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## CONSTRUCTING A RESEARCH AND DEVELOPMENT ECOSYSTEM IN THE PGZ CAPITAL GROUP

**Abstract.** The article presents the paths of organizational work leading to the construction of a strong ecosystem in the area of research and development at the Polska Grupa Zbrojeniowa (PGZ - Polish Armaments Group). The tasks of the Innovation Policy implemented within the Group companies on the initiative of the Department of Innovation and Technological Development (DIRT) are discussed. The importance of the proposed model of an integrated R&D management system, supposed to result in increasing the competitiveness of the companies, is emphasized.

**Keywords:** Polska Grupa Zbrojeniowa, Innovation Policy, research and development works, integrated management system.

### 1. INTRODUCTION

Polska Grupa Zbrojeniowa (PGZ) is a joint stock company capital structure associating over 60 major plants of the Polish industrial defence potential. PGZ is a company the sole owner of which is the State Treasury. It forges the strength of the Polish defence industry capable of implementing innovative defence solutions.

The strategic goal of PGZ is to provide the Polish Armed Forces with the highest quality equipment that allows soldiers to perform their tasks and duties effectively. However, it is not only the increase in the defence capabilities of the armed forces resulting from the implemented modernization programs that serves to ensure state security. Increasing the technological potential of the national defence industry is also a permanent and far-reaching factor that strengthens the security of the state and its citizens.

### 2. NEW TRENDS IN THE DEVELOPMENT OF ARMAMENTS

Actions which PGZ undertakes as an initiator of innovative solutions include not only the implementation of priorities specified in the Plan of Technical Modernization of the Polish Armed Forces, but also the observation and implementation of new technological trends that will shape the global security over the next 10 to 20 years.

Changes in the defence sector are already visible today. These changes include a shift towards the use of unmanned and autonomous systems, robotics, C4ISR (Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance), sensors, systems, 3D printing, cybertechnology and energy weapons (lasers, electromagnetic radiation). These technological domains affect not only the defence industry, but also the civilian sector, for instance in the case of dual use technologies.

PGZ provides innovative products that improve state security. The technologies being developed include, for instance, very short range air defence system with "Poprad" unit and "Soła" radar; portable air defence units "Grom" and "Piorun"; wheeled armoured personnel carrier "Rosomak"; self-propelled mortar "Rak"; artillery system with self-propelled gun-howitzer "Krab"; soldier's field gear with "Beryl" and "Grot" rifles. The systems delivered have great potential for further development. The PGZ Capital Group companies also provide

the possibility of modification and modernization of older generation equipment to adapt it to the requirements of the modern battlefield.

For the PGZ Group, the new Technical Modernization Plan (PMT) is an opportunity for significantly developing its technological potential and it enables the extension of the product offer to include solutions sought abroad, including air defence systems and land platforms.

### **3. INTEGRATION OF RESEARCH AND DEVELOPMENT WITHIN THE PGZ GROUP**

Nowadays there is much talk about building a market position by conducting research and development activities. It should be stressed that this is a very difficult task. It requires great commitment not only in the technological area, but also to focus on efficient management of the process of implementing R&D projects in the PGZ Capital Group. In 2018, the Department of Innovation and Technological Development (DIRT) was set up by merging into one unit three independently operating offices that carried out tasks in the field of complementary subject areas, i.e. analysis, research, technology development, project implementation, innovation, technology acquisition, cooperation with universities, initiating changes. The consolidation of converging areas within one Department streamlines the implementation of goals not only in the interest of the individual Companies, but also of the entire PGZ Group. The Department of Innovation and Technological Development is involved in research, development and innovation through a number of activities it conducts.

Before the establishment of DIRT, the distributed management system for defence projects within the PGZ Capital Group led to a lack of information flow on R&D work carried out by the companies, which reduced the efficiency of the entire process. An important support instrument we are working on is to create an integrated research and development management model, i.e. to build an R&D ecosystem in the PGZ Capital Group. The goals of creating an ecosystems include:

- organizing orderly flow of information within the PGZ Group, enabling it to obtain the necessary knowledge about current and future projects realized by the companies;
- elimination of internal competition between the Group companies;
- strengthening the cooperation between the companies, ultimately leading to the construction of one value chain for the entire PGZ Capital Group;
- introducing portfolio management of research and development projects;
- creating an organization "memory" – a system for mutual use of the experiences gained by the companies.

In the process of constructing the R&D ecosystem at the PGZ Capital Group, it is important to implement a number of corporate documents in the Companies of the Group that support efficient completion of projects. Its key elements are the PGZ Capital Group Code and the PGZ Capital Group Strategy, as well as the Code's executive act, the Innovation Policy (and Guidelines in this regard provided to the Companies of the Group at the end of 2018), which determines the major paths of development of the PGZ Capital Group's competencies and products. The purpose of implementing the Innovation Policy is to introduce a uniform research and development model in the PGZ Group, including the management of ideas (innovations), research and development programs and projects, and knowledge management. This process is to provide access to knowledge about projects, build a database of projects implemented by the Companies of the Group, record and effectively use resources and potential in the PGZ Capital Group. The introduction of the Innovation Policy will allow to increase effectiveness in the

implementation of research and development works, in accordance with the interest of the PGZ Group resulting from the implemented Code of the PGZ Capital Group. The Innovation Policy of the PGZ Capital Group will constitute a tool for coordinating activities in the area of acquiring new technologies, which is to contribute to achieving better results by using the synergy effect and cooperation between the Companies of the Group and to enable the reduction of costs of implementing research and development projects, as well as jointly achieving the goals set by the strategy of the PGZ Group. The Innovation Policy of the PGZ Capital Group will enable the intensification of activities in the PGZ Group in the area of research and development as well as defining research areas in a way that will allow optimal use of resources and means, supporting the development of Companies of the Group and implementing the PGZ Group business strategy.

An element of the integrated R&D management model at the PGZ Capital Group will be the implementation of a cooperation and communication platform between the Companies. The actions taken are aimed at ensuring that the Companies cooperate with each other and complement each other, gaining thereby additional cooperation effects and bargaining power when acquiring orders under tenders. The main advantage of cooperation, which is a denial of rivalry, is the coordination of all activities undertaken by individual units to achieve the most beneficial effects for the entire PGZ Capital Group. Comprehensive knowledge about purchases of new production equipment should result in cost optimization by avoiding unnecessary expenditures and external contracting. The tool being created by DIRT will also support the management of research and development processes, it will also be a step towards improving project management efficiency.

#### **4. FORUM OF INNOVATION AND TECHNOLOGICAL DEVELOPMENT**

Achieving success in innovation requires continuous search for new solutions and use of a variety of tools. For this reason we periodically organize the "Forum of Innovation and Technological Development". It is dedicated to specialists and experts of the Companies of the Capital Group responsible for the development and implementation of research and development projects. We also invite to participate in these meetings external experts whose knowledge and experience may improve the effects of our work. The last, fifth edition of the Forum took place at Wojskowe Zakłady Motoryzacyjne S.A. in May 2019 with the participation of representatives of the agenda of the Ministry of Science and Higher Education, i.e. the National Centre for Research and Development. The next, sixth edition of the Forum will be held at the end of September this year. at Zakłady Mechaniczne "TARNÓW" S.A. The goals of the Forum include: exchange of information on innovative projects carried out in the PGZ Group Companies, presentation of the possibility of obtaining domestic and international funding for research and development works, identification of potential areas of cooperation between industry and scientific and research units and government institutions, as well as the implementation of innovative technological solutions in the companies of the PGZ Group.

#### **5. SUMMARY**

PGZ, in order to provide access to the latest trends and challenges in the field of defence, as well as to conduct a dialogue on the shaping of future international defence policy, is involved in various cooperation mechanisms: for instance through regular participation in the NATO Industrial Advisory Group (NIAG), or the PADR program (Preparatory Action on Defence Research) run by the European Defence Agency (EDA). We also set up projects that can be financed from other sources, e.g. PESCO (Permanent Structured Cooperation).

Innovation in the arms industry is implemented in the traditional triangle of cooperation of science, industry and the army. In effect this means that the funds allocated for the development of the defence industry are used to build a knowledge-based economy, develop the competencies of research institutions and to ensure Poland's security.

Full implementation of the tasks outlined in the integrated research and development management model will enable making optimal decisions regarding the launching of R&D projects. Eventually, we strive to achieve greater competitiveness and profitability of our companies.

## 6. REFERENCES

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