller firms is essentially undertaken to ensure numerical flexibility, whereby workers can be deployed or laid off according to demand fluctuations. Since these activities involve tasks that do not require too many skills, workers can be replaced or augmented as and when required. Scholars therefore posit the formation of two clear segments of the labor force; one, a multi-skilled functionally flexible 'core' work force and the other, a 'periphery' characterized by numerical flexibility and hence, high employment insecurity and poor working conditions.

Further, the structure of the organization has moved away from the vertically integrated firm to a decentralized network, with production centres distributed across the globe to take advantage of both factor endowments and proximity to markets. Crucially, it deploys the information and communication technologies to co-ordinate the decentralized production and distribution segments.

The relationship between technological change and institutional arrangements is one of mutual interdependence. The diffusion of knowledge-based production systems has therefore played its part in reconfiguring the Fordist labor market into what has been labelled “post-Fordist” labor markets. Research and development has also moved away from purely university-based activity into applied research, and reflects a hybrid between academics and practical research at the enterprise level. Today, according to some researchers, the scientific communities are considered central to innovations in the knowledge-based sectors. Together, they support a strong belief in the skill generation potential of the knowledge-based organization.

Thus, a crucial component of the new organization is the increased use of information content. Though this dimension is evident even in traditional industries like clothing, footwear, etc., it is especially high in the knowledge-based sectors like computers, micro-electronics and telecommunications.

## **2.2. The Global Division of Labor**

The shift of manufacturing activities, from industrialized countries to developing countries, was initially explained by the new international division of labor (NIDL). This approach supersedes the structuralists' 'dependency' approach that viewed the relationship between industrialized and developing regions as essentially one of perpetual dependence, with little room for the latter regions to alter their position in the division of labor. The developing regions were viewed only as providers of primary commodities and/or cheap labor. The NIDL, on the other hand, points out that developing countries have more than just lower wages as a pull factor. The emergence of the newly industrialized economies (NIEs) and their ability to compete with the developed economies in certain manufacturing industries is an indication of the potential of developing countries. Further, the structuralist theory fails to explain the continued existence of certain labor-intensive manufacturing sectors in the industrialized world. It has also been criticized for its failure to consider other factors, such as transaction costs, in influencing location decisions.

The global production of goods is organized primarily by multinational corporations (MNCs) in the core economies. Different stages of the production process may be distributed across the globe taking into account various considerations, not only wages, but also factors like access to raw materials, proximity to markets, skill pool, agglomeration economies, transaction costs, etc.

Four possible roles that developing countries can play have been identified: 1) that of the classic exporter of primary commodities; 2) assembling of components or other labor-intensive sections of a process that can be outsourced; 3) production of entire product, which the parent MNC markets in its brand name (Original Equipment Manufacturing or OEM); and 4) manufacturing of the final product for marketing under

their own-brand name (Original Brand Manufacturing or OBM). These are, in a sense, different stages through which producers in developing countries can move up the value chain or build up competitiveness. As can be envisaged, a particular region may be the host to producers in different sectors undertaking different roles at a given point in time. Further, as has been pointed out, the positioning of sectors in global production conditions a country's capacity to create a regulatory framework to attract foreign direct investment and strategic alliances.

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### **Biographical Sketch**

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