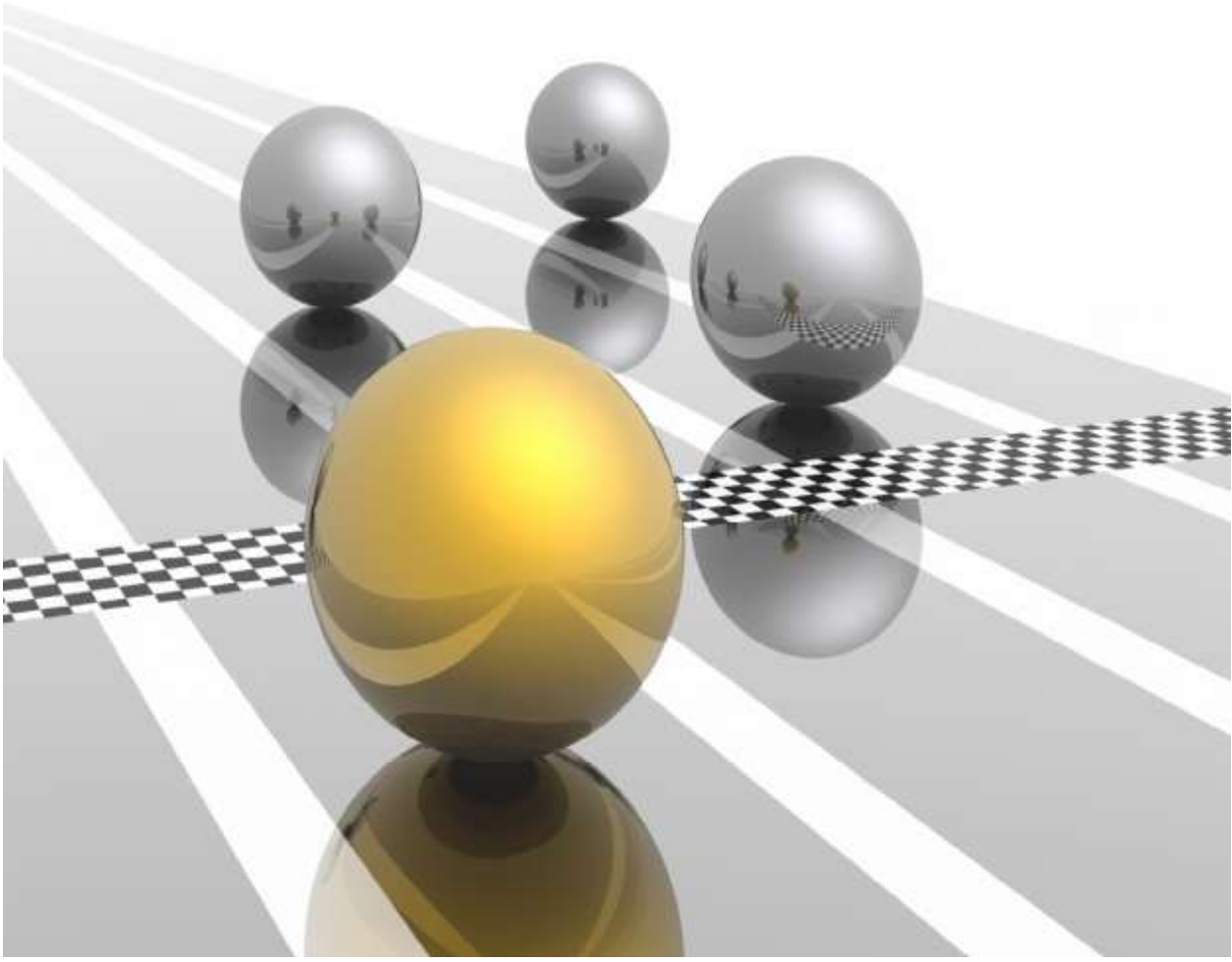
DRAFT

ARMENIA

SUSTAINABLE ECONOMIC DEVELOPMENT STRATEGY

WAY TO INNOVATIVE PROGRESS



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INTRODUCTION

Program documents of socio-economic development in Armenia define the key sectoral and structural policies, goals and actions for short, medium and long-term periods. They establish sound institutional grounds for sectoral development and efficient activities of bodies responsible for management of public resources. Furthermore, programmatic documents enable partner states and organizations to reach better understanding of Armenia's economic development targets, priorities, outcomes and expectations.

At the same time, academic and political theory and practice shows that countries, which succeed in uniting around the key concept of development have the best opportunity for achieving economic breakthrough and landmark developments. The vision of the concept realization benchmark entails political ownership for taking the most balanced decisions and giving up momentary benefits with the view to guarantee comprehensive outcomes in future. To this end, adoption and realization of strategies and systemic reforms is preconditioned by global consensus and trust towards the milestones and the most perspective expectations, otherwise it translates into a collection of wishes for obtaining which neither public nor the state itself are ready to fight.

This paper aims to express the vision of economic development in Armenia, and form the key concepts around which development strategy will be shaped. The document intends to guide programmatic vector of development and consolidate around it the whole resource potential of the country.

The key concept is to ensure such ecosystem, where economy permanently expresses demand for innovative activities and there exist continuously developing capacities for provision of innovative initiatives.

Chapter 1. DEVELOPMENT CONTEST AND CHALLENGES

Perspectives of development are reflected by milestones of technological initiatives. In the beginning, they all have equal opportunities. Those, which understand global challenges and overcome internal challenges, succeed.

During the previous period of more than five decades, various development models were adopted; countries and international donors consolidated significant resources based on which solidarity of countries focused around the main idea, i.e. overcoming of poverty and inequality. Historical scenario of global development reveals that development fruits are not distributed equally resulting in deeper wealth polarization between developed and developing countries.

Development perspectives were also distributed unequally. Subsequently, quickly growing countries were not always involved in the processes directly relating to global progress or benefited from their results.

During the last 50 years only few countries (Hong Kong, China, Japan, Korea, Malta, Singapore, and Taiwan) managed to change their status from developing to a developed country. While this proves complexity of the process, however demonstrates its reality as well. The studies focus on five preconditions which determine success of those countries:

- adequate usage of the global economy opportunities;
- maintenance of macroeconomic sustainability;
- ensuring high level of savings and investments;
- major role of market in the distribution of resources;
- consistent, reliable and skillful management.

At the same time, the international experience evidences that further to diversification and specialization, realistic solution of the problem on ensuring growth assumes technological breakthrough through realization of the accumulated potential, expansion of the capacities base, formation and administration of adequate environment. Today, this is more than realistic, since at present stage of cognitive advance and technological diversity we witness an unprecedented expansion of systemic reforms and transfer of the fruits of progress.

Modern reality assumes that country development concept cannot be based any

more on the so-called "catch-up" paradigm. Realities of the global economy of the last two decades call into question the assumption that growth results fill finally spread downstream as a result of which there will be a less difference between the level of development of countries. It is obvious that historically economic growth and growth of per capita income were directly related with the achievements of technological progress. This means that the existing gap between countries is conditioned not only and not so much by the relative level of welfare, but more importantly by differences between the existing technological systems, and often by incompatibilities, as well as capacities of absorption and utilization of new technologies.

Every change of global technological system has led to a global socio-economic transformation, and technological alterations of infrastructures and institutional systems within that context. The speed and quality of change was predominantly conditioned and limited by human factor, meaning that the speed of systemic change cannot be higher than the rate at which people can accommodate with the new technological settings. In this case, person, with all his/her intellectual, psychological and physical values, becomes the target of growth, while socio-economic development and improvement of environment does not end in itself, but is an instrument for ensuring sufficient level of sustainable development of a person and the society.

Hence, this model of growth requires focusing on human capital development, whereby investments made in this direction are considered as a prerequisite for consolidation of the qualitatively new economy. Investments in human capital leave a huge legacy for future generations in the form of rich knowledge base, protected **environment and advanced industrial technologies. To this end, evolution of the economy based on the intensive use of intellectual and creative capacities of human resources acquires lasting priority.**

The development vector must be redirected in order to place it within the value chain of creation and exchange of results. The goal is to ensure transfer from mainly resource based participation to horizontal and network involvement in knowledge and technology based processes. The alternative to this approach is to stay a country of resources within the current dynamics of regularities and logics, as a result of which, the gap with the world centers of intellectual potential, knowledge and technological development will persistently grow. **Therefore, revaluation and review of the development model is an indisputable imperative**.

Today, global economy is in the stage of post-crisis rehabilitation where the comprehensive efforts to foster economic recovery are accompanied by socio-

economic and geopolitical challenges. Parallel to ensuring decent livelihood, challenges relating to economic growth and sustainable employment, accessibility of vital health education infrastructures, environmental safety and other challenges progressively come to the foreground with their global importance either in terms of coverage, impacts and required solutions. Internal and external challenges are manifested as risks in case a country does not properly recognize and deal with them. At the same time, they provide opportunities, if a country strives to implement development agenda.

1.1. EXTERNAL CHALLENGES

Global Solutions to Global Challenges

Economic challenge is accompanied by multiple social and environmental problems, including inter alia health and food safety, climatic changes, access to clean water, etc. This reality leads to the need for the review and change of production and consumption content. The aforementioned global challenges require fully coordinated and consolidated efforts of the international donor community and states.

Recovery of Economic Activity

Global economic environment is still in post-crisis (not stabilized) stage and vulnerability of developing and underdeveloped countries increases. Several traditional sources of economic growth have lost their significance. Due to activation of migration flows in many countries number of population drops, which in turn limits the role of labor force as the major driving force of long-term growth. The role of this factor within the context of overall population aging acquires additional weight. Investments in human capital tend to decline, entailing a serious risk particularly for the sustainable growth of the developed countries.

Redesign of Technological Systems

Modern public relations are peculiar to the extent that their character is largely determined by significant redesign of global technology systems, which are based on the unprecedented progress in informational and newest technologies. The process of technological progress has transformed into the stage of biotechnological and nano-techological achievements, serving as a benchmark for generations aiming at further breakthroughs.

1.2. INTERNAL CHALLENGES

In terms of ensuring new developments and economic progress the global context of challenges is accompanied by a number of challenges at national level. The latter are of national importance in terms of their collective sense of urgency.

Productivity Increase

A precondition of forming a viable economy is to raise the level of productivity both in terms of economic sectors and enterprises. Macroeconomic situation, supporting state policies, foreign trade conditions enhance competitiveness of enterprises provided their performance is based on high level of productivity. Any incentive of enterprise performance (tax, administrative or logistics) is extremely limited by its impact, unless it is accompanied by strategy of increasing resilience through productivity and flexibility. Subsequently, efforts of the government within the framework of industrial policy aimed at increasing competitiveness of enterprise, reducing their vulnerability through preferential crediting of particular economic sectors and other mechanisms of support will not bring to the desired result until institutional leverages for ensuring sustainable growth are disclosed.

Accumulation of Savings

The economy has the ability to operate effectively and provide high activity, if it has the capacity to absorb investment flows. **Maintenance of economic attractively is the strategic criteria for foreign investments.** However, provision of FDI can be of cyclic nature and often depend on external factors, mitigation of which in Armenia is an unsolvable problem. **Therefore, mobilization of internal capacity for operation of income-savings-investments chain is among the major challenges**. The best way to incentivizing savings or preventing capital outflows is creation of investment fostering environment at national level. Such conditions are created when a country maintains a constant ambition of having a modern economy. In other words, in order to have the opportunity to create additional income with additional savings the process of modernization should never cease. Their sole purpose is the full exercise of person's mental and physical abilities with equivalent material, moral and spiritual compensation in return.

Ensuring Exclusiveness of Growth

In Armenia, the sustainability of economic growth, targeting it to development and the possibility of translation of growth into higher living standards of population is conditioned by ensuring the quality (model) of growth and sustaining its speed (momentum). Involvement of as many branches of economy and labor resources in the process of creation of new value is essential. Moreover, the creation of new jobs must be carried out at the expense of productive employment expansion. This is the goal of adopting a new growth model, which better addresses the issue of raising living standards. Such model of growth provokes the on-going need for identification of new solutions to existing problems, resulting in the need to replace resource-intensive engines of growth by non-resource intensive.

Regional Excellence

Small developing economies like Armenia get a chance to participate in global game due to succeeding in regional integration processes. At the same time, participants can assume the role of a leader or outsider of the integration process. The first role requires existence of clearly manifested advantages due to which it is possible to settle within the niche of demand shapers. At present stage of formation of the new integration formats Armenia faces the challenge of furnishing such claim. Hence, during the present stage of "distribution of roles" Armenia should "rush" with its special offer. The perspective of falling into the group of "outsiders" is unacceptable.

Chapter 2. PRINCIPLES OF INNOVATIVE DEVELOPMENT AND INTERNATIONAL PRACTICE

Developed countries operate within the upper boundary of the technological cycle, whereas developing countries, which follow them benefit from the real opportunity for accumulation of knowledge and technology and its dissemination within the local context.

Hence, current development paradigm dictates that sustainable development can be achieved only through the creation of a knowledge-based economy. The core is the human capital, while innovation policy guarantees the growth. Due to the development of human capital, competition is mainly based on modern technology absorption capacity, which in turn results in the diminished strategic role of separate natural resources per se. In other words, the focus is on human development, including identification and multiplication of capacities, expansion of academic concepts and promotion of their utilization in economy.

2.1. INNOVATION AS A SYSTEM OF GUIDING DEVELOPMENT CONTENT

The role of knowledge, innovation and technologies throughout the historical milestones of human society development is explained and manifested by specific features of the overall process. Hence, innovation development is:

- **Multilayer –** involving all economic participants – state, private sector, households;
- **Clustered** - involving all sectors of economy;
- **Networked** - involving local, regional and global value chains;
- **Many faceted** - it can be positioned within knowledge value change at a different level of depth depending on the degree of development or specialization, absorbing capacity of economy and the level of integration in global economy.

Parallel to overall technological progress, innovation perceiving boundaries have expanded as well. Today innovation is not perceived any more as a new word in the field of science and engineering and is not linked with the direct outcomes of R&D sector. It is mainly embodied in the form of their extended use. Such a broad perception of innovation allows countries to adopt more

flexible policies in terms of content and phased development relying primarily on existing opportunities. Given the overall the rapid pace of the growth of technology and knowledge resource, developing countries' policies, at least in the initial stages, can be targeted not only to knowledge creation. Rather than servicing the overall innovation value chain, they can use the created result at the sectoral or company level. Accordingly, innovative development agendas of developed and developing countries are different. Thus, if the incentives for innovation in developed economies are mainly focused on getting better results with fewer resources for greater benefit, a key incentive for the developing countries is getting better results with less cost for more people. That is innovation in a developing country is targeting the "inclusive growth".

In other words, considering innovation as a development model, the most important issue is the absorption and dissemination of the relative novelty as a source of jobs, incomes and welfare.

Targeting innovative development entails systemic redesign, whereas innovative development starts from its adoption as future economic driving force of the country and its integration in policy agenda. While entrepreneurs are the main bearers, creators and disseminators of innovation, the state's role in development of the innovation system is decisive.

Innovation is the process of creating value through knowledge where concept plays the role of the main factor of production. Innovation mostly has a non-competitive nature since it can be used continuously and simultaneously by many. In addition, because of uncertainty of the final result and high risk factors, innovation is significantly different from other factors of production, therefore may generate insufficient investment interest of market (private sector), especially in developing countries, which lack the conducing environment for dissemination and rooting the practice of comprehensive utilization of innovative result and where the system of incentives is not mature yet.

Therefore, ensuring the proper functioning of the innovation system requires participation of the state, especially in developing countries, in order to address the "failures" or faults (in terms of capacity building, institutional, environmental, network), which are extremely difficult to overcome through market regulation or private sector initiatives, as well as guarantee consolidation of framework conditions.

In fact, the innovation system is a network where the main actors are cooperating around knowledge-sharing. The system is based on a fairly complex relationship where educational processes paly the pivotal role. Environment in

which participants interact with the system is shaped by peculiarities of historical, cultural and social relationships. Such socio-cultural dynamics characterize the type of innovative system, and the nature of its key elements: organizations, institutions and links between them.

2.2. INTERNATIONAL PRACTICE

Transfer of developing countries to knowledge based economy guarantees maintenance of long-term growth, helping them to catch-up with developed countries. Even if the overall development policy is aimed at attracting investments in production, absorption and dissemination of knowledge and innovation, the speed and quality of transfer vary by country. This is due to the fact that the transition is a comprehensive and multifaceted process that requires:

- human capital development;
- Research and Development (R&D) promotion, creation of the respective infrastructures;
- institutional and regulatory framework;
- absorption of scientific and technological developments and their localization parallel to global environment.

Education and Human Capital

Education is the Backbone of Knowledge Based Economy

Education in **Singapore** is heavily subsidized by the state and is the second largest item of expenditure. Higher education is defined as a priority, as a basis to foster efforts of the country towards R&D development. The state provides grants for the establishment of branches of foreign universities in Singapore. Singapore features a world-class education (country scores on PISA international tests of science and mathematics are close to maximum). Already in the early stage of development, bringing the teaching of mathematics in schools to an excellent level has become a key policy goal, in order to serve as a basis for the preparation of highly qualified engineers.

Sweden's economic success was built on creating a world-class human capital strategic plan. About 45 percent of high school graduates are enrolled in the universities. In recent years Sweden steps up its efforts to increase the number of students. The country also tries to encourage students to major in science and

engineering programs simultaneously increasing the funding for those areas. As a result, during 1994-2004, the number of those qualified in the technical sciences doubled. Sweden is the world leader for his "Life Long Learning" program, which is an important factor in overcoming the problem of unemployment and ensuring labor flexibility.

Ireland has built its success on the special education system, which does not limit itself to a number of universities of excellence, but also extends to all age groups throughout the system, from pre-school to high school. Transnational companies around the world try attract highly educated workforce from Ireland.

Finland has a fairly successful record in fostering strong ties between universities and the private sector. To provide funding for academic and basic research, the Ministry of Education and Culture established financing and technical assistance agency, which serves as a link and platform between public and private sectors.

Research and Development, Infrastructures

Proper scientific and support infrastructure serves as a bridge between quality education and innovation.

Singapore's government strategic direction is active investment in innovation infrastructure in order to gain a critical mass to innovators and innovative practices, rather than to simply satisfy with availability of efficient organizations. Efforts have been made to change “mentality” of population.

Singapore government's pursues consistent policy for protection of innovators. Back in 2001, the government restructured register of trademarks and patents into Intellectual Property Office (IPOS), to support which Intellectual Property Academy was established in order to strengthen the capacity of intellectual property through research and education. University research activities are encouraged through multiple toolset. Funding for research projects and graduation research is expanded, especially in IT, telecommunications and public administration sectors.

Development of venture capital since 1980s is one of the key areas of support. In late 1990s, government established investment fund «Technopreneurship» with $1 billion equity, which attracts worldwide lending venture capital in order to transfer Singapore into a regional hub use and enhance training of venture capital specialists. Currently there are more than 100 venture capital

firms in Singapore.

The Finnish government is actively working with the Council for Research and Innovation. It has established an excellently organized public infrastructure in order to encourage generation of R&D and innovation. Ministry of Employment and Economy of Finland founded the "Tekes" expert organization, which focuses mainly on the research, development and innovation funding to support research groups, industry and services sectors in various innovative initiatives. Finnish Innovation Management Institute IMI, which is part of the BIT Research Centre and the Institute for Science Aalto, studies and develops corporate innovative tools and national innovation systems based on scientific methods. It has integrated with the world's leading research institutions in the field of innovation management, clearing the way for a global, high-quality (state-of-the-art) research and educational environment.

Being a major success in the development of high-quality human capital, Sweden adopted an open foreign trade, investment and technology policy, which enabled the country's corporate sector to gain maximum benefit from human capital. The secret of success is that the country's political and business leaders are able to rise above their own interests in order to form a complete consensus on the vision and compete in the global market.

Swedish Research Institute (RISE) is a network of research and technology organizations (RTOs) that is partially or fully owned by the state. Structures, which operate under the Institute, carry out industrial research and innovations, testing and certification. Among priorities of the Institute's mission is modernization of the network of organizations, and creation of internationally competitive and influential companies in the field of industrial research and development and innovation.

Institutional and Regulatory Framework

A favorable institutional and regulatory framework serves as a guarantee for transforming the existing innovation potential into specific results.

In the services and industry sectors, Singapore is targeting 3 strategies for capacity building. The first is the horizontal approach for increasing new value-added of food production, in particular through high-automation of industry. The second is the upstream approach for the design of tax regimes in R&D, innovation and generation of new ideas. The third, downstream strategy is targeting expansion of participation in the regional electronics supply chains, market development, and intellectual property fields. Development of a vibrant

entrepreneurial ecosystem through development of venture capital and use of tax incentives in order to encourage generation of new ideas is considered necessary environment for implementation of this strategy.

Israel created is a structural unit carrying out systemic policy under the Prime Minister's Office, which amalgamated institutions dealing with issues relating to economic and social security and policies, science, technology and higher education, etc. At the same time, structural units responsible for innovation policy development and management were formed in all ministries to work with them in a more targeted manner.

Finland has a central coordinating body for innovation policy: In particular, the Science and Technology Policy Council, which is headed by the Prime Minister, integrate all key ministries, as well as business and civil society representatives.

Ireland adopted a very specific and focused agenda implemented by the Irish Development Department in order to create new attractive environment for foreign investors. As one of the poorest member countries, Ireland is entitled to receive structural, agricultural and R&D funds from the EU.

Ireland's success has highlighted the role of strategic planning and coordination, as well as the speed of scaling of the positive results from the implementation of policies. **This is a story of how strong can be a quite ambitious vision, if it is accompanied by concrete practical measures, which are being strictly implemented**.

Another important factor, which was of vital importance for the economy, was the technological transformation. As a manufacturer and exporter of low-value products, in order to maintain the competitiveness the country focused on the one hand on developing technological capabilities and venture activities, while on the other, on use of new technologies for modernization. Ireland technological transformation process is not inferior by its importance to industrial policy.

Korea Development Institute of Technology is a quasi-public institution, which operates under the Ministry of Science and Economy of Korea. Formed in 2009, the main function of the Korea Institute is development and analysis of R&D and industrial policy. It acts as a funding agency for industrial innovation in technology, shapes industrial and technological ecosystem of the country and promotes international technological cooperation. Institute annual budget is around US $1 billion, while the number of employees reaches 257.

Chapter 3. ARMENIA INNOVATION DEVELOPMENT VISION

Armenia recorded modest success in formation of innovative system. Public consolidation around the vision of innovative development and coordinated management must become guarantee for converting the potential and opportunities into sustainable development and ensure its irreversible progress.

Analysis of the potential, achievements and faults of the individual components of the innovation system shows that the quality of the innovative environment in Armenia can be generally described as embryonic and far from technological edge. However, realistically planned and targeted strategy of consistent, comprehensive and participatory implementation of technological breakthrough is possible, as there are serious prerequisites for that.

3.1. ARMENIAN NATIONAL INNOVATIVE SYSTEM

Education, Human Capital

Quality and availability of technical personnel are crucial for knowledge-based development model of the educational system. Highly qualified professionals with advanced skills and high human resource capacity have traditionally been the obvious advantage of Armenia. **At present, it becomes a factor restraining growth.**

The country's 37 private universities as a rule do not provide services in the areas of natural sciences, engineering, and math education.

Foreign students make up only 3 percent of the total students, evidencing passive international cooperation in the field and low participation of Armenia in the international market of educational services. Competitive advantages are mainly concentrated around low education fees and affordable survival factors. Only the medical education sector recorded a strong reputation for teaching (annually around 500-600 foreign students get medical education in Armenia). Important work is being done in the field of education policy in order to bring educational system in compliance with international standards (in 2005, Armenia joined the Bologna process).

21 percent of Armenian workforce has higher, 23 percent vocational, and 42 percent secondary education. Such proportion points to insufficient supply of human capital in order to activate innovation activities in high technological

niches. There is also a split between education and labor market.

Quantitative and qualitative inadequacy of education to innovation development agenda stresses the urgency of rapid modernization of the education system, strengthening its ties with science and industry. One of the main obstacles for creation and maintenance of highly qualified labor force is the high level of unemployment and the limited ability of private sector to absorb labor force, especially with regard to highly qualified workers.

Despite that, currently Armenia's ICT sector needs around 4,000 highly skilled workers, once again demonstrating the existing gap between labor demand and supply. Various initiatives of the government in recent years are aimed at attracting companies to the educational process. This is true especially with regard to the ICT sector, where a number of companies have begun to collaborate with universities to address the shortage of staff.

Research and Development, Infrastructures

Links between science and industry are developed very poorly. Out of 37 private and 26 public universities, only 7 are engaged in scientific and research activities. In 2012, the number of research organizations reduced to 72. Throughput 1991-2008, number of scientists reduced from 25,344 to 6,899.

Since 2000, the number of 30 year old researchers has been significantly growing. Half of the researches during 2000-2012 belonged to up to 50 year old age group. This is a rather encouraging trend. In 2000-2012, the share of candidates and doctors of science in organizations dealing with R&D reached 36%, while administrative and technical staff fell to 21%, evidencing improved quality of specialists in the sector. Innovative business segment is primarily engaged in imitation R&D. The main trend in the Hi Tech sector is outsourcing. As a result, around 70 percent of outsourced work is of simple nature, and only 30 percent is research.

Within the framework of the government initiative aimed at strengthening and deepening science-production chain several “major projects" were launched, such as CANDLE, Radiation Medicine Center and Armenia's National Oncology Center. EIF implemented projects Computer for Everyone, Computer for School and Computer for Teacher, mLab and some others. EIF is also involved in joint projects with international organizations, such as “Microsoft”, “Cisco Systems”, “Sun Microsystems”, etc. Tools are deployed for fostering bilateral R&D. Nevertheless, opportunities that still exist in the international arena are limited in use.

Today R&D sector essentially operates in "survival" mode. The low level of resources channeled to R&D sector (about 0.2% of GDP) puts at risk the possibility to move out from the "survival" mode. 2008 crisis put an end to increased flow of financing of R&D. In 2012, only 5,600 people were employed in R&D organizations, which is 19% less than in 2008. The share of private sources of R&D funding, which until 2008 was growing, began to decrease, and in 2012 state budget provides about 70% of R&D funding, resulting in increased system's dependence on public funds. The nature of public funding in recent years has also changed. Under the auspices State Committee of Science three financing mechanisms of R&D, commercialization and innovation operate: basic (in 2013 financing totaled AMD 8,349 million), contractual/thematic (AMD 1,107 million) and targeted programs (AMD 1537 million). As a result of emphasizing commercial component of research, in 2001 the share of applied research in state financing reached 49%, compared to 25% in 2000. In 2012, growth of financing of development projects was observed. R&D sector is mainly oriented to addressing problem of technical and economic nature, whereas almost 85% of the costs in the last decade were channeled to applied research and technology programs and services, and only 15% to fundamental research.

Institutional and Regulatory Framework

Innovation and knowledge-based economic development was mainstreamed in policy agenda in the mid 2000's, and was immediately followed by a number of important initiatives.

Formation of national innovation system was declared a strategic goal. In this context, important gains include development of adequate policy documentation and concepts, legislative and institutional framework and key institutional units. During 2000-2011, more than two dozen laws, regulations and programs directly related to innovation were adopted.

The main responsible role-players in innovation policy development and implementation, promotion and support of innovative processes were identified (National Academy of Sciences, Ministry of Education and Science, National Science Committee, Ministry of Economy). Different agencies ensure implementation of policies, programs and initiatives (Enterprise Incubator Fund, Armenia Development Fund, Armenia SME DNC, National Center of Innovation and Entrepreneurship Development, Agency of Intellectual Property).

Systemic governance of sectoral policy is conducted through high-level

Councils under the Prime Minister (Science and Technology, Industrial, Information Technology Development, Business Support, SME Development), involving the competent ministries, private sector, academic community and civil society representatives.

In terms of innovative development, government endorsed two key documents – Inception Strategy on Formation of Innovative Economy and Export-Oriented Industrial Policy Strategy. They both practically target transformation of Armenia into regional R&D center in the long run attraction of transnational organizations acting in Hi-tech niches and internationalization of domestic Hi-tech companies.

Government defined the priority areas of scientific and R&D development through its 2011-2020 Scientific Development Policy, 2010-2014 Science and Technology Development Priorities, and 2011-2015 Strategic Action Plan of Scientific Development. These papers focus on 6 strategic priorities:

- Armenology, Humanities and Social Sciences,
- Biomedical Sciences,
- Renewable Energy Sources; ,
- High and Informational Technologies;
- Sciences studying universe, earth and sustainable use of natural resources;
- Applied studies enhancing fundamental research.

Steps were taken for protection of intellectual property. In 2011 Intellectual Property Protection Strategy was developed, Armenia ratified the majority of the international treaties in that area and works on ensuring compliance of Armenian legislation with international standards are conducted.

Armenia gradually introduces system of assessment of research institutions, which is one of the priorities in science-industry relations.

The Main Constraints and Faults

The existence of some elements of national innovation system evidences about existence of initial environment for recognition of the opportunities of knowledge based development and kits transformation into practical policies. However, the system as a whole is fragmented. A number of constraints are particularly important in terms of ensuring "Knowledge-Market" chain of

complex operations for creation of innovation hubs, their dissemination at local level and in separate areas. In particular:

- **Narrow Perception of Innovation**. Overall, the emphasis is only on technological innovation, hence the majority of projects and initiatives are focused on high and informational technologies. Promotion of non-technological processes, social management and innovation is crucial for the overall and efficient system operation. On the other side, strategic goal is limited only by the involvement of transnational corporations, while development and internationalization of local R&D institutions, as well as support of their progress in global value chains is also of significant importance.

- **Weak Links Between System Elements.** Links which are vital for functioning of sound innovation environment are almost non-operational. In particular, education-research-R&D, research-industry, institute of innovation intermediaries and support structures have poor budgets, there are nearly no start-up financing opportunities. Subsequently, local environment is not favorable for innovative entrepreneurship.

- **Lack of Governance Coordination.** Fragmentation of R&D governance and innovative management between different bodies does not facilitate strengthening of ties between science and industry, especially given the fact that financing of R&D designs is extremely limited and truncated from the next stages of the innovation chain. However, not always mechanical combination of two functions can lead to positive results in terms of commercialization of knowledge and expansion of its application in economy. Complex nature of innovation essentially assumes system horizontal and vertical governance through strongly integrated links.

- **Inefficiency of Education System.** Within the context of human capital based development education services throughout the chain "from preschool to higher education and life-long post graduate professional development" are inadequate and non-competitive, relation between education, labor market and level of income is weak. Radical improvement of the sector is high on the agenda.

- **Very Limited Funding Instruments.** Innovative funding is primarily carried out with donor resources allocated through public support and private sector. This is also an indication of the fragmented system,

which may not be viewed as the long-term model.

3.2. AGENDA OF INNOVATIVE DEVELOPMENT

The framework of innovative development system and policy identifies the existing gaps in the key areas of innovative practice, such as resource base, appropriate educational attainment and institutional system. This leads to two priorities: development of the innovation agenda and identification of institutional framework.

Innovation comprehensive understanding thus enables to identify the type of innovation or development stage, which is most applicable for developing countries and allows for beneficial use of the national content. This provides sufficient grounds to consider the possibility of developing **innovative development agenda.** Furthermore, innovative policies and tools are limited and cannot be efficiently adapted and combined with the peculiarities of the local environment.

Innovative development agenda rests on two fundamental components:

- Institutional resources;
- Knowledge based resources (education, innovation, IT).

With its focus on developing a dynamic exchange of knowledge and technology and being largely based on the nature of the ongoing relationship between these two parameters, innovative development suggests a durable process and cyclical changes.

It is accepted that short-term policy agenda takes into account a country's level of technology and, on the other hand, private sector development environment. These two factors provide for realistic functional integration of institutional and knowledge resources.

In the longer run, the agenda comes to the irreversible phase of self-developing and mutually reproductive institutional and knowledge based abilities. These innovative stages of development (Table 1) intrinsically include three levels of technological and institutional development and/or changes in, which are necessary to create very specific policy agendas.

Table 1. Cyclical Policy Matrix of Innovation Development

Level of Innovation and Human Capital	Strong investment environment and institutions	Acceptable investment environment and (weak) institutions	Poor investment environment and institutions
	DECISION MAKING HORIZON		
	LONG TERM	MEDIUM TERM	SHORT TERM
HIGH	Innovation for new leaders agenda	Critical mass agenda	Survival agenda
Technology creation	Development of specialized technologies through promotion of innovative clusters	Increased value-added from natural resources and technology commercialization	Inventory of progress sources
AVERAGE	-	Critical mass agenda	-
Creation and development of technologies		Design of innovation clusters and high value-added chains	
LOW	Knowledge resource creation agenda	"Export as benchmark" agenda	Institutional content agenda
Technology absorption	Investing in higher education and technology absorption	Development of non-traditional exports as an opportunity for institutional and technological development	Institutional infrastructure design Demonstration programs (health, education, agriculture, handicrafts)

Innovation for New Leaders Agenda

Countries, which are in this phase aim to step up investment in fundamental and applied research and the development of human capital. Identification of new innovation platform and system restructuring is the main goal of this agenda aimed at formation of greater value added and safeguarding living standards rise.

For example: Finland, Ireland, Israel, Korea, Portugal, Spain, Taiwan, and China.

Critical Mass Agenda: Inventory of natural resources and scientific and technical resources (STR)

Russian Federation can be considered as typical bearer of this agenda as it has high level of both natural and scientific and technical resources. While these resources were strongly eroded during the last two decades, government efforts are being invested in their rebuilding, upgrading and promotion. Here, we evidence "double transformation" phenomenon, when there is a need for commercialization of STR on one side and development of value chains on the other, with the view to gaining higher value added and expansion of processing capacities. One of the peculiarities of this type is the existence of relatively weak institutions, which constantly hampers efficient implementation of the integrated agenda even at public policies level and dissemination of innovation programs and initiatives at sub-national level.

For example: Russian Federation

Survival Agenda: Inventory of progress sources

This is essentially the situation when there is a deep gap between sufficiently strong knowledge resources and unpredictable and unsustainable institutions. At the same time, situation in the context of pure innovation is more promising. Such countries implement various successful initiatives, but mainly due of “global origin”, i.e. due to compatriots living abroad and Diaspora.

Within the framework of this agenda foreign potential is exploited in order to alleviate adverse environment and weak marketing culture in the country. It is advisable to concentrate this type of policy on development of science and technology, technological incubators and other bridge institutions, which allows providing a vibrant environment for import of entrepreneurial projects

and ideas. Another important prerequisite for progress is the promotion of openness in application of innovative instruments, ensuring mutual awareness of the global and own practices, involvement in South-South cooperation networks.

For example: Argentine and Russia (in 1990s), Belarus, Iran

Critical mass agenda: Design of innovation clusters and high value-added chains

This applies for countries that have strong technical capabilities (engineering and applied research) and export oriented industrial and natural resources, often in the form of branches of transnational companies. Human capital value in such countries is relatively high. They usually accommodate between low-cost technology absorbing countries and the advanced OECD states. In some countries of this type the (with high middle-income) the potential of being in the turning point is extremely strong. They have isolated centers of dynamic development and innovation. While within such agenda one can witness successful stories of innovation initiatives, however those are rather exceptions than general trend or regularity. This main challenge of this type of policy agendas is development and expansion of links between the elements of the innovation system (value chains and clusters). At the same time, it is feasible to concentrate activities and resources on distribution and scaling of the existing viable assets rather than new projects, in order to ensure the upward growth of the value chain and the influx of global knowledge to local industries.

For example: Latin American middle-income countries (Argentina, Brazil, Chile, Mexico), Asia (Malaysia, Philippines, Thailand), Eastern Europe, South Africa

Knowledge resource creation agenda

It is mostly common for the oil-rich countries, which have strong/sustainable institutions in the sense that decision-making process is supported by long-term strategic planning. However, within the context of very modest knowledge resources, the task of channeling oil revenues to formation of internationally competitive education and R&D institutions is becoming a priority, more over given the need to establish at least a few centers of excellence in the initial stage, which would result in their strong dependence on import of human capital. These countries spent huge resources for localization and mimicking of foreign experts and best global practices, however, they are far from creating

a culture of innovation, which will take into account local peculiarities. At the same time, the purchase of foreign technology and improvement of domestic technology, creation of joint ventures with foreign partners and development of its own R&D product are not mutually exclusive activities.

For example: Gulf Arab oil countries

"Export as benchmark" agenda

Countries which are institutionally rather are able to export to shape export targeting agenda, because they could convert low labor costs into market products and services. This strategy has been extremely successfully implemented in the East Asian Tigers and Japan.

One of the traditional instruments of this agenda is the establishment of export zones. However, its success largely depends on the efficiency and management culture as the risk of market distortion and corruption is high. Therefore, in using such tools it is important to have a clear strategy in order to spread target zones and applied market incentives throughout the country over time and create an enabling environment in general.

For example, Bolivia, Central America, Korea (1960), Kazakhstan, Mauritania, Mexico (1970), Paraguay, Pakistan, Vietnam

Institutional content agenda

This is a policy vector of countries with lower level of technology and weak institutions. In fact, this group represents the so-called "bottom billion" countries, which are landlocked, have impoverished population and extremely weak institutions. The whole paradox is in that phase of development process the need for public intervention is the highest, but obviously any interference is most probably deemed to fail. The key problem of such countries is unresponsive system of mutual interests, therefore Diaspora with its successful representatives may become an important factor of the environment redesign. Under this agenda, the appropriate inception activities should be of a ***differentiated*** nature, and should take into account the possibility of failure, furthermore they should be ***prudent*** in order to reduce possible failure costs. Such mechanisms can be provided by export processing zones, educational initiatives with the mechanism of refinancing and distance teaching, etc.

For example many countries in Southern Africa and Central Asia

3.3. SELECTION OF ARMENIAN AGENDA OF INNOVATIVE DEVELOPMENT

As a first step, formation of the national agenda of innovative policy aims at self-identification and self-disclosure. Best practices of developing countries suggest that pure imitation of stories of success cannot guarantee the desired outcome. At the same time, design of the national program that is mostly based on clear detection of internal restrictions, centralization of opportunities and selective application of piloted strategies and mechanisms will be destined to success.

The existing stock of knowledge and institutional resources serves as a basis for designing direction of the innovative development strategy in Armenia and define realistic scenarios of policy milestones.

- **Short-term objectives. Agenda of rapid transition from creation of institutional content to export promotion.**

This agenda aims at a quick (1-2 years) redesign of the existing innovation system by streamlining and establishing the necessary institutional units and their functional portfolio, establishing innovative development management hierarchy, supporting highly integrated horizontal links between the system units by effective mechanisms, which will ensure the necessary environment for realization of "knowledge-market" chain.

Given the existing gap of institutional knowledge and resources, as well as a limited resource base, establishment of the hyperactive supporting infrastructures, introduction of attractive and low risk tools (micro and small target lending, matching grants), involvement of Diaspora and use of its potential during that period is of key importance.

It is necessary to implement parallel events and actions aimed at formation of small-scale and local innovation units, focusing on exports. Portfolio of important initiatives may include the establishment of special zones, attraction of multinational companies especially in technology intensive areas.

Transformation of business mentality from short to long term perspective must be emphasized, as this will strongly foster innovative practice and shift it vertically from policy making to taking business decisions, which will incentivize innovative demand. To this end implementation of exemplary projects in specific regions or sectors is of significant importance (such projects can be especially effective in the agriculture, health and education sectors).

The modernization of the education system should become an indisputable imperative, focusing on training of competitive specialists in engineering and fundamental sciences.

The main short-term task is the enactment of the necessary institutional infrastructure, formation of capacities for absorption of global knowledge and creation of successful local examples.

- **Medium-term objectives. Critical mass agenda.**

This agenda assumes that knowledge and resource reserves have been accumulated in order to disseminate the existing practice and examples of success throughout the country and in different economic sectors.

At this stage, important policy and realistic actions should be focused on development of incubators, transforming the existing local knowledge into R&D culture and ensuring involvement in international networks.

Inventory and perhaps revision of the accents in sectoral policies where there is huge innovation absorption potential will become the key element.

In the medium term industrial policy attains a crucial role, the priority goals of which should include support to hubs with higher value added potential, expansion of horizontal links with transnational corporations, ensuring local production of specific products or services, creation of the new regional "economic islands" based on the experience gained in the previous stage.

The Armenian Diaspora is an important resource for development. Diaspora members who have succeeded in business abroad can provide peer review and financial support to the development of new enterprises, thus overcoming the limitations of the domestic market.

Ensuring "double transformation" becomes key issue of the medium-term horizon to ensure transformation of accumulated knowledge into R&D capability and development of value chains.

- **Long-term objectives. Innovation leader agenda**

This agenda targets coordinated activities aimed at dissemination at national level of critical masses of knowledge, technologies and industrial hubs created in the previous phases.

Given the complex nature of innovation, expanding effect of economic development, can be achieved only when industrial restructuring, knowledge and formation of critical mass of experience occurs at the national level. As a

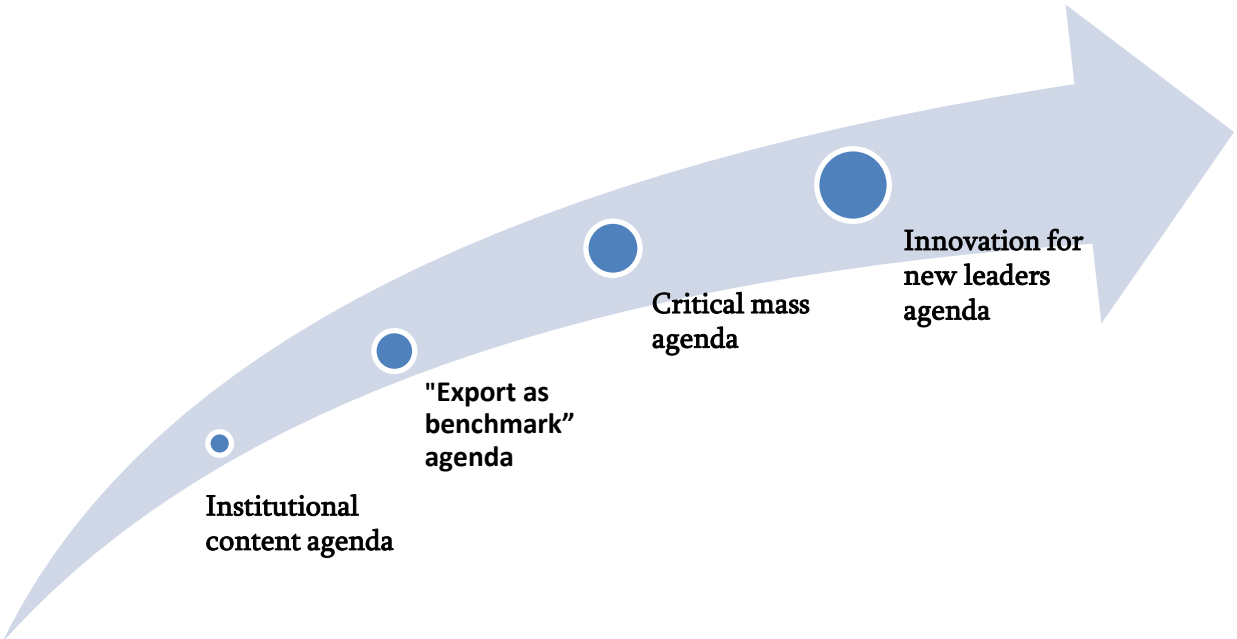
result, economic and institutional transformation starts in certain areas or certain sectors of the economy, and over the time evolves into a qualitative transformation of the country.

Thus, the core of the national innovation development agenda must be:

- Short-term - formation of bottom-up (micro level) start-up hubs;
- Medium-term – scaling of accumulated knowledge and experience through coordinated and guided activities;
- Long-term – transformation of sectoral achievements into all-inclusive reforms.

Guiding principle of the national agenda should provide for implementation of the agreed policies aimed at overcoming problems in order to ensure the irreversible reforms.

The key principle of such development model is formation of demand-side of economy. Furthermore, it is essential that innovation becomes a crucial factor for improving the daily life of citizens. Prerequisite for this type of economy is consumers' intellectual development. The basket of consumer products must contain the latest science-based products. In order to make such purchases, it necessary that the intellectual potential of a consumer is at least one step ahead of his/her material capacities. Here it is important that citizens understand and accept the nature of such economy, and to guarantee this the state should constantly demonstrate and proof the effectiveness and benefits of utilizing science and science-based solutions.



Chapter 4. INTERVENTION AREAS AND POLICY DIRECTIONS

Within its extensive and profound integrity innovative development requires equally goal-oriented and inclusive policy with the view to creating stimulating environment, making sustainable resource base to ensure effective management of the process, and the inclusion of sectors and areas.

Compulsory prerequisites of ensuring logical and automatic sequencing of innovative development milestones in Armenia and implementing its long-term goals include:

- **Free environment of idea generation and commercialization.** design of scientific fundamentals, technology transfer mechanisms and modernization process, enabling the intellectual property system, enhancement and expansion of venture mechanisms of financing, investment fund formation.
- **Structural reforms and freedom of entrepreneurship.** "subtlety" of tax, customs and inspection relations for fostering business and innovation demand, "liberalization "of monetary and fiscal system, enhancement and simplification of technical regulation of foreign trade, introduction of complex and proactive support mechanisms for start-up businesses.
- **Efficient management and infrastructures.** energy efficiency and renewable energy, infrastructure construction, attraction of private capital in innovation absorbing sectors of strategic importance, which have professional public management and systems for assessment of policy and public investments impacts

Ensuring these activities assumes existence of the respective complex of public policies focused on the following umbrella of complementary directions or areas of intervention.

4.1. EDUCATION, LEARNING AND TRAINING

Education system with all its systemic components is the main resource of knowledge and human capital, serving as a driving force for development, progress and accumulation.

Politicians, educators and citizens must emphasize the role of education, in order to educate the young generation as active political and social participants

of future knowledge-based economy. To this end policy should be aimed at ensuring higher qualities and standards of learning, training and pedagogical education.

Education in knowledge based economy must be different from traditional educational systems and have on-going life-long nature. In order to improve "life-long education" process, the government must focus on two types of reforms. First, innovative approaches must target the quality of elementary and secondary education through upgrading curriculum, teachers' training, creation of more flexible system, which is prone to change, raising the level of IT literacy, etc. On the other hand, it is equally important to strengthen the core skills of the informal sector. The government should invest in programs that promote the transfer of skills in the informal sector from adults to the young generation. These actions should include training of instructors, modernization of curricula, programs and financial support. Technical and financial support will be provided also for non-formal education, focusing on short-term programs and courses in areas such as information technology literacy.

Effectiveness of teaching in knowledge-based economy depends on learning motives. This requires ideological perception, structuration of thinking. The process of educating educators is of fundamental importance.

4.2. REGULATORY FRAMEWORK

Reform agenda

Reforms must be aimed at abolishing administrative and legislative obstacles of innovation through the following ways:

- identification of realistic reforms and establishment of priorities for acquisition of sustainable results;
- development of strategy of receiving support of public at large and political forces and mitigating or eliminating resistance of critical interest groups;
- creation of institutional mechanisms, adequate capacities and incentives for implementation of reforms and maintenance of the chosen direction.

Key factors for success of the reform process are:

- Strong political leadership,
- Existence of independent legal entity, which will ensure inclusiveness,

continuity and protection of reforms from different vested interests;

- Transparency, communication and effective dialogue with stakeholders is an important factor for gaining public support and interest and weakening conservative resistance;
- Reforms should ensure the elimination of the causes of problems, preservation and strengthening of results.

Foreign Trade

Foreign trade enhances transfer of technologies and knowledge at least through three pipe-lines:

- transfer of technologies embedded in goods and services;
- vendor-consumer relationship related to use of technological goods;
- international flows and investment of capital.

Although in recent years, international trade restrictions have significantly weakened weak, still there are tariff and non-tariff barriers in the form of customs duties, technical and quantitative constraints or their combinations. Customs duties can be a major obstacle to innovation, technology exchange and appropriation, and quantitative constraints significantly affect commercial opportunities.

The impact of quantitative constraints, standards and norms on innovation can be either positive or negative. They can force exporters to improve their product quality and master new technologies as well as reduce informational and transaction costs relating to manufacturing processes. On the other hand, they limit foreign trade and participation in the process of global exchange.

The government should be consistent in simplification of customs procedures and implementation of effective control measures:

- simplification and rationalization of complex data collection and documentation;
- rationalization of non-tariff control;
- harmonization of the proposed reforms with agreed standards and international customs agreements;
- implementation of one-stop-shop principle for importers and exporters;
- reduction of inspections and delays due to introduction of risk management systems.

Protection of intellectual property plays an important impact on promoting innovation and technology transfer. Opinions about the impact of intellectual property protection in developing countries vary. Many believe that promotion of knowledge creation and dissemination process requires strong intellectual property rights protection system. But often this makes valuable copyrighted materials unavailable or difficult to access for educational system. Besides, monopolies created in this way ask higher price for goods and services. Finally, the system of intellectual property protection in developing countries constraints the development of local capacities and slows down the implementation of future innovations. Thus, the system of intellectual property protection must be consistent with local technological skills and capabilities.

4.3. BUSINESS SERVICES

While innovations in the developing countries are largely the result of exchange of technologies to is, favorable business environment in this process is not less significant. All this can lead to the promotion of competition in internal market, which will have a positive impact on innovation by fostering investments.

Favorable business environment implies business support institutions or promotion of innovation is carried out through the provision of appropriate services to businesses by various institutions. They are mainly aimed at enhancing the competitiveness and marketing capabilities.

The infrastructure of specialized services includes:

- capital investment promotion;
- technological expansion
- ;
- standardization and metrology;
- productivity centers;
- information and telecommunication.

Capital investment promotion. Attraction of foreign direct investments and promotion of national investments requires focused efforts. Skills development, the relevant recruitment services, upgrading local industries, all this is important not only to attract investors but also to create synergy in terms of the local environment.

Technological expansion. The main objective of technological expansion is to obtain small, but promising achievements. While technological expansion methods vary by companies, they all relate to small businesses and technology sources.

Productivity centers. These centers are mostly oriented to industrial rather than technological development. They collaborate with organizations to increase productivity and efficiency in the processing industry and to adapt with the changes in nature of the issues under review. Many companies focus on relationship between employment and productivity to dispel concerns that the increase in productivity will lead to job cuts.

Standardization and metrology. Value chain globalization occurs parallel to standardization of practice and processes. Metrology is the basis of standardization. While Armenian standards are in line with ISC standards, conformity certificates are not sufficiently developed.

Information and telecommunication. Provision of information services is determined by specific objectives of the organizations. Those services are provided by organizations, which stand closest to the supply of public goods. They help organizations to develop information, advice on risks in innovation and intellectual property areas.

SME support. In theory, all organizations are related to innovation, but in practice their policies mainly cover its specific categories. While formerly innovation was mostly triggered by larger firms, nowadays SMEs are selected as the policy subjects. This change can be explained by two factors:

- Innovation is increasingly taking place in new, smaller companies.
- Small businesses have huge unrealized potential to create new products and processes.

However, SMEs need support to access technology, large-scale resources, utilization of new technology. Often SME support policies cover the entire product development cycle starting from design till entry of international market. In this respect, incubators play an important role in terms of the viability of start-up companies.

4.4. PROCUREMENT POLICIES

The main objective of proactive innovative policies is to support products and services suppliers through grants, purchase of securities or financial

instruments. Demand, however, is an important potential source of innovation. Public procurement is one of the possibilities for innovative solutions and for guiding demand of products and services while improving provision of public services. Public procurements can open a wide-scale market for innovations, since the state is more willing and capable of paying the offered high price and secondly, state demand often reaches critical mass more quickly. State governance bodies promote innovation through three main directions:

- **In terms of innovative products and services,** government identifies alternative solutions that meet their needs and improve the quality of public services.
- **Precommercial procurement: T**he goal is to create innovative solutions in the areas where solutions have not been designed yet. In other words, precommercial purchase is a R&D services contract given to a supplier through future multi-stage process. Acquisition of innovations is initially very risky and in order to reduce costs, purchase process is divided into various phases. The advantage of precommercial procurements is in sharing the risks and benefits of design and piloting of new goods and services without budgetary support.
- **Catalytic procurements.** Procurements are made on behalf of final consumers. In this case, the criterion of assessment is shifted from cost to solutions, which will ensure the biggest profit for end users.

4.5. R&D PROMOTION POLICIES

R&D is a necessary and important condition for rooting innovative practices. The unsatisfactory level of R&D in developed countries, especially industry oriented, can be mostly explained by the following factors:

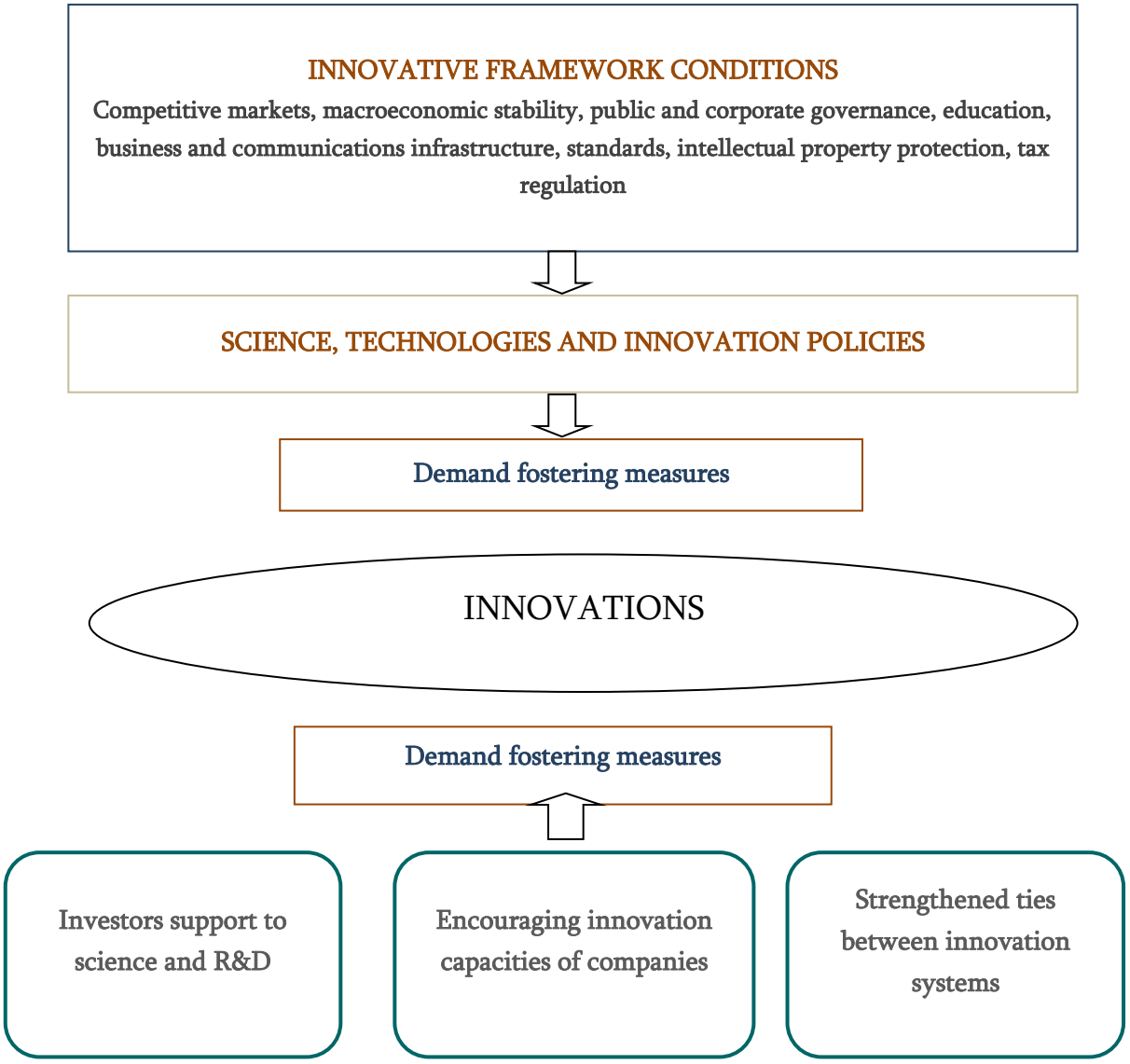
- Many organizations are inward of global technological opportunity curve and it is more profitable for them to buy or adopt foreign technologies.
- Given weak competition and narrow segmentation of market there is a lack of pressure to force organizations to develop research capacities.
- The relative cost of capital is higher than in developed countries. Transaction costs are high
- Macroeconomic environment is generally unstable, which makes it

more risky to make investments in R&D.

- Intellectual property protections system is underdeveloped.

Thus, government interventions or perspective policy directions include all stages of innovation from idea creation through economic turnover. Participation format and size in different depending on the stage. Meanwhile, the state is interested in the final result, which suggests that state benefits at certain stages may not be expressed as direct income. Still, the state plays the role of a key performer in terms of security, especially during the transfer stage.

During transfers from fundamental to applied science, and then from pilot design to pilot production and finally to serial production and its wide public implementation, the state must ensure availability of the respective education environment, infrastructure and access to financing.



Chapter 5. REALIZATION OF VISION

The complexity of selection of development model is in its practical realization. must become a national project, which will be managed in traditional areas of risk, resource and results management

5.1. PRECONDITIONS AND RISKS

The implementation of policies and maintain of approaches provided in this document requires existence of the respective environmental and behavioral conditions, the efficiency of which will be determined by their formation. As we can see above, the solutions are largely known. However success is observed only in those countries that are able to establish an adequate system of values and public attitudes. Addressing this challenge is difficult since it is largely expressed in non-material and inconspicuous way, and thus has an implicit and entrenched nature, which constantly delays its identification and the possibility of taking the necessary steps. Thus, in order to reach success through the selected progress model, it is needed:

Cope with the *challenge of maintaining consistency* (stability of rules of the game, predictability of change, weak dependence on the political conjuncture), which is the prerogative of attractive business environment and investment flows. Business decisions are based on short-term expectations and the economic policy decisions do not serve the purpose of increasing competitiveness. Period for acquisition of policy results takes longer period of policy management. In case of divergence of possible and preferable periods of obtaining results steps are taken in order to obtain quick results ignoring the real needs to increase competitiveness.

Lack of consistency in terms of rules leads to the *challenge of lack of trust.* This This condemns to failure any radical and systemic reform, since as a rule their benefits materialize only in long-term period and assume certain losses in short-term period. Lack of trust leads to the *challenge of conflict of alternatives*. Public (in the stage of development and transition) often faces conflict of values caused by inertia or external impacts, including deformed attitude toward wealth, the misunderstanding of the role of state, hesitance in development issues, etc. Coercion of artificial selection results in existence of winners and losers in society. This in turn lowers potential policy implementation resources.

Thus, conditions for the provision of vision are:

- Simple and clear definition of the rules of game and consistency in compliance with them.
- Comparison of mid-term decisions aimed at obtaining long-term results.
- Public awareness and consensus around the vision.
- Public policy coherence and effective management of resources.

5.2. AGENDA OF MAINSTREAMING THE VISION

The long-term socio-economic development strategy of Armenia is set out in the 2014-2025 Armenia Economic Development Strategy Program. It is expected that the Program will be revised in order to ensure programmatic base for implementation of the approaches prescribed by this Vision.

Sectoral strategies and programs will be reconciled with the Vision as well. The new mechanisms and tool-kits will be assesses in the prism of the Vision.

Evaluation standards will be developed within the framework of medium-term expenditure programming, assessment of public investments and procurement policy in order to focus on priority projects.

5.3. MMANGEMENT OF INNOVATIVE DEVELOPMENT

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5.4. COORDINATION OF DEVELOPMENT

In cooperation with the donor community Armenia has opted for partnership relations. Resources aimed at support were replaced by development oriented investment resources. Those resources are accessible through various tools and have a clear price. Cooperation of the government with the donor partners in such areas as research, evaluation of policy outcomes, and integration in global development platforms will be performed in a fully coordinated and result-oriented manner.

Expenditure priorities will be reflected in mid-term program developed in coordination with the donors.

Annex 1. ECONOMIC ANALYSIS (SWOT)

The purpose of such economic performance analysis is to identify all the main factors, which can influence the process of economic development. Such analysis enables to assess and classify all the factors by nature and quality of their influence, which greatly enhances development and implementation of balanced and realistic economic policy. Armenia's economic development strategy is formed through combination of these factors.

STRENGTHS	WEAKNESSES
▶ Knowledge and intellectual activity propensity ▶ Diaspora as a capacity bearing factor ▶ Relatively sound private sector ▶ Liberalized foreign trade regime	▶ Insufficient market economy institutions ▶ High level of corruption ▶ Low labor productivity ▶ Low absorption capacities of the economy in terms of scientific output ▶ Uncompetitive educational services ▶ Limited and unreliable land connectivity channels ▶ Dependence on fuel sources ▶ Disproportionate territorial development
OPPORTUNITIES	**THREATS**
▶ Access to external diversified markets ▶ Objective conditions for research and development progress, IT development potential ▶ Use of Diaspora academic, governance and financial potential ▶ Regional hub of civil aviation transfers ▶ Diversified capacities in the field of electricity	▶ Low ability to absorb external shocks ▶ Emigration of brains ▶ High depreciation degree of energy facilities ▶ Worsening demographic situation ▶ Unequal wealth distribution and high poverty level ▶ Regional geopolitical instability

STRENGTHS

Armenia's identified economic strengths are the main prerequisites and resources for long-term economic development. Their presence and/or dynamics are the prerequisite and guarantee for selection of Armenia's economic development instruments and their efficient operation. Therefore, these areas will be subject to on-going strengthening and protection policies, placing them among strategic policy priorities.

Knowledge and intellectual activity propensity

The scarcity of natural resources in Armenia as a kind of catalyst for manifestation of nation's innate intellectual potential, and its consolidated and rational utilization, which is a key to innovative development. Scientific potential, understanding of the superior value of education and science is a prerequisite for the realization of knowledge-based economy.

In 2015, Armenia is ranked 43-th among 124 countries by human capital index.

In 2014, Armenia's score of Human Development Index is 0,730 and it occupies 87-th place among 187 countries as a country with "high human development level".

Knowledge Economy Index (KEI) in 2012 in Armenia amounted to 5.08 (maximum 10), and with this index Armenia is ranked 71-th among 146 countries. The average world score was 5.12, and the lower middle income group average was 3.42.

The proportion of Armenian workforce with higher education in 2011 amounted to 25.4%, which is almost equal to the same indicators of developed countries. For example in EU countries, it was around 29%, and in OECD countries around 28%.

Source: www.worldbank.org, www.undp.org

Diaspora as a capacity bearing factor

Diaspora is a major factor for the development of Armenia in economic political integration and representation directions. Vibrant and successful Diaspora individuals in many fields, such as art, culture, finance, science, politics, serve as a special envoy representing the collective image of the nation in the world.

Armenian Diaspora is spread around the world in 120 countries, where their total number according to various estimates amounts to 7-10 million people. .

Diaspora has active participation in global promotion of Armenia, and presentation and solution of its geopolitical challenges. In addition, Diaspora plays active role in socio-economic development of Armenia.

Due to "Hayastan" All-Armenian Fund's activities, including significant participation of the Diaspora, more than US $ 270 million were committed for projects in Armenia

and Artsakh. In particular, infrastructure, schools, hospitals were built and improved, as well as educational and scientific programs were implemented.

In 2014, remittances transferred by domestic banks amounted to US$ 1,728.6 million or 15.9% percent of country's GDP.

Source: www.cba.am, www.himnadram.org

Relatively sound private sector

Armenia's economy is characterized by liberal economic system and high level of cooperation with international organizations. Development of market relations created enhanced opportunities to strengthen economic self-regulatory mechanisms, which allow minimizing direct state involvement in business processes. Adopted liberal principles and approaches ensure legal and institutional framework for favorable business environment. Due to consistent economic reforms implemented by the government and the high level of business activity, business environment in the country is continuously improving. Government provides favorable treatment of small and medium enterprises (SME), as a result of which a well-functioning system of state support for SMEs has been developed.

According to EBRD estimates, private sector share in 2009 GDP was 75%.

According to "Doing Business 2015" Armenia is ranked 45-th among 189 countries. In t In terms of individual components Armenia is ranked 4-th for "Starting Business", 7-th for "Registration of Business" and 69 for "Termination of Business".

Armenia's 2015 Economic Freedom Index score was 67.1, ranking the country 52-th among 186 countries and qualifying it among "moderately free" countries. In terms of "Business Freedom" component Armenia with 82.7 points ranks on the 25-th place.

In 2014, the state register of legal entities registered 8,947 entrepreneurs, 3,134 Ltd.-s and 74 other trade organizations.

Source: www.doingbusiness.org/rankings, www.heritage.org/index, www.ebrd.com, www.armstat.am, www.e-register.am

Liberalized foreign trade regime

On-going reforms in tariffs non-tariff regulation and customs administration ensure favorable conditions for intensification of foreign trade. Armenia's membership in WTO ensures non-discriminatory treatment of Armenian goods and services in 160 countries. Beginning from January 2014, Armenia became eligible to the new cycle of "GSP+" regime, which means that more than 6,000 goods of Armenian origin will be imported to EU countries under "GSP+" regime with privileged zero or reduced customs duties. From January 2015, Armenia became a member of the Eurasian Economic Union. Armenia's membership opens wide range of opportunities for export of Armenian

products to new markets.

According to the 2015 Index of Economic Freedom (EFI), Armenia with 85.4 points of "commercial freedom" level of points and ranked 47th place among 186 countries. External trade/GDP ratio in 2014 amounted to 54.4%. According to 2015 freedom index, Armenia with 85.4 points ranked 47 among 186 in terms of "Trade Freedom" Foreign trade/GDP ratio in 2014 equaled 54.4%.

Exports are exempt from customs duty, while imports are subject to two customs duty rates (0 and 10%). In 2013, trade weighted average customs duty stood at 2.8%. According to 2014-2015 EFI, Armenia by these indicators is ranked 41 among 144 countries. :

The World Bank Services Trade Constraints Index of Armenia was 11.4 (0 is fully free, 100 is fully non-free).

Sources: www.heritage.org/countries/Armenia, www.wto.org, RA NSS Statistical Year-Book, 2014., www.weforum.org/GCI, iresearch.worldbank.org/servicetrade

WEAKNESSES

Weaknesses are the factors, which with their current level and/or dynamics limit potential for use of the strengths. This framework does not include purely weak indicators. Only the factors which inhibit efficient use of the economic development tools (if the respective supporting and enhancing policies are not conducted with regard to them) are reviewed.

Insufficient market economy institutions

In terms of the existence of fully-fledged market system, Armenia still has some problems with regard to market institutions. While there are certain structures, specific for market economy, they do not fully resolve the issues for which they were formed. Secondary securities market practically does not function, and there is a lack of control over competitive environment and abuse of dominant position. Problems exist in terms of resolution of commercial disputes through courts as well. While the volume of loans to the private sector by the banking system is constantly growing and interest rates on loans are gradually declining, still they are still too high in order to boost higher economic activity. In addition, there is a significant difference in levels of interest rates on loans and deposits. These problems adversely affect growth of economic activity and competitiveness, as well as investment attractiveness.

According to 2014-2015 Global Competitiveness Index, in terms of "Financial System Development" Armenia is ranked 97h; "Institutes" – 72; "Efficiency of Court System in Dispute Solution"- 95; "Independence of Justice System" – 107; "Financing through Domestic Securities Market" – 112. According to "Doing Business 2015" Armenia is ranked 119 in terms of "Implementation of Contracts".

Balance of loans to residents/GDP ratio for 2014 was 46.2%. However balance of loan to enterprises was equal only to 56.5% of loan portfolio. As of December 2014, average interest rate of loans in AMD with a maturity of one year totaled 17.1%, and 12.3% in US dollars. Depending on currency and maturity, difference between loan and deposit interest rates fluctuated within 3-10 percentage point range. In terms of EFI index "Accessibility of Loans "Armenia was ranked 97. During 2014-15 survey conducted within EFI framework, access to financing was indicated as the second obstacle to business development after corruption.

In 2012, capitalization of equity market was equal to 1.3% of GDP, which is significantly lower than in the developed countries. The same indicator in USA is equal to 115.5%, Germany 42.1%, Czech Republic 18.0%, Slovenia 14.0%.

Source: www.weforum.org/GCI, www.worldbank.org/DoingBusiness, www.cba.am, i-tip.wto.org/services

High level of corruption

High level of corruption limits opportunities for free competition and increased attractiveness of business environment. Corruption has negative impact on the competitive environment, improvement of public institutions, as well as fair distribution of the tax burden.

According to 2014 Corruption Perceptions Index, Armenia occupied the 94th place among 175 countries. Under "Freedom from Corruption" component of 2015 Economic Development Index, Armenia is placed at the 95th place.

During 2014-15 survey conducted within EFI framework, corruption was indicated as the main obstacle to business development.

Source: www.transparency.org, www.weforum.org/GCI, ww.heritage.org/Index

Low labor productivity

Armenia is far behind developed countries in productivity levels. Low level of labor productivity hampers economic growth, investments and wages increase. Productivity level is affected also by inadequate business management practices. Unsatisfactory strategic business planning, inefficient management of human and financial resources, low quality of management, as well as insufficient use of marketing tools for promotion of market products and services still inhibit the growth of business competitiveness.

GDP per employed in 2013 was equal to AMD 3.7 million or about 9 thousand US dollars. The same figure in the USA is equal to 116.5, in Germany 89.9, Slovenia 52, Estonia and Czech Republic 40.1 thousand US dollars.

In Armenia, the highest produced value added per employed was recorded in construction AMD 6.8 million (1.9 times above the average), the lowest in agriculture 1.9 million (1.9 times below the average). The average value added per employed in industry was equal to AMD 5.6 million.

According to "Marketing prevalence" indicator of 2014-2015 EFI, Armenia occupied was ranked 109; "Willingness to delegate authority(outsource)" – 106; "Reliability of Professional Management" – 95 and "Efficient of Corporate Boards" – 104.

Source: RA NSS Statistical Year-Book, 2014, www.imf.org, www.weforum.org/GCI

Low absorption capacities of the economy in terms of scientific output

Armenian economy provides almost no demand for the output of science. There are no incentives to engage in scientific research either by universities or individuals, as well as companies, which are the main subject for innovation. Interest of entities to research and innovation activities, as well as application perspectives of research potential are extremely low. This is reflected by insufficient funding and low levels of cooperation in "science-production", "education-science", "science-state" areas. Science component within production, export and import of hi-tech goods is low. System of public procurements does not facilitate demand on scientific output as well.

Armenia lags behind in education, as well as the volume of public financing. Other sources of funding are highly unsatisfactory as well (private sector, foreign sources). Research and development expenses (public and private)/GDP ratio in 2011 totaled 0.27 percent (0.18% in 2000). The same figure in Israel is 4.0%, EU 2.0%, USA 2.8%. Research and development costs on the state budget in 2013 amounted to 0.6% of the total state budget expenditures. In developed countries, the government finances 20-50-% of the research costs. The same amount of co-financing is provided by private sector.

The volume of carried out research work in relation to gross domestic product in 2013 was low and amounted to 0.24%. Export share of high-tech products within total exports of processed products in 2013 amounted to 2.9%; the share of exported ICT products as a percentage of total exports of goods amounted to 0.2%; and the share of exported ICT services as a percentage of total exports of services amounted to 14.9%.

Armenia performance in terms of 2014-2015 EFI for different components is as follows: "University-Industry Partnerships in Research and Development" – 112'; "Research and Development Costs on Companies" – 102; "Purchases of Advanced Technological Products+ 121; "Quality of Scientific Research Institutions" – 105; "Sophistication of Manufacturing Process" – 91; "Value Chain Depth" - 94. Armenia has a rather high ranking in "Number of Patents per Million of Population" (53), however realization of registered patents is almost at zero level.

Source: RA NSS Statistical Year-Book, 2014, www.worldbank.org, www.weforum.org/GCI

Uncompetitive educational services

The existing system of education and training, which should be focused on human capital development, does not enhance achievement of current development objectives. Quality of education, in particular relevance of higher education to labor market requirements creates problems in terms of ensuring

employment prevention of "brain emigration" and enhancing penetration of science in the economy.

Armenia lags behind in the level of state financing for education and vocational education in particular. Public spending on education in 2013 amounted to 2.3% of GDP, whereas it was 5.2% in the EU and the USA.

In 2012, the share of public expenditure per school student within GDP per capita was 16.2%, while the EU average and the USA was around 20%.

In 2012, the share of public expenditure per university student within GDP per capita was 5.1%, while the EU average was around 28% and in the USA around 21%. In low-income countries, this figure can exceed 10 percent.

According to 2014-15 EFI, despite satisfactory enrollment in secondary and tertiary education, Armenia lags behind in terms of qualitative indicators. Thus, Armenia occupied the 86th place in "Educational System Quality", "School Quality Management" – 116, "Research and Training Services Access" - 120, "Staff Training"- 119, " Country Ability to Retain Talent" 123, "Country Ability to Attract Talent" - 119.

Within Human Capital Index 2013, Armenia occupies the 113th place among 122 countries in terms of "Human Resources and Employment" pillar, in particular 103-rd place in terms of "Unemployed" and "Youth Unemployment".

The highest unemployment rate was recorder in 2013 among population with higher, post-graduate, tertiary and incomplete higher education. Compared to 16.2% general unemployment, unemployment within higher and postgraduate education group is 16.4%, and within vocational and incomplete higher education group 17.5%.

Source: www.worldbank.org, www.weforum.org, RA NSS, "Labor Market in Armenia", 2014

Limited and unreliable land connectivity channels

Limited land connectivity opportunities disrupt reliability and continuity of flow of exports and imports and make them vulnerable to various external geopolitical and climatic factors. Together with the land-locked nature of the country, these constraints entail higher transportation costs and significantly hamper Armenia's economic competitiveness.

During the survey conducted within the framework of 2014 Trade Promotion Index, high cost of international transfers and delays were noted as one of the main export constraining factors. Armenia occupies the 134th place among 144 countries in terms of "Port Infrastructure Quality" index (measuring accessibility of seaports for the landlocked countries). Being a country with no direct access to the sea, about 15 percent of export revenues is spent for covering goods transit transportations costs, while countries with direct access to the sea spend for that purpose only 3-4% of their export earnings.

Source: www.worldbank.org, www.weforum.org

Dependence on fuel sources

Scarcity of local base makes energy system of the country strongly dependent

on foreign sources, as Armenia has to constantly replenish its energy resources.:

In 2005-2014t, the share of mining output within total imports ranged between 15.0-21.5%. During 2005-2011, 64.6-73.2% of consumed energy was imported. According to 2011 data, per capita consumption of energy in Armenia totaled 1,754.7 kilowatt/hours, while in Germany the figure was 7,081.0, Czech Republic 6,288.5, Hungary 3,895.5, Turkey 2,709.3.

Source: RA NSS Statistical Year-Book, 2014, www.worldbank.org

Disproportionate territorial development

Armenian territorial-administrative units are at different levels of development both in terms of lagging from capital Yerevan and by urban-rural comparison. Regional economic reforms are still insufficient. The level of unemployment and poverty is rather high and infrastructures are underdeveloped.

Major share of exports and imports falls on Yerevan – in 2013 these figures totaled 47.9 and 82.4% respectively, while the share of marzes is between the range 0.3-19.7 and 0.3-3.6%: Yerevan also accounts for the bulk of industrial production, in particular 40.9% - industry, construction - 58.3%, 83.9% - retail turnover of goods, 84.8% - provided services. In marzes, these figures range as follows: 0.8-16.5% - industry, construction - 1-8.3%, 0.3-3.1% - retail turnover of goods, 0.6-3.5% - provided services.

In 2013, unemployment in Armenia totaled 16.2%, of which 24.6 in Yerevan, while in marzes the level of unemployment ranged from 2.8% (Gegharkunik) to 21.7% (Shirak).

Poverty indicators significantly differ by marzes – the overall level of poverty in 2013 was 32.0, ranging from 21.0% (Vayots Dsor) to 45.9% (Shirak). In Yerevan, this figure was 25.5%. Poverty is significantly above the average in Shirak, Kotaik, Lori and Gegharkunik marzes.

Source: RA NSS, "Republic of Armenia Marzes and Yerevan in Figures" 2014, RA NSS, "Armenia Social Snapshot and Poverty" 2014

OPPORTUNITIES

The factors below are the areas, which in case of effective use of the strengths can ensure strong economic developments prospects in Armenia, and can reduce, offset or completely eliminate the impact of weaknesses due to application of sound economic development strategy and measures.

Access to external diversified markets

Membership in Eurasian Economic Union (EAEU) will foster economic links between companies of participating states and expand external markets (around 170 million consumers), simplifying access of Armenian production to markets

of EAEU participating states. Within the framework of cooperation, the EAEU participating states will not apply non-tariff regulation measures, technical barriers to foreign trade, businesses will benefit from lower trade costs and time required for trade, compliance will be monitored by integrated assessment system. Membership in EAEU creates an opportunity for duty-free import of raw materials from participating states.

Beginning from January 2014, Armenia became eligible to the new cycle of "GSP+" regime, which means that more than 6,000 goods of Armenian origin will be imported to EU countries under "GSP+" regime with privileged zero or reduced customs duties. EU awarded the right of using this regime only to 10 countries.

In 2014, trade with CIS countries accounted for 28.7% (including 24.5% with EAEU countries), EU -26.6% and other countries 44.7%.

Use of GSP by Armenia is high and reaches 90%. Within the framework of the "Generalized System of Privileges" (GSP) Armenia exports to EU mostly inputs, textile and food.

In 2010-2013, investments of EAEU countries in in the real sector of Armenian economy amounted to 873.2 million US dollars, of which 77.8% were direct investments. The volume of investments from EU countries amounted to USD 1,058.5 million, of which approximately 53.2% were direct investments.

Source: RA NSS, RA Socio-Economic Situation in January-December 2014, http://eeas.europa.eu/delegations/armenia/eu_armenia/trade_relation/bilateral_trade/index_hy.htm

Objective conditions for research and development progress, IT development potential

The level of R&D can be strongly enhanced due to coordinated initiatives in the field of information technologies (research centers of excellence: Alikhanyan National Scientific Laboratory (Yerevan Physics Institute), Centre of Oncology, "CANDLE" project, etc.), accumulated experience in research activities, advanced property protection system, as well as adequate level of international cooperation in the field of science and technology.

Attraction of transnational companies in the IT sector and joint implementation of regional projects with them, as well as formation and development of innovative infrastructures in IT sector based on public-private partnership will leverage economic progress higher productivity and competitiveness of Armenian economy.

By end 2013, there were 62 scientific organizations carrying out research and development with 5,230 employees of whom 81% were technicians and researchers.

11.6% of the total number of researchers and technicians are doctors of science, and 34.5% candidates of science. Scientific and technical activities in 2013 amounted to AMD 10.2 billion, as against AMD 8.7 billion in 2010. Domestic costs on research and development amounted to AMD 9.3 billion (7.9 billion in 2010), of which 72.1% from budget funds.

In 2014, the number of ICT companies reached 396 (4% increase compared to the previous year), of which 239 are local companies. There are 1,564 employees working in the sector, and the total turnover of the sector amounted to 474.9 million US dollars.

There are international scientific and research organizations involved in this sector as well which carry out joint projects. These are: "Microsoft Innovation Center", "Armenian-Indian ICT center", "Intel", "Cisco," "National Instruments", "Nokia" and other transnational companies.

According to the World Economic Forum's Networked Readiness Index 2015, Armenia occupied the 58th place among 143 countries. Since 2012 the country witnessed the highest advancement of the position among all countries improving it by 36 points.

In 2014, Intellectual Property Agency of the Ministry of Economy registered 1,584 trademarks, of which 1,018 in the name of national applicants. The Agency received 123 applications for inventions and 58 for utility models and granted 108 patents for inventions, and 40 for utility models. The Agency issued 27 certificates of industrial samples.

Source: RA NSS Statistical Year-Book, 2014, 2015-2017 Republic of Armenia Medium-Term Expenditure Framework, 2014 Annual Report of Intellectual Property Agency of the Ministry of Economy, www.weforum.org

Use of Diaspora academic, governance and financial potential

Active involvement of Armenian Diaspora in governance and business management of leading countries, the accumulated experience and potential may turn into vital sources for knowledge and skills transfer to Armenia.

There are 744 scientists from Diaspora representing almost all spheres of economy. Geographically, most of them work in the Russian Federation (over 250 scientists and specialists) and the US (around 150 scientists and specialists). About 95% of specialists are doctors and candidates of science working both in foreign companies and research organizations as well as foreign-based Armenian research centers.

Armenia also maintains partnership with a number of reputable foreign academic institutions such as National Centre for Scientific Research (CNRS) Joint Institute for Nuclear Research (JINR), International Science and Technology Center (ISTC):

Source: http://scs.am/files/otarerkrya_hay_gitnakanner.pdf

Regional hub of civil aviation transfers

Armenia's geographical position provides good perspectives for becoming a regional hub of aviation transfers. Yerevan "Zwartnots" airport meets the requirements of international standards. Currently, around 35 international airlines have flights from Yerevan to several dozens of CIS, Europe and Asia,

countries. At the same time growth potential of Gyumri's "Shirak" airport is high.

By international standards "Zwartnots" airport corresponds to "4D" class. Due to its operational and technical capacities it can operate Boeing 747, Airbus 310, Il-86, ANT -124, IL -62 and other classes of aircrafts. Cargo Terminal allows servicing of around 100 thousand tons of commodities annually.

Gyumri's "Shirak" airport corresponds to "4D" class of international standards. Due to its operational and technical capacities it can operate Boeing 757, Airbus 319 (320), Il-76, TU -154 and other classes of aircrafts. "Shirak" airport can be used as a back-up airport for "Zwartnots".

In 2014, passengers flow of "Zwartnots" Airport grew 20.9% to 2,045.0 thousand passengers (1025.3 thousand in-coming and 1,019.7 thousand outgoing). The number of flights-landings grew by 19.3%, making 10,409. Export and import of commodities reached 10,345 tons (of which 6,450 tons export, 3,895 tons import).

Passenger flow from "Zwartnots" Airport increased by 20.9% in 2014.

Source: www.aviation.am

Diversified capacities in the field of electricity

There are all main types of energy system available in Armenia. The accumulated expertise and professional staff working in nuclear, thermal and hydro energy sectors provide good perspective for further expansion of capacities. In particular, his includes construction of new nuclear power plants, small hydropower plants and expansion of the existing base. There is also the possibility of regional energy integration, in particular after construction of "Iran-Armenia 400 kV overhead power transmission line" and Georgia-Armenia 400 kV overhead power transmission line.

Climatic conditions allow the development of renewable energy sources and alternative sources of energy. Armenia has sufficient wind resources. There is great potential for solar energy. Geothermal resource potential is also quite promising.

In 2014, power plants produced 7750.0 million kilowatt hours of electricity, of which around 20% was exported. 42.4% of the electricity was produced by thermal power plants, 31.8% by NPP and 25.7 percent by hydro power plants. Electricity alternative sources are still insignificant and the share of their output in 2009-2014 ranged from 0.05 to 0.1 percent.

The total capacity of electricity plants is 4,094.4 thousand kilowatts of power (2013), of which 407.5 nuclear, 2,394 thermal, 1,289 hydro, and 3.9 million kilowatts from other sources. Compared to 2000, capacities of hydroelectric power and thermal plants grew by 10.9 and 23.9 percent respectively.

In December 2005, the first wind power station in Armenia and Caucasus with capacity of 2.6 million MW became operational in Armenia.

In Armenia, the average annual flow of solar energy per 1 m² of horizontal surface is 1720 kWh flow, whereas average annual solar flow in one quarter of Armenia's territory is equal to 1850 kWh/m².

There is also a good potential for use of geothermal energy. Within the framework of financial support provided to Armenia by International Bank of Reconstruction and Development, geological and geophysical surveys were conducted in "Gridsor" and "Karkar" geothermal platforms and subsequently, geological drilling works have been already launched in "Karkar" platform. «

Using private investments cogeneration plants of combined cycle with the installed capacity of 12.85 megawatts, as well as the new energy block of Yerevan thermal plant with combined turbo gas cycle of 240 megawatt capacity were constructed.

Source: RA President order No 182-N from October 23, 2013 "On Approval of Concept of Energy Safety", www.armstat.am, www.minenergy.am , RA NSS Statistical Year-Book, 2014.

THREATS

Low ability to absorb external shocks

Slowdown of growth in the world, including the EU and EAEU had a negative impact on Armenian economy as well. Vulnerability to energy and mining production price fluctuations in international market negatively impacts Armenian exports. 2008-2009 economic crisis resulting in dramatic growth of Armenia's external debt proved importance of attracting additional external resources in order to mitigate shocks. Currently significant uncertainties continue to go side-by-side with global economic developments. Therefore, fluctuations in economic developments of partner countries (EU member states and especially EAEU) and their weak ability to withstand potential shocks is a serious threat for economic development of Armenia.

In 2009, Armenian economy dropped by 14.5%, which was the third largest drop in global terms. Compared to 2008, external debt in 2014 grew more than twice as a result of which external debt/GDP ratio equaled to 40.8%:

In 2014, the net inflow of remittances transferred by Armenian banks dropped by 10.1%, particularly from Russia by 13.7%. In 2013, 10.5% of monthly household income per member comes from remittances, including 9.3 from transfers received from relative living abroad (the respective 2012 figures are 10.0% and 8.9%).

Because of low global demand, in 2014, exports of commodity group "base metals and articles thereof" dropped by 17.1 percent against 2011.

Source: www.imf.org, www.cba.am, RA NSS, "Armenia Social Snapshot and Poverty" 2014

Emigration of brains

Outflow of scientific cadres, as well as their leakage to other sectors diminishes

country's scientific and technological potential endangering the perspective of Armenia's development through building knowledge-based economy. "Emigration of brains" deepens technological gap with developed countries and can lead to irreversible loss of national scientific school. If urgent steps on training of new academic cadres and expansion of the existing scientific potential are delayed, the situation will continue worsening resulting in full loss of the existing potential.

According to household survey data on migration during 2007-2013, 224.0 thousand people left Armenia (average annual migration is 35 thousand people).

Out of migrants 17.2% had higher, 20.9% vocational and 49.8% secondary education.

It is estimated that during the last 6 years around 39,000 people with university graduate and post-graduate education left the country. Around 6.8% of migrants took citizenship of the destination country.

While research and development costs increased in recent years, compared with developed countries, expenditure on research and development (public and private)/GDP ratio continues to remain small. For example, in 2011 it amounted to 0.27 percent (0.18% in 2000). Similar rate in Israel is 4.0%, EU average is 2.0%, and in the USA this figure is equal to 2.8%.

Source: www.armstat.am, www.worldbank.org, "Report on Household Survey on Migration in Armenia" UNDP, RA NSS, Yerevan 2014.

High level of depreciation of energy facilities

Obsolescence of equipment and machinery Internal in the power grid, man-made accidents, and low level of energy efficiency are the internal threats for sustainability of the Armenian energy system. There is an urgent need to upgrade the generating capacity and install new generation of equipment.

Another issue is the artificial reduction of Akhurian and Aras rivers' levels by Turkey, which can affect capacities of hydropower plants constructed on Aras River together with Iran. Closure of the existing nuclear plant without creating new energy sources could cause unforeseen obstacles for Armenia's economic development.

38% of the existing power plants have been operated for more than 40 years, the main thermal power plants have reached the limit of 200 hours of operation and their technical and environmental indicators do not meet international standards, 70% of the equipment installed in hydropower stations has been operated for more than 30 years, and 50% for more than 40 years. Estimated life of the second operating block of Armenian Nuclear Power Plant (ANPP), expires in 2016. Within electricity and natural gas consumption structure, consumers of low-voltage electricity and natural gas account approximately for 40%, which increases the level of energy losses.

Source: RA President order No 182-N from October 23, 2013 "On Approval of Concept of Energy Safety"

Worsening demographic situation

Law level of natural reproduction of population, decline of economically active population, population aging, widespread migration from rural regions to Yerevan may lead not only to a shortage of labor and human resources, but also become a serious threat to national security both in the short and especially long term period.

Preliminary data for 2014 shows that labor resources totaled 2,179.6 thousand people dropping by 9.5 thousand or 0.4 percent over 2013.

Economically active population in 2014 amounted to 1,375.4 thousand people, dropping by 13.0 thousand or 0.9% over the previous year. This figure has continues to drop since 2010.

The population growth rate in 2013 was 4.8 ppm. Total Fertility Rate (number of the population), despite recent increase, in 2013 was 1,573, but it still does not provide even simple reproduction (the necessary rate is 2,150).

In 2013, the share of population aged 63 and above was 12.3%. There are 483 elderly persons and children (0-15 years old) per 1000 working-age population.

In 2013, 63.3% of the total population was concentrated in cities, of which 55.8% only in Yerevan.

Migration balance continues to remain negative and in 2014 it amounted to 41.7 thousand.

Source: www.armstat.am, www.smsmta.am

Unequal wealth distribution and high poverty level

Revenue concentration is one of the main factors restraining the growth of consumption, which curbs the growth of GDP because increased consumption of higher income deciles does not lead to increase in consumption due to lower level of marginal consumption propensity in those deciles. Income increase in higher deciles mainly contributes to the formation of savings, which however, are not fully channeled into investments due to lack of the appropriate systems and mechanisms.

Since 2012, poverty fell in all forms. However, poverty reduction is not accompanied by a reduction in inequality of income and expenses. In 2008-2013, Gini coefficients on concentration of total revenues and expenditures had a growing trend.

Despite the continued fall in poverty, poverty levels are still high threatening full access to education and health services and boost of consumption, as well as economic growth in general.

In 2013, rates of concentration of income and expenses amounted to 0.372 and 0.271 respectively, recording positive trends.

In 2013, income and consumption of the richest 10% of households exceeded income and consumption of the poorest 10% of households respectively by 15.0 and 8.2 times.

In 2013, poverty totaled 32.0% and extreme poverty 2.7%. The highest levels of poverty and extreme poverty in 2013 were recorded in Shirak - 45.9% and 4.0%, Kotayk 42.5% and 5.1%, and Lori regions 38.6% and 2.6% respectively.

Higher education enrollment rate in 2013 was 42%, of which 51% among poor, 26% poor and 15 percent extremely poor.

Source: RA NSS, "Armenia Social Snapshot and Poverty" 2014

Regional geopolitical instability

Legacy of historical and geopolitical issues with the neighboring countries and potential for their further exacerbation directly threaten Armenia's socio-economic progress. The possibility of renewed conflict with Azerbaijan and steps taken by Azerbaijan and Turkey for Armenia's regional isolation are the most serious challenges to the economy, as well as safety.

At the same time Armenia is impacted by relations between neighboring countries and partners with other countries of the world.