



# A POLISH HIGH-TECH COMPANY IN THE GLOBAL MARKET

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What does it take to secure a foothold in the global high-tech market and keep such a business afloat? We can look at the experiences of other companies to find proven solutions and answers to the most important questions.

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**I**n Poland, dozens of new high-tech businesses are set up every year, but dozens also go under every year, having failed to reach a sufficient level of sales in the international market, or exist only thanks to research funding. Very few have succeeded in establishing a presence in the global high-tech market.

Polish high-tech companies that operate internationally in the sector that is closest to me professionally, namely optoelectronics, can be counted on the fingers of two hands at best. Despite being a lot smaller in size than Poland, Lithuania has more optoelectronic companies that have made a name for themselves worldwide.

Many of the Polish high-tech businesses that have achieved real success in the international market were founded by scientists, and I am also one of them. This is a typical scenario also found in other countries, and it results from factors that facilitate the launch of high-tech companies. These factors are: expertise

in a given discipline and an extensive network of international contacts.

Since very few Polish high-tech businesses operate globally, we could ask if the experiences of their founders could be harnessed by Polish scientists who have recently set up their own companies, are involved in companies owned by others, or consider trying to turn the findings of their own research into a business. Over the past 18 years, I have been running Inframet ([www.inframet.com](http://www.inframet.com)), a global leader in the production of equipment for testing electro-optical surveillance systems. Based on my experience in this field, I would like to try to find answers to practical questions related to the problems faced by Polish high-tech companies in international markets. At the same time, however, I must stress that there are no clear-cut, universal solutions that may be applied to any high-tech business, and the answers I offer are given from the perspective of the founder of a rather untypical optoelectronic business established in the early 2000s, when the possibilities of raising money to fund a business were a lot more limited than they are today, and Poland's image was a lot worse. That said, the conclusions from Inframet's experience may prove useful to many potential founders of high-tech companies.

### **What should a Polish high-tech company produce, and how, in order to gain and keep a foothold in the global market?**

The answer to this question depends on the goal we want to achieve and the level of financial resources that we have at our disposal in the early stages of the company's development. If we want to create a small yet independent global high-tech business, but we have little or no funding, I would suggest opting for a specialized market that meets the following conditions:

1. The market one we know: in other words, we have expert knowledge about the devices or services offered on this market. This is a critically important requirement for the establishment of any high-tech business. Specialist knowledge should involve how to develop a better device or bring down production costs.
2. It is a small market (or a market niche) that is not attractive to big companies (including Chinese companies, which can produce and sell at very low price levels).
3. There is real demand for the company's products and services in this specific market for reasons related to high prices, long delivery times, or the technical limitations of the products offered by rival companies.
4. The company's potential clients are based in many different countries of the world. Such a decentralized market reduces the risk of a sudden plunge in sales, potentially bankrupting the company.

Alternatively, we may want to try to create a big global business that operates in a high-value market and engages in mass production. However, this requires considerable financial resources in the early stages of the business, an innovative and well-thought-out product (or, better still, a series of products), and a perfect mastery of management and marketing skills.

### **What types of intellectual property protection should we seek to keep the company's know-how safe?**

Patents are the most common form of protection for intellectual property sought in technical fields. Inframet could have hundreds of patents for the technologies used in the devices it produces (we currently have technologies for the production of over 50 test stations). In practice, however, we have not patented even one of them for reasons related to the drawbacks that the system of patents has for small high-tech businesses that operate in the global market.

Back in the early 20th century, waiting several years for the grant of a patent made practically no difference for the owner of a product or a service, because the process of their implementation was much longer. Currently, it may take another company just a few years to use the information disclosed in the patent application to build a new product, tap into the market, earn a profit, and modify the product so that it is no longer covered by the patent.

In order to secure patent protection, businesses that operate globally should apply for patents in many countries of the world, which increases the costs of patent protection to a substantial extent and reduces its economic effectiveness. In addition, the focus of the world's economy is shifting increasingly towards the Far East. In turn, patents and the concept of intellectual property are products of the Western civilization, and they have been accepted in full only by Japan and largely by South Korea. In a vast majority of other Asian countries, including China, the patent system is seen as unfair, imposed by Western countries, which seek to secure high profits without doing real work.

Big global companies that offer products or services to the mass market are clearly less vulnerable to the flaws of the modern-day patent system. Such companies employ dozens of lawyers, have substantial financial resources that they can both use to analyze their competitors and spend on litigation. They can force their competitors and business partners all over the world to respect their patents for decades. We could even hazard the claim that big companies use the system of patents to block their rivals. This is why this system is practically useless for small businesses in the high-tech sector. Such companies must work out a different model of protecting against unfair



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competition. For example, Inframet's solution to this problem can be described as a model of controlled sharing of its own growing know-how. This model is based on two pillars:

- a continuous process of making technological modifications to the produced devices, so that a new generation of measurement devices can be developed in a period of no more than five years,
- the publication of information about scientific and technological achievements in the form of research papers or education materials.

Thanks to the first pillar, the differences between the devices produced five years ago and those available today are always discernible, and often even considerable. Therefore, merely copying Inframet's technological solutions is not enough for the production of a rival product in the near future.

The second pillar, releasing publications on the current state of technological solutions, creates a certain form of the protection of intellectual property. Publishing a research paper means sharing certain knowledge while retaining the moral rights to such knowledge. Inframet's experience shows that most people consider attempts to copy the solutions presented in research publications for commercial purposes as unethical, which gives effects comparable to patent protection. Publications also protect us against the rather unlikely yet still possible event that our rivals might intentionally file patent applications for such technologies.

#### **What forms of marketing should we use to reach out to potential clients and create a global brand?**

In the operations of a high-tech company, marketing only plays an auxiliary role. Essentially, we can assume that if we have a technologically unique product, interested buyers will find it, whether directly or indirectly. All that is needed is a good technical description on the company's website. Everything else will be done by Internet search engines. The website is a company's most important marketing tool. It is worth considering the possibility of publishing in-depth information and education materials such as detailed data sheets with technical descriptions, research papers, and popular-science articles. Potential clients will appreciate the company's openness and will know that what they get is not merely the equipment or services that they want to buy along with basic instructions for using them but also information that will allow them to get a better grasp of a specific field of technology and use their purchases more effectively.

#### **Which market or markets should we focus on?**

Asian countries, especially in the Far East, are developing faster than the Western economies. In Asia, young teams build factories from scratch, while old teams in the West restrict themselves to modernizing

the equipment that they already have. This naturally translates into greater demand for specialist equipment for new factories.

This difference in development is accompanied by differences in how Poland is perceived abroad. The situation is now much better, but around a decade ago many teams in Western Europe and the United States perceived Poland as a technologically underdeveloped country, one in which a reliable producer of technologically advanced measurement devices could not possibly exist. In the developing Asian countries, it was easier to overcome the psychological barrier and the myth about Eastern Europe's technological underdevelopment.

#### **How can we cope with competition from China?**

China was, and still is, the biggest market for the products of many companies, including Inframet. The ratio of Inframet's exports to China to its imports from the country is approximately 100:1. Chinese rivals are no match for us in terms of the basic competition criterion (the quality to price ratio). This shows that China may be potentially a very important destination for Polish high-tech companies, and Polish exports could reach at least the same level as imports.

The myth of China's low-cost labor and low prices, which persists in Poland, is not true. A hotel room in cities on the East coast costs more than a comparable room in Warsaw. The real purchasing power of a Chinese engineer's salary is currently greater than that of the average salary of a Polish engineer. This is the main reason behind the trend towards the relocation of production from China to neighboring countries such as Vietnam, the Philippines, and Thailand.

The Chinese have made great progress in the field of advanced technologies. For example, they currently produce all key components of electro-optical surveillance devices (infrared detector arrays, image intensifier tubes, advanced infrared objectives, and so on). But the flip side of the coin is that apart from highly-advanced directions that are regarded as strategically important, there are plenty of fields in optoelectronics and other fields in which Chinese technologies are at a low level or it does not pay for the Chinese to make products for a small niche market where requirements are high. In practice, this means that we can easily compete against the Chinese in the field of advanced technologies in numerous niche markets, because they have focused on mass production or strategic directions. There are hundreds or thousands of small specialized high-tech niche markets in which Chinese competitors do not pose a major threat.

It is likewise possible to successfully compete against the Chinese in strategically important areas, but this requires good products, a well-thought-out strategy of action as well as high quality, moderate prices, and short delivery times.

### What is the role of funding for research work in the development of a high-tech company?

The First Industrial Revolution (the rise of steam and mechanized production) and the Second Industrial Revolution (the advent of electricity and batch production) happened between the second half of the 18th century and the first half of the 20th century, with no or minimum state assistance in the form of public subsidies. The Third Industrial Revolution (production automation and the use of computers) has been ongoing since the 1970s, and the share of state funding of the research work done by companies is growing. In Poland, we have dozens of programs that support the formation and development of high-tech companies and offer generous help and comfortable conditions for growth.

Inframet was founded in 2002, when there were a lot fewer possibilities for obtaining financial support and the amounts were many times lower. The Polish – or more broadly European – system of support for high-tech companies is very bureaucratic, and an untypical small business operating globally such as Inframet did not meet the official criteria for government funding. Consequently, Inframet has developed with minimum subsidies from the state (only two projects were co-financed from public funds in 2002–2018). That said, such funding did make it possible to fine-tune several products and helped boost Inframet's position in the market.

There have been both advantages and disadvantages of the low level of state support for the research work that Inframet had to conduct to produce a long series of test stations. On the minus side, Inframet's development was delayed by at least five or seven years. On the plus side, the low level of funding forced us to be innovative and learn to conduct scientific research with the use of a small budget. Inframet was too poor to buy expensive blocks for the production of typical measurement stations, so it had to come up with new technological solutions to use less expensive blocks. Also, time showed that it was possible to overcome many technological barriers and produce world-class measurement devices with the help of modest financial resources, generated by current sales.

The ability to conduct low-cost scientific research is very important if a business is to have good prospects for further development in today's unstable world. Both in Poland and in the EU, many high-tech companies cannot survive in the market without considerable subsidies.

To sum up, funding for research could speed up a high-tech company's development to a substantial extent, but – as is the case with doping in sport – it may have certain negative side effects, possibly leading to the business's excessive reliance on this source of revenue.



### Does the establishment of a company by a scientist pose a threat to his or her scientific development?

It is commonly believed that business is the opposite of science, and a scientist who sets up a business is expected to do his or her scientific work with inferior output, usually in terms of the number of publications and citations. I am sometimes asked if what I currently do is science or business. I answer half-jokingly that it's science, but at a higher level, without simplifications.

Such hackneyed opinions are harbored mainly by those who are not familiar with the specific characteristics of small, high-tech businesses. Their managers do not have too many day-to-day duties, but they do need to solve practical scientific problems in a swift way. Scientists who hold executive posts at universities and research institutes are a lot more burdened by administrative tasks than those who work in such companies.

Working in a high-tech company that is a global leader forces scientists to address topics that have considerable practical importance, and the results of such studies may be published in indexed journals. For these reasons, the establishment of a high-tech company usually does not pose any major danger to the effectiveness of the research work done by scientists. In turn, running a high-tech business offers them the possibility of immediately putting their ideas into effect. In addition, they stand a chance of doing something lasting, something that will have practical applications for other people in many countries in the world. ■

ITS-IP station for testing image intensifier tubes