Appendix: Methodological Notes, Sources of Information and Definitions

Innovation.bg comprises five groups of indicators which describe the national innovation system and its functioning:

1. Gross innovation product.
2. Entrepreneurship and innovation networks.
3. Investments and financing of innovation.
4. Human capital for innovation.
5. Information and communication technologies.

Each group contains several synthetic indicators. Working definitions which could differ from stricter theoretical definitions have been applied to the groups and the indicators. The latter consist of various numbers of statistical values displayed graphically. They are grouped in way providing the most comprehensive view of the respective component of the national innovation system. The graphs representing the values are based on the internationally recognized definitions and concepts.

The report uses innovation in its many forms and meanings. **Innovation** is the adoption of a new or significantly improved idea, product, service, process or practice in order to meet a certain need. The concept is also used in a narrower sense in some parts of the report.

Methodology of the survey of the innovation activity of enterprises in Bulgaria

The Applied Research and Communications Fund has been carrying out regular surveys of the innovation activity of enterprises in Bulgaria (INA) since 2004 based on the methodology of the Innovation Survey of the European Community. In 2009, this methodology was used as a base for drawing up a questionnaire for telephone interviews as a methodology for data registration. The sampling, fieldwork and its quality control has been performed by the Vitosha Research marketing agency. The telephone interviews were conducted the Sofica Group Business Process Outsourcing (BPO) provider of call centre and back office services in the period October 19 – November 16, 2009. The planned sample included 1,000 enterprises (200 micro, 700 SMEs and 100 large ones) in sectors 10 to 74 of the National Classification of Economic Activities (NACE) – 2003. The respondent target group were the owners and senior managers of the enterprises.

The general population on which the sample is based includes the corporate data base of Vitosha Research of about 260,000 legal persons which have been statistically active in the period 2000-2008. On this basis, a random sample of 5,015 enterprises meeting the following criteria for selection was generated: the size of the enterprise, type of ownership, distribution by territorial administrative regions aligned with the type of the relative nucleated settlement. With a view to fulfilling the quotas by region and scope of enterprise, as well as the high share of unsuccessful calls in some of the regions, the initial sample was expanded by the addition of another 232 enterprises from 12 regions.

A total of 1,022 questionnaires with full answers in e-format were received from the 5,247 enterprises called. Following the initial logical review of the information, 31 cases were discarded (5 cases because of doubling the data for one enterprise because of simultaneous telephone interviews conducted by different interviewers and 26 cases because of incompliance in the sector of economic activity). The final sample contains 991 cases.

Table 11. INFORMATION ABOUT THE TELEPHONE INTERVIEWS IN INA-4

	Number
Failed calls (free line but no response or automatic message about a non-existent telephone number)	3,119
Wrong number (the respondent is a natural person or a constantly operating fax machine)	452
Terminated telephone interview	36
Refusal to participate in the survey (including refusal at second call after a terminated telephone interview)	618
Successful calls (filled-in questionnaire)	1,022

Source: Sofica Group, 2009

Following the completion of the telephone interviews, the data about the main economic activity of the enterprises were additionally re-encoded by sectors according to NACE-2008 and the tables for transition from NACE-2003. This was done to achieve compliance of data about the enterprises collected in the fourth survey of the innovation activity of enterprises (INA-4) and the data from official sources (NSI, Eurostat and others), which have been applying NACE-2008 since 2009. With a view to subsequent analysis, the data about the number of employed by the end of 2008 at the enterprises from the final sample were complemented with data about the number of employed in these enterprises in the first 9 months of 2009 using data from the National Social Security Institute. The number of employed has been recalculated as the mean value of the sum of persons with health insurance at the respective enterprise, divided by the number of months.

Table 12. CHARACTERISTICS OF THE ENTERPRISES SURVEYED IN INA-4

Total number	**991**
Distribution by size	
Share of micro enterprises (under 10 staff)	18.7 %
Share of small enterprises (between 10 and 49 staff)	48.2 %
Share of medium sized enterprises (between 50 and 249 staff)	23.8 %
Share of large enterprises (over 250 staff)	6.5 %
Distribution by type of company	
Share of joint stock companies (joint stock and single-member joint-stock company)	22.1 %
Share of limited liability companies (incl. sole owner Ltd)	67.1 %
Share of proprietorships	6.8 %
Other (general partnerships, cooperatives, partnerships limited by shares, companies pursuant to the Contracts and Obligations Act)	3.0 %
Distribution by type of ownership of controlling stake	
Share of enterprises over 50 % of which is owned by private owners	96.2 %
Share of enterprises with over 50 % state/municipal ownership	2.5 %
Lacking data about private/state ownership	1.3 %
Share of enterprises over 50 % of which is owned by local private owners	89.0 %
Share of enterprises with over 50 % ownership of foreign natural or legal persons	10.7 %
Mixed ownership (equal share of local and foreign ownership)	0.3 %
Lacking data about local/foreign ownership	3.5 %

Source: Applied Research and Communications Fund, 2009

Innovation Index of Bulgarian Enterprises

The index summarizes the measurement of innovation activity at company level and aggregates seven types of innovation of the four types applied by enterprises (to products, processes, organization and marketing) and their degree of novelty (to the enterprise, to the market or to the world) as registered by INA-4. Its values range from 0 to 100, with 0 indicating that the enterprise had lacked innovation, while 100 meaning that the enterprise had made all types of innovations at the highest degree of novelty.

Box 8. COMPONENTS OF THE INNOVATION INDEX OF BULGARIAN ENTERPRISES

1. **Product innovations**
   - 1.1. The enterprise has started to make products new to the company
   - 1.2. The enterprise has started to make products new to the Bulgarian market
   - 1.3. The enterprise has started to make products new to the international market

2. **Process innovations**
   - 2.1. The enterprise has adopted production methods/processes new to the company
   - 2.2. The enterprise has adopted production methods/processes new to the sector

3. **Organizational innovations**
   - 3.1. The enterprise has adopted new or considerably improved management methods and systems
   - 3.2. The enterprise has made considerable changes in the organization of work
   - 3.3. The enterprise has established new or considerably changed relations with other companies in the value adding chain

4. **Marketing innovations**
   - 4.1. The enterprise has made considerable changes in the design or the packaging of its products
   - 4.2. The enterprise has applied new or considerably changed methods for the sale and distribution of its products and/or services

Source: *Innovation.bg 2007,* Applied Research and Communications Fund

The index considers three types of innovations, which are equal from the point of view of the positioning of the innovation – **product innovations** (what is being produced), **process and organizational** (how it is being produced) and **marketing** (who it is designed for and how it is sold). In turn, process and organizational innovations have equal weight in the sub-group. Process innovations refer mainly to *technologically* new or improved processes. Purely process innovations usually stand behind a large portion of organizational innovations without having technological innovation as a component (as, for example, application of process or organizational reengineering). This was also the motivation behind their being considered in one group. The various components of the index have equal weights within their groups.

Availability of data, information sources and definitions

Innovation.bg contains secondary statistical and administrative data and data from nationally representative surveys of enterprises conducted by the Applied Research and Communications Fund. The report uses a number of freely accessible Bulgarian and foreign sources, which in some cases has resulted in differences in time horizons, definitions of the used variables and graphically represented indicators. Detailed information about the sources used can be found in the report and systematized information about the data used in *Innovation.bg* is available at www.arcfund.net and www.innovation.bg. The Applied Research and Communications Fund updates the Innovation.bg report annually, aiming at making it a reliable and effective instrument for monitoring the Bulgarian national innovation system.