Foundation for Polish Science

Summary

Support for transfer of scientific achievements into commercial practice by the Foundation for Polish Science in 1991–2015: Analysis of the effects of pursuit of FNP's second and third statutory objectives from the beginning of its operations

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Study

According to the Foundation's statute, its objective is to pursues the mission of supporting science by:

1. supporting distinguished scholars and research teams in all fields of inquiry,
2. supporting the transfer of Polish scientific achievements into economic practice,
3. assisting investment initiatives benefiting science in Poland.

To date, the Foundation's evaluation activities have focused on pursuit of point 1 of the statutory objective, i.e. supporting scientists and research teams. The two remaining points have played a decisively lesser role in FNP's activities. This applies in particular to capital investments, which were conducted only during the first years of the Foundation's existence (the last purchase of shares was made in 1995). Support for transfer of Polish scientific achievements into commercial practice has been pursued with lesser or greater intensity throughout the Foundation's existence, but with a relatively low expenditure of funds, averaging 3% of FNP's annual operating costs.

Across the over 25 years of the Foundation's support for transfer of Polish scientific achievements into commercial practice and investment initiatives benefitting science in Poland, these actions have undergone a great metamorphosis. Both the scale of financing and the expectations of beneficiaries have changed, as well as the degree and form of the Foundation's involvement, and the stage of development of the supported projects. Originally, support for technology transfers was also supposed to generate income for the Foundation. The nature of the first programmes (Joint Ventures, LOANS, INCOME) combined both statutory objectives into one action. The funded ventures were also at a fairly advanced stage of development, close to commercialization. Over time, the Foundation divided the operations serving to implement research results from operations seeking to grow its capital. Its interest focused instead on the pre-commercial phase of projects: the ventures funded by the Foundation began to more resemble research projects, in which the prospect of commercialization was more distant. The type of support also evolved. It was financial in nature over the first 15 years, but the experiences of that period showed that scientists lacked knowledge of market mechanisms and commercialization skills. Thus the INNOWATOR programme was launched in 2006, primarily to teach scientists the basics of market mechanisms, providing them basic business skills, and only in a later phase to provide them funds to execute selected projects. The aim of funding the IMPULS programme as part of the Innovative Economy Operational Programme (POIG) was exclusively to develop "soft skills" needed by researchers in the process of commercialization. The VENTURES programme, also financed with POIG funds, was devoted to other aims: making skills in implementation of research results an element of the training of the youngest researchers—undergraduates and doctoral students.

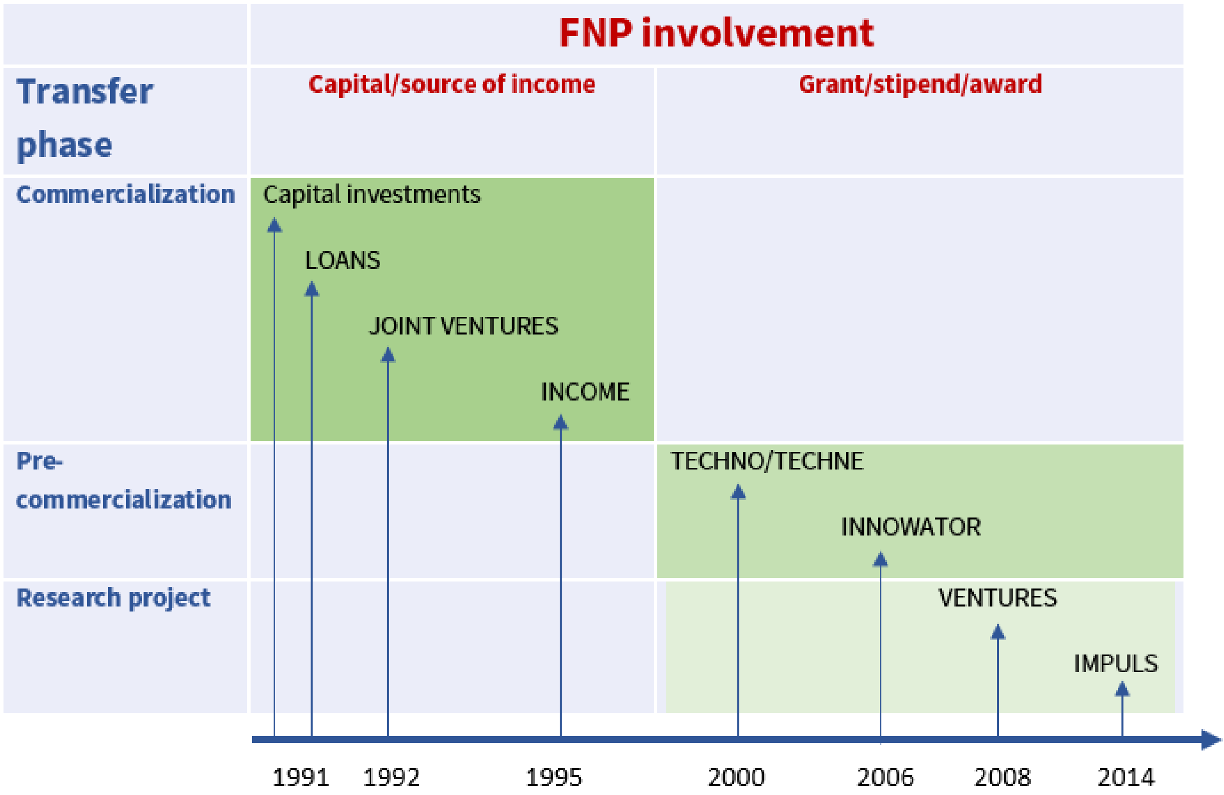

Figure 2. Comparison of FNP programmes reflecting phase of transfer, funding method, and implementation period

The aim of the analysis was to summarize the Foundation's experience to date in pursuing both of these statutory objectives, and in particular to (1) track the fate of the supported ventures, (2) identify success factors and barriers, and (3) assess the impact of the programme on the laureates' future technology transfer activity.

The analysis covered the following measures:

1. Capital investments (1992–2007): statutory objectives 2 and 3
2. "Joint Ventures" programme (1991–1994): statutory objectives 2 and 3
3. LOANS (1991–1995): statutory objectives 2 and 3
4. INCOME (1995–1999): statutory objectives 2 and 3
5. TECHNO (1999–2000): statutory objective 2
6. TECHNE (2001–2005): statutory objective 2
7. INNOWATOR (2006–2009): statutory objective 2
8. VENTURES (2008–2015): statutory objective 2
9. IMPULS (2013–2015): statutory objective 2

Key conclusions

The measures taken by the Foundation with the objective of transferring Polish scientific achievements into commercial practice and investment initiatives benefiting science in Poland illustrate the difficult beginnings of the development of an economy based on new technologies. Particularly the first initiatives undertaken in this regard (Capital Investments, Joint Ventures and LOANS) departed significantly in practice from the original assumptions. Undertakings that were supposed to combine transfer of technologies with generation of financial profit for the Foundation proved especially difficult. In the early 1990s, when the Foundation took up investments of this type, the capital market in Poland was in its infancy, lacking appropriate regulations and solutions suited to the needs of institutions like FNP. The Foundation was unprepared for this type of activity. It did not have the appropriate team and resources that would allow it to effectively analyze the market, oversee the finances of ventures, and enforce receivables. Conducting such activities requires huge commitment and knowledge, and it was difficult to pursue for an institution not specialized in investment activity. The Foundation attempted to address this problem by involving a bank in cooperation (Polski Bank Rozwoju S.A.), but this approach did not secure it against the failure of financed ventures. In light of the losses generated by capital investments, a new formula was sought combining transfers of technology with income-generating activity. At an interval of several years, the Foundation introduced "Joint Ventures" and LOANS, but these also exposed the Foundation to financial setbacks.

The assumption that scientific projects would generate financial or capital profits was probably unrealistic during that period. Undertakings that were successfully developed at that time in Poland had little in common with science and were characterized by a simple business model primarily based on trade. It seems that the capital market was too immature not only for the activity of entities like FNP, but also for investments in science in general.

The Foundation drew lessons from these failures and in the mid-1990s withdrew from ventures that were supposed to combine technology transfers with capital investments. The Foundation's approach to supporting transfers of technology into commercial practice also changed fundamentally. Hopes for a return on investment were replaced by a formula of subsidies and grants, and even awards (IMPULS). Instead of commercialization, the Foundation began to support the pre-commercialization phase of projects, and then research projects that had potential for commercialization.

Successive programmes of the Foundation on behalf of the transfer of research results into commercial practice proved a lack of readiness for this type of activity on the part of scientists. In 1995, in the INCOME programme, the Foundation initiated the creation of technology transfer centres which were to support scientists in commercialization, by seeking out and selecting projects that were promising in this regard, and then preparing the necessary documentation and proposing them for funding by the Foundation. In 2006 FNP offered scientists direct training support, which proved a well-targeted response to the needs of the community. The INNOWATOR programme, which combined a training and advisory component with grants, generated spectacular success in the form of the exchange-listed Medicalgorithmics as well as the company Apeiron Synthesis.

With time, the development of scientists' skills became the centre of the Foundation's attention. Here an important change occurred: originally the Foundation expected scientists to establish business ventures, combining the roles of entrepreneur and researcher. In the programmes carried out in 2008–2014, the aim became to prepare researchers to cooperate with industry and business partners.

The initial failures of the Foundation's efforts in support of transfer of technology led to a gradual reduction of the risk connected with the funded ventures. First, the Foundation not only ceased to tie its assets to the success of the supported projects. The expectations for these projects also changed. Instead of profit from the sale of new products, the measure of success became the implemented research projects and growth in the "soft skills" of scientists. In this manner, the level of risk was reduced: whereas in the case of the first FNP programmes, it can be said that there were clear failures if efforts to sell the product or at least to launch the product on the market were unsuccessful, in the case of the programmes implemented after 2008 all projects that were properly carried out could be regarded as successes, particularly since, as a rule, the projects were accompanied by growth in the scientists' skills. On the other hand, these programmes did not boast of successes comparable to Medicalgorithmics.

The change in expectations for the results of ventures was largely tied to a change in the source of financing. Initially, programmes fostering the implementation of research results into commercial practice were financed out of the Foundation's own funds. Starting from 2008, they were financed from EU structural funds. This meant more rigid conditions for financing and strict regulation of costs eligible for financing. First and foremost, however, it became problematic for profits to be achieved by private entities (programmes financed from the Innovative Economy and Human Capital operational programmes did not include state aid). This led to a quite paradoxical situation: on one hand, the ultimate aim of the programmes was to enable scientists to commercialize their research results, but on the other hand, within the projects they carried out, they could not achieve results that would threaten to upset competition by privileging certain enterprises or the production of certain goods.

An important factor in evaluating the significance of actions on behalf of technology transfer and investments is the change in the financial situation of the Foundation itself. Initially the challenge was advantageous investment of the Foundation's capital. Profits were generated relatively quickly, enabling the Foundation to focus on pursuit of its statutory objective of supporting outstanding scientists and research teams. These profits have dwindled in recent years, however, and the Foundation lacks funds to finance its programmes in their former shape. While the Foundation has skilfully taken advantage of the opportunity to use EU structural funds, they do not appear to be the best source for supporting commercialization of research results, and first and foremost do not ensure the stability of FNP's activity. It now seems worthwhile to seek new mechanisms for pursuing the Foundation's statutory objectives.

An analysis of FNP's past actions on behalf of technology transfer does not seem particularly helpful in formulating recommendations in this respect. A comparison of the effectiveness of these measures would be particularly deceptive given that over the course of 25 years of conducting such measures, the external conditions have fundamentally changed. The capital market in Poland and the legal regulations related to investing have undergone a metamorphosis. Firms have been established profiting from innovative technologies. The system for financing applied research and commercialization of research results has grown, NCBR was founded, and venture-capital funds have appeared on the market for technological innovations. Many instruments for supporting technology transfers have been introduced, such as tech parks, incubators, accelerators, and centres for technology transfer affiliated with universities and research institutions. Scientists and staff of research institutions are offered many types of training on protection of intellectual property rights and commercialization, which has also raised their competence in this respect.

The conditions for functioning of Polish science and scientists have fundamentally changed. Since Poland joined the European Union, Polish scientists now participate in international cooperation and work abroad to an incomparably greater extent, which has a clear impact on their awareness of the possibilities for exploiting research results. Finally, thanks to EU funds, the apparatus available to Polish scientists has significantly improved, which also provides conditions for growth of new technologies.

The most conclusions concerning the current needs in the area of technology transfer flowed from interviews with laureates of programmes conducted in recent years, i.e. INNOWATOR, VENTURES and IMPULS. The following needs raised by scientists working to implement research results into commercial practice deserve attention.

- <u>Assistance in formulating commercial projects.</u> Scientists lack information on which topics are of interest to investors and the chances for exploitation of their research results. External assistance is particularly essential given that—leaving aside purely commercial activity—identification of the commercial potential of research attainments is not easy. Scientists don't always know how to extract from their projects what could be of interest to investors. On top of that are many other challenges connected with cooperation with business, such as negotiations, professional presentation of tech projects, and securing of intellectual property rights, which the scientist must overcome before beginning the implementation process and obtaining funds for this purpose. Support of this type must be "bespoke," tailored to the specific needs of specific individuals and firms, and founded on the principle of an individual approach.

- <u>Contact with experts.</u> In Poland investors earn money in traditional industries and there is still a shortage of experts, persons with experience who have successfully commercialized advanced technologies, know the market, have the right contacts, and are in a position to assess the probability of success in the specific sector. When taking its first steps, a tech firm needs a mentor, a consultant from the industry who can realistically evaluate the chances for the product.

- <u>Assistance in corporate management</u>. For many laureates, operating a company has proved a much greater challenge than they imagined when joining the programme. It requires not only specific knowledge and skills, but also huge commitment. Scientists who have research results at their disposal are rarely in a position to devote them adequately to management of the firm, in a day-to-day or a strategic sense, including e.g. raising financing and managing investor relations. Theoretically they could hire the appropriate specialists, but often they lack the funds or, lacking the appropriate experience, it is hard for them to make a proper selection of experts who could help in this regard.

- Grants for the initial phase of operations of tech firms. Although the situation has improved, this affects primarily firms which already have a product and clients, or at least a patent and technology, and are ready to seek investors. But it is still hard to survive the early phase of commercialization. On one hand, funding from grants has its limitations and threatens detachment from the market, and on the other hand, obtaining an investor too early carries risk for the growth of the firm.

- Assistance in finding an investor. Grants can prove to be a trap for firms, postponing their confrontation with the market. Proper commercialization requires bringing an investor onboard, which presents a huge challenge for scientists functioning in an entirely different environment. Bringing these groups together and facilitating contacts between them appears to be an important element of support for transfer of technology.

- Funds for gaining the first customers. The investor is generally not in a position to verify the technology on the basis of patents or scientific and technical parameters but rather relies on verification by customers. This is why it is key to build relations with customers, which requires lots of money and time, particularly when foreign markets, for example in the US, are involved.