3 New perspectives on automation

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3.1 Automation: reference strategy for the automobile industry

Considering the automobile industry evolution of production and assembly technologies, it is easy to ascertain that the pursuit of efficiency/quality binomial growth objective and the reduction of manufacturing time has taken on the form of a systematic replacement process of human labor with machines. This process has had different denominations: standardization, specialization, production and assembly line organization, mechanization, automation, flexible automation, computer aided manufacturing, and so on. The different names result from the need to highlight the innovative aspect (within the general automation process) and by the succession of technological innovation brought forth, thus the technologies made available. However the basic element, common to all these different phases, can easily be traced to the progressive exclusion of human labor in favor of machine power and activities (Hounshell 1987; Abernathy 1983; Hsieh et al. 1997). This was first seen in simple manual operations and it then extended to operations where the intellectual nature of the job became more important, but the objective was to replace man with machines.

The concurrent reasons determining this evolution are numerous and have different degrees of importance according to the period of time considered and characteristics of the working conditions (economy, technology, and social) of the automobile manufacturers in the various countries (Freyssenet, Mair, Shimizu

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2 On the strategic role of automation and automation industry as well see: Rosenberg (1963).
and Volpato 1998). For example, in certain moments the replacement process, more generally referred to as "automation", was mainly driven by the need to reduce production costs, while in other moments by the need to reduce human intervention in dangerous and harmful jobs or to obviate the decrease in availability of desired labor force.  

Recently, there are phenomena significantly modifying this orientation in the automobile industry. The trend towards automation, machines replacing human workforce, has not stopped. But it is entering a new phase, implying a deep reorientation of the automobile industry management. This means the entire present and prospective reference schemes, in which the defining strategies of production and assembly processes materialize, are influenced by an intense redefining phase. Scholars and business managers are reexamining not just the way automation could be implemented, but also the way automation is conceived and its potentiality and limits evaluated. So it is necessary to analyze the main aspects characterizing the mutation process going on in the international automobile industry, in order to provide an adequate reference scenario in which the most recent trends can be interpreted by the theoretical debate on automation and choices can be made by the automobile manufacturers.

While keeping clarity and conciseness, the analysis could group the changing factors of the reference scheme into three main categories. They have a strong degree of mutual interaction, but they can be considered separately:

1. repositioning of the international automobile demand;
2. offer globalization, in its diverse meanings;
3. a new division of labor between automobile manufacturers and component suppliers.

The aim of this paragraph is to analyze these phenomena and obtain indications to modify perspectives and automation choices during implementation phase by automobile manufacturers.

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