



SEED-IDEA – Basic Sciences and Human Security

Nebojša Nešković

Vice-President, World Academy of Art & Science

Human security is the state of being secure from danger, fear, and anxiety for all humans and social groups. The roots of these insecurities were clearly recognized in the Sustainable Development Goals, which were adopted by the United Nations General Assembly in September 2015 within the resolution *Transforming our World: 2030 Agenda for Sustainable Development*. Most of these goals are connected to basic sciences— mathematics, physics, chemistry, and biology. The ones that are directly connected to and crucially depend on the results of basic research are those focused on innovation, engineering, healthcare, water security, food security, energy technologies, climate action, protection of the environment, education, and peace.

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Basic research is a theoretical and experimental activity undertaken with the aim to advance knowledge without a specifically envisaged application in practice. It is the exploration of the unknown, which requires curious, courageous, creative, and persistent researchers. There is no clear dividing line between basic and applied research—they are inextricably intertwined. Most research, whether in academia or in industry, is a combination of new knowledge generation and its subsequent exploitation. Usually, if the extent of basic research is diminished, the same will happen with the results of applied research. The ideal situation is to have strong basic research and strong applied research that are effectively interconnected.

New knowledge is essential for fostering innovation, technology, and production, but also acts as a stable foundation of education and training as well as of other activities that contribute to the development of society, to enhance human security. It is sometimes naively argued at a national level that, since we live in a global society, the investment in science should be concentrated primarily on applied research, with the necessary basic scientific information acquired indirectly, *e.g.*, via the internet. However, new knowledge is more than a set of results of basic research. Its acquisition includes development of cognitive

capabilities, *i.e.*, the capabilities of thinking, concluding, and remembering, of the involved teams of scientists. Therefore, the transfer of new knowledge along the chain of research and development, with basic research as the initial link, can be successful in the long term only if it includes the direct interactions of capable scientists and engineers all along the chain. There have been numerous examples in which the objective of a crucial basic scientific experiment was attained only upon the realization of a severe technological requirement.

One of the necessary conditions for the sustained growth and inclusive development of a country, which eliminates dangers, fears, and anxieties of all kinds for all humans and social groups, is to have a thriving scientific and technological community capable of generating new knowledge and applying it. This condition can be met only with an appropriate strategy of scientific and technological development that complements the corresponding investment plan, which must be applied consistently and continuously, even during periods of economic crises. But how will the government of a country make an appropriate strategy of basic research and the corresponding investment plan? It can do that only on the basis of proposals made by the scientific community of the country, *i.e.*, by its independent scientific institutes and such institutes within its universities and industry. This means that the primary social responsibility for maintaining, actualizing, and enhancing basic research lies with the scientific community, individually and collectively, *i.e.*, with those who have committed themselves to the exploration of the unknown.

Our conviction is that the necessary basis for advancement and excellence in science and technology on a wide front and their significant contribution to human security is a dialectical unity of the national and global approaches to these fields. This means that the global science should comprise the national sciences, *i.e.*, a national science should be an integral part of the global science—in agreement with the capacity of the country. This is in contradiction with the everlasting rule that national science should follow global science that is determined by the most developed countries. In Southeastern Europe, for example, such an approach applied to basic research would also provide the very much needed cultural bridges and contribute to peace between the nations living in it, some of them being in severe conflicts with each other several times during the 20th century, which could be repeated. Hence, the approach would additionally contribute to the inclusive, balanced, and sustainable development of the region. The same is true for a number of other regions worldwide.

Author Contact Information

Email: nneskovic49@gmail.com