Explanatory Notes on Main Statistical Indicators

Research and Experimental Development (R&D) refers to creative and systematic work undertaken in order to increase the stock of knowledge (including knowledge of humankind, culture and society) and to devise new applications of available knowledge. R&D includes 3 categories of activities: basic research, applied research and experimental development. The scale and intensity of R&D are widely used internationally to reflect the strength of S&T and the core competitiveness of a country in the world.

Basic Research refers to experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundations of phenomena and observable facts, without any particular application or use in view. Basic research usually formulates hypotheses, theories or laws, and its results are mainly released or disseminated in the form of scientific papers or monographs or research reports.

Applied Research refers to original investigation undertaken in order to acquire new knowledge. It is directed primarily towards a specific, practical aim or objective. Purpose of the applied research is to identify the possible uses of results from basic research, or to explore new (fundamental) methods or new approaches. Results of applied research are expressed in the form of scientific papers, monographs, fundamental models or invention patents.

Experimental Development refers to systematic work, drawing on knowledge gained from research and practical experience and producing additional knowledge, which is directed to producing new products or processes or to improving existing products or processes. Results of experimental development activities are embodied in patents, exclusive technology, and monotype of new products or equipment.

Product Innovation refers to the introduction of new or significantly improved products by enterprises. The innovation should be reflected by the functions or features of the products, including improvement on technical specifications, materials, parts, user-friendliness etc. Simple appearance change or other subtle changes are not included, neither is direct reselling. The product must be new to the enterprise, but it is not necessarily new to other enterprises or the whole market.The products here cover both goods and services. Examples of innovation on goods include new energy vehicles and mobile phones with new functions; examples of innovation on services include new warranty service, such as significantly extended new warranty period of products.

Process Innovation refers to the implementation of new or significantly improved production methods, process equipments or supporting activities by enterprises. The innovation should be reflected by technology, equipment or process. It must be new to the enterprise, but it is not necessarily new to other enterprises or the whole market. Simple change of organization and management mode is not included. Supporting activities cover purchase, logistics, account and compute activities.

Organizational (management) Innovation refers to the adoption of a completely new organizational management mode, which has never been used before. It mainly involves the business model, organizational structure or external relations of enterprises. It does not include pure mergers or acquisitions. Organizational (management) innovation should be the result of strategic decision-making of enterprise management. The term "new" here means that it must be new to the enterprise, but not necessarily new to other enterprises or the whole market.

Marketing Innovation refers to the implementation of completely new marketing concepts or marketing strategies that have never been used before. It mainly involves product (service) design or packaging, product (service) promotion, product (service) sales channels, product (service) pricing and so on. It does not include seasonal, cyclical and other conventional marketing changes. The term "new" here means that it must be new to the enterprise, but not necessarily new to other enterprises or the whole market.

R&D Personnel refer to persons of R&D activities units engaged in basic research, applied research, and experimental development at the reference period, including persons of directly participating in the three activities above, as well as management and direct service staff related to R&D activities, such as literature provision, material supply, equipment maintenance staff, it excludes persons providing indirect support and ancillary services, such as canteen and security staff.

Full-time Equivalent of R&D Personnel refers to the ratio of working hours actually spent on R&D during a specific reference period (usually a calendar year) divided by the total number of hours conventionally worked in the same period by an individual or by a group. The measurement unit of the ratio is “man-years”. This is an internationally comparable indicator of S&T manpower input.

Expenditure on R&D refers to the real expenditure of surveyed units on their own R&D activities in reporting period. It is divided into current expenditures and gross fixed capital expenditures for R&D according to the nature of expenditure. It doesn’t include the fees transferred to cooperated or entrusted agencies on R&D activities.

Expenditure on R&D from Government Funds refers to the expenditure of funds on R&D activities from government agencies at different levels, including appropriate funds on

science and technology from financial departments, and the real expenditure of other fiscal functional funds on R&D activities from government agencies.

Expenditure on R&D from Enterprises Funds refers to the expenditure of all kinds of funds on R&D activities from enterprises. In terms of enterprises, it refers to the expenditure of self-raised funds of enterprises, funds from other enterprises through entrustment, loans from financial institutions on R&D activities. In terms of public institutions, such as institution of scientific research and universities, it refers to the expenditure of funds from enterprises through entrustment.

Number of R&D Projects (subjects) R&D Projects (subjects) are the basic forms of R&D activities, The project task, target, personnel and expenditure are usually defined by R&D activity execution unit according to project approval specification or contract document.

Full-time Equivalent of Personnel on R&D Projects (subjects) refers to the full-time equivalent of persons actually engaged in R&D projects (subjects).

Expenditure on R&D Projects (subjects) refers to the real expenditure of internal funds of the surveyed units on research and test of R&D projects (subjects) at the reference year, including service fee, other daily expenditure, cost for fixed assets, cost of external process, it excludes expenditure of funds transferred to other cooperated or entrusted units of the projects.

Sales Income of New Products refers to the sales income of new products of the enterprises at the reference period. New products refer to products developed and produced with new technologies and designs or improved in structure, material, process or other aspects so that their performance are improved or their functions expanded. New products include those affirmed by government authorities in their validity period and also those developed by enterprises without the affirmation of government authorities within one year after they are put into production.

Patent is an abbreviation for the patent right and refers to the exclusive right of ownership by the inventors or designers for the creation or inventions, given from the China National Intellectual Property Administration after due process of assessment and approval in accordance with the Patent Law. Patents are granted for inventions, utility models and designs. This indicator reflects the achievements of S&T and design with independent intellectual property.

Patented Inventions refer to new technical proposals to the products or methods or their modifications. This is universal core indicator reflecting the technologies with independent intellectual property.

Patented Utility Models refer to the practical and new technical proposals on the shape and structure of the product or the combination of both. This indicator reflects the condition of technological results with certain technical content.

Designs refer to the aesthetics and industrially applicable new designs for the shape, pattern and colour of the product, or their combinations. This indicator reflects the appearance design achievements with independent intellectual property.