

## MACHINERY IN TUSCANY

### How the sector operates

The machinery industry comprises a complex variety of products and activities, often belonging to other industries: the manufacturing of special-purpose machinery is usually part of the supplied industry, and the phases of its production chain are commonly performed by different enterprises. In Tuscany, and also at national level, it represents a key sector, not having been affected by the globalization process – if anything, it led to a transition from domestic to international markets – and being more open to technological innovation. It thus generates high productivity gains and export trends that are also beneficial to other sectors. Therefore, it seems useful to investigate the specific characteristics and needs of machinery enterprises taken as a whole, although they are often examined by focus groups on other industries.

At regional level, the highest concentration of firms has developed along the Arno valley, in proximity to other manufacturing businesses, both small and medium-sized enterprises and large international corporations (e.g., Finmeccanica and GE Oil & Gas). The recent trends have shown a shift to: productions with increased added-value, and high-tech and design contents; externalization and delocalization of routine production cycles; streamlining of costs aimed at increasing productivity through automation; custom design and manufacturing to meet customers' requirements; supply of sophisticated post-sale services. These changes are pushing towards an upgrading of skills at all levels.

### Skill needs: strategic competencies and job profiles

The recent reorganization of the machinery sector has built around the increase of professional competencies, owing somewhat to the delocalization and automation processes: today, workers need special qualifications and **machine operators** are technical experts, preferably **post-graduate specialists**. In this direction, a reference point for the area is the Higher Technical Institute "Prime", where affiliated companies provide teachers and suggestions on the educational plans, giving shape to a training path focused on direct practical experience.

Another key professional is the **engineer**. Since the companies usually require long periods of in-house training, to include these in the school and university curricula would speed up labour market entry. In the manufacturing segment, as compared to others, machinery requires more competencies in **electronic, computer science, chemistry** and **biology**, that should shape a multi-qualified professional, comfortable with working in production as well as communicating with the management and planning departments.

A significant challenge is to **organize and manage the internal and external processes**, upon which depends the recovery of efficiency and productivity, but in Italy there is no **Master's program** in this field. Firms also emphasize the need to rethink **life-long learning** as a way to keep up with continually evolving skills. This sort of training must necessarily be extended to the subcontractors' personnel, in order to ensure the product standards required by the multinational groups, which are often the leaders in their respective industry.

## A taxonomy of the required professional qualifications

The table below combines data from three sources: the mandatory employment notices from firms to job centres, introduced in 2008; the IRPET survey on the training needs of the Tuscan firms having recorded higher-than-average turnover and employment rates after the crisis; the focus groups with firms belonging to strategic sectors for regional growth. The quantitative and qualitative data collected were used to classify occupations by employment capacity (number of newly employed), and job stability (combination of days worked and contract type).

### Overview of the most sought-after and in-demand machinery jobs

		Job stability	
		Medium-high	Medium-low
Employment capacity (number of newly employed)	Medium-large	Tool-makers and related workers Electrical-equipment assemblers and wirers Porters, deliverers and related workers Industrial designers and related workers Electrical- and electronic-equipment installers and repairers Energy and mechanical engineers Software analysts and designers Mechanical technicians Electrical and telecommunications engineers Production planning technicians Industrial electronic equipment maintenance and repair workers	Non-qualified industrial workers and related workers Industrial machinery mechanics and fitters and related workers Moulders, blast furnace-, converter- and metal refining-furnace operators Electronic- and telecommunication-equipment assemblers and wirers Composite products assemblers Artisan mechanics, vehicle maintenance and repair and related workers Automated and semi-automated machine-tool operators Carpenters and carpentry assemblers Camera operators and audio-video technicians Civil engineering electricians and electrical installers Application technical experts Welders and flame cutters Automated-assembly-line operators
	Medium-small	Computer programmers Industrial and management engineers Electronic technicians Precision mechanic technicians Electrical power-line installers, maintenance technicians and repairers, cable wiremen Plumbers, steamfitters and pipefitters Manufacturing technicians Electro-technical and industrial-automation engineers Information and reception clerks Managers and general directors in manufacturing, mining, production and distribution of electricity, gas and water, and waste management Machine operators in other rubber product manufacturing Electrical engineering technicians Refrigerator technicians	Machine assemblers Plumbing, heating and air-conditioning equipment installers and technicians Metal plating operators Packaging equipment operators and industrial packaging workers Mechanical testing technicians Installers of pre-fabricated and pre-formed products Artisan and industrial painters Metal-, rubber- and plastic-products assemblers Telecommunication equipment installers and repairers Metal heat-treating-plant operators Doorkeepers and related workers Continuous plant technicians

The analysis of recruitment capacity resulted in two occupation groups (medium-large and medium-small), depending on the number of newly employed (larger/smaller than the median value). The analysis of job stability resulted in two occupation groups (medium-high and medium-low), depending on the value of the composite indicator (higher/lower than the median value).

### **Territorial localization**

The map below shows the location of local units in the sector, highlighting the most dynamic firms in terms of turnover rate and number of workers for the period 2007-2011. This graphical representation allows to appreciate the degree of diffusion/concentration of production activities on a regional basis.

### **The machinery firms**

