Chapter 4: KNOWLEDGE GENERATION AND ABSORPTION

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The biggest obstacle - irrelevant policy models

- A policy wish for R&D driven growth (directly commercializing results of public or private R&D through new technology based firms) vs. growth based on production capability
- Policy should broaden its view of innovation which is currently confined on 'commercialization of R&D results'
- Technology upgrading is never based only on R&D but requires increased skills and increased absorptive capacity of labour force
- Which dimensions of tertiary education, vocational education and lifelong learning can be considered as bottlenecks to increased innovativeness and industrial upgrading > growth-enhancing expenditure

Armenian innovation system

- Inherited unbalanced and disconnected R&D system – originally build for needs of USSR - dominance of physics
- A few remaining large firms that are poorly or not linked with the rest of economy dominated by small or micro enterprises of low technological level
- Poor skills upgrading in the last 20 years which has now become constraint to future growth
- A very limited integration into global value chains
- A strong brain drain

Innovation and industrial policies in Armenia are entirely post 2008 phenomenon.

- It is donor driven and when domestically driven it has at its disposal very limited funds.
- Currently EUFP7 is the main funding program from abroad.
- The overall weight of Armenian industrial policy is around Euros0.6mn - really marginal even for poor country

Towards a new innovation system

- Armenia has functioning patches of innovation system and it should try to build on its functioning enclaves.
- Its future innovation system will emerge through a series of trials and errors which should involve all potential 'agents of modernisation' be it FDI, local new technology based firms, competent public and non-public organisations, or useful support programs.
- The role of policy should be to serve as leverage to emerging niches of potential growth with the aim to upscale them.

R&DI in business sector and upscale success stories

- Armenia does not yet have policy for RD and innovation in business sector including absent statistics on R&D in business enterprise sector
- A diversity of actions very often linked to donors programs and focused most often on ICT.
- There is very encouraging development of industrial export led policy supported by ADA.
- However, these initiatives are in budgetary terms very limited and there is need for up scaling those initiatives and programs that turn out to be successful and promising.

R1: Modernise and internationalise higher education

- Modernise and evaluate curriculum in order to ensure that skills of its graduates correspond to needs of future growth based on technological knowledge
- International training for teachers should be based on highly competitive selection process and on promising career opportunities. This should be important component of modernisation of curriculum
- All R&D institutes to be integrated into higher education system via joint PhD and other education programs.
- Vocational based universities could develop much better links with business sector, including foreign firms

R2:Increase investment in R&D, especially in Business Enterprise Sector

- To harmonize R&D statistics with international standards (Frascati) and introduce innovation statistics – extend twining programs in this area + establish surveys on R&D and innovation in business enterprise sector
- Support to R&D should be extended to engineering and innovation management including support to quality improvement programs like ISO9001 standards, ISO14000 environment standards and industry specific international standards (CMM Certificates).
- Innovation Vouchers can be used for innovation activities such as: innovation / technology audit; tailored training in innovation management; new business model development; new service delivery and customer interface; new service development; knowledge of product and service testing, economic impact assessment and efficiency audits.
- Armenia should introduce public innovation procurement for small technology based firms similar to known US SBIR program

R3: Restructure R&D system: from survival to growth

- Active RD restructuring which until now was passive with some elements of active restructuring (eg. mergers of some institutes). Some of R&D institutes to be reoriented to become technical institutes supporting knowledge intensive SMEs and working in dual-mode (public funded programs / commercial services) focused on technology upgrading in specific sectors. These technical institutes should closely cooperate with technoparks
- Criteria for evaluating of R&D cannot be only international excellence but also local relevance. Criteria for evaluation should be manifold reflecting different functions of different organisations.
- There is strong need for international evaluation of R&D organisations on case by case basis through technical assistance programs and World Bank loan for restructuring of R&D system.
- This should be accompanied by plan for gradual relative increase of public expenditures for education and R&D in GDP over 10 year period as strategic orientation

R4: Integrate FDI and innovation policy

- Armenia should aim to integrate FDI and innovation policy. It could learn from CzechInvest in shifting towards FDI technology and engineering centres, and business support service centres. FDI support should be extended to after care services.
- FDI support should extend to subcontracting and program should be set up which would incentivize foreign companies to involve Armenian suppliers in their value chains. Funding should be given on matching funding basis to assist potential suppliers to bring them to required international levels of efficiency and productivity

THANK YOU!