

Research and development, innovations

This section includes indicators of scientific and scientific-technical activity of organisations (enterprises) and innovation activity of Ukraine industrial enterprises. It includes work undertaken by universities, government and not for profit research organisations.

Scientific and scientific-technical operations are fundamental and applied research, scientific and technical developments and scientific and technical services.

Fundamental research is experimental or theoretical research aimed at obtaining the new knowledge about natural development of nature, humans, society, their relationships without any specific objective connected with the usage of this knowledge. The results of their fulfilment are hypotheses, theories, methods, etc. Fundamental research can end up with recommendations regarding the conduct of the applied research to identify possibilities for making practical use of the obtained scientific results, scientific publications, etc.

Applied research is original research that is carried out to obtain the new knowledge. Applied research is mainly meant for fulfilment of the specific practical objective or task. Applied research identifies possible strands for making use of results of fundamental research, new methods for resolving problems that were indicated earlier.

Scientific and technical developments are systematic operations based on the existing knowledge obtained as a result of research and/or practical experiences and aimed at creating new materials, products, processes, devices, services, systems or methods. The operations could also be focused on significant improvement of the processes and products that already exist.

Scientific and technical services are defined as activity in the area of scientific and technical information, licenses, standardization, metrology and control over the quality, scientific and technical consultancies and follow-up activity that assist to implement research and developments into production, other types of activities that help obtain, disseminate and make use of scientific knowledge.

Financing of the expenditures for fulfilment of scientific and scientific-technical operations is the amounts of funds that have been placed on an account of organisation (enterprise) during the reference period from all sources (budget, funds from the national and international customers, own funds, etc).

Volume of operations is defined as the costs of all operations that are performed by scientific organisations on their own during the reference year. These are direct contracts without value added tax. For operations which are financed internally volume is defined on the basis of the estimate for the contracted operations. If the operation is not finished, only that part is taken into account that was carried out during the reference year as an interim stage.

Expenditure for fulfilment of scientific and scientific-technical operations are the total amounts of expenditures for scientific and scientific-technical operations by organisations on their own. Expenditures include expenditures for labour remuneration, material expenditures and other current expenditures, capital contributions (without the depreciation deduction for the complete renovation of fixed assets).

Staff engaged in research, experimental and scientific-technical operations. These are researchers, technicians, auxiliary staff and other employees of independent scientific and research, design, drawing and design organisations and also staff of laboratories or detached divisions at educational establishment of higher learning or at enterprises where the main activity is the fulfilment of scientific and scientific-technical operations.

Specialists engaged in scientific, and scientific and technical operations are researchers and technicians.

Researchers are scientific and engineering and technical employees who are professionally engaged in scientific research and developments and directly take part in creation of the new knowledge, products, processes, methods and systems. This also includes administrative and management staff who directly manage the research process (includes chiefs of scientific organisations and divisions engaged in performing the scientific research and developments).

Technicians are employees whose basic functions require technical knowledge and experiences in one or more spheres of natural, technical, social or humane sciences. They

take part in fulfilment of research and developments. They fulfil their technical functions under the guidance of researchers (for example: elaboration of software; reference search and selection of appropriate papers from libraries and archives; conduct of experiments, tests and analysis; registration of measurements; preparation of the calculations, blueprints, and schemes; the conduct of statistical observations, etc).

Innovationally active industrial enterprises are enterprises that were involved into innovation activity.

The innovation activity means all scientific, technological, organisational, financial and commercial actions that really lead to implementation of innovations or design for this purpose. The innovation activity include researches and developments not directly connected with the preparation of specific innovation.

The implementation of innovations means of any new or significantly improved product (goods, services) or process, new method of marketing or new organisational method into the activity of an enterprise; establishment of work places or external ties. Innovation products are split into those that are new for the market and the ones that are new for business.

The **market means** the subject or geographical area in which a operates. It consists of a business together with its competitors; taking into account geographical aspect or typical series of products. The geographical aspect may include both domestic and international enterprises.

The minimal level of novelty for inclusion of any change into the category of innovation is defined as **new for a business**. The product could be used (produced) on other business, but if it is new or essentially improved for the given business, then such a change is considered as an innovation for that business.

Innovation production is production that is new or significantly improved in relation to its properties or methods of usage. The new products are goods and services that are substantially different in their characteristics or functions from products that have been produced by business earlier. The significant improvements can be made on account of changes in materials, components and other characteristics of products that improve their properties. This includes the significant improvements to technical characteristics, components and materials, built-in software and other functional characteristics.

Volume of innovation products includes the above-mentioned products that are produced over the last three years and sold on the domestic market.

The total sum of **innovation expenditure** includes expenditure that was incurred by enterprises to implement innovations which are new both for enterprises and markets including: internal R&D work, purchase of R&D, machines, equipment and software, other external knowledge and other expenditure.

The **advanced technologies** (hereinafter technologies) are technologies and technological processes that imply the use of machines, devices, equipment and instruments based on microelectronics or being computer-guided and which are used for design, production or processing the produce.

The **technology to be developed** is the development of technical documentation, design drawings, production of the necessary equipment, testing and acceptance according to the established procedure.

The **technology is considered the developed** one if it has successfully been tested and there is a positive decision to accept it during the reporting year.

The **technology to be used** is its implementation into the production run and which resulted in products being produced, services being rendered (obtaining or processing information, etc).