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Business



Why the networked firm model became increasingly important
The 1980s had been turbulent for Stuttgart's machine tool firms. They had begun with a severe crisis and ended with a period of unprecedented economic success, a high estimation of their flexibility and a still growing demand for their high-price, high-quality engineering products. A major challenge occurred with the introduction of microprocessor electronics in machine tools, because this technology had to be integrated into the product as well as the production process. If firms wanted to stay on the path of customized production, the new technology had to be individually adapted.

Consequently, firms could not make use of a standardized innovation scheme. To what extent and in which ways a firm implemented CNC technology had serious implications for investment in sophisticated R, the cost and design of the product, their potential usage and rationalization effect in the production process of the user firms. Entrepreneurs had to take into account the reorganization of the work process induced by the new machines being bought in or developed.

While automation was always one of the major intentions behind the development and application of microelectronics, the firms in Stuttgart refused to 'benefit' from such innovations. Their highly qualified workforce was acting in an environment of changing and multidimensional tasks. Cooperation between engineers and machinists was a frequent and integral part of the day-to-day work process. However, inventions in microelectronics made possible a further elimination of such forms of cooperation, as well as a more executive function for the machinist once these programmes were operating (Hirsch-Kreinsen 1993). Their implementation shifted the

production process towards a more integrated system of toolmaking, while individual machines could be designed for flexible use.

Until the 1970s relatively inflexible manufacturing lines had been established in bigger firms of related sectors according to Taylorist needs. In the USA machinery firms with a strong orientation towards the military and aerospace sector had promoted a further use of numerically controlled machines as part of a centrally steered manufacturing process. This created rationalization effects through a high level of automation. While the machine tool firms in Stuttgart had also tried to apply innovations from microelectronics to their machinery design, it took longer until this knowledge was diffused in firms and until they implemented shop floor solutions. Finally they chose a totally different path of innovation compared to other countries (ibid).