FUTURE FUELLED
BY KNOWLEDGE

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COMPANIES AND THE CULTURE OF INNOVATION

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INTRODUCTION

JACEK KRAWIEC

PRESIDENT AND CHIEF EXECUTIVE OFFICER, PKN ORLEN

Ladies and Gentlemen,

We present you the third edition of the PKN ORLEN booklet "Companies and the culture of innovation." It has been prepared as part of the framework of a series of publications entitled "The Future Fuelled by Knowledge" on strategic issues in the field of economics and energy.

There is no doubt that innovation is one of the keywords necessary for an understanding of the economic transition that is affecting virtually the whole world. Despite this, the term 'innovation' raises some mixed feelings – it is easy enough to take it at face value, forgetting the fact that innovations can be seen only as a means, and not as an end in themselves – in the latter case they can become quite dangerous. Why so? Because the term "innovation" sounds so good that in any evaluation of projects one can sometimes forget that above all they must be cost-effective. Meanwhile, the objective of today's policy makers should be to adapt the state and economy to the emerging global political context, to economic and social development, and, in particular, to the birth of the post-modern society. Innovation is a very important, but not the only tool for achieving this.

The fundamental question for today is: what must happen in order for governments and the business to meet the challenges of post-modernity and to make use of it as an opportunity for rapid growth? In this publication, in which I have the honour to present some innovative themes, experts will endeavor to respond to this question. We invited Prof. Isaac Getz, from the European School of Business, Prof. Michal Kleiber, President of the Polish Academy of Science, Edwin Bendyk, Editor of the Polityka weekly and Director of the Research Centre on the Future at Collegium Civitas, and Paweł Bochniarz, a Director at PricewaterhouseCoopers Poland.

In the first article, Prof. Getz analyses the reasons why some companies manage to achieve a high level of inno-

vation and others do not. He refutes myths about high levels of expenditure on research and development and the number of notified patents and draws attention to the need to create a proper organizational culture within enterprises. Referring to the example of W.L. Gore Co. (the maker of Gore-Tex), Prof. Getz demonstrates the importance of autonomy and responsibility on the side of workers, which in turn is essential in ensuring the necessary "unleashing of leadership."

In the second article, Prof. Kleiber looks at the birth of a new culture of innovation in business, science and among citizens. He notes, however, that states tend not to be well cut out for this challenge. Meanwhile, he argues: "the new society needs not so much less state, as more new and less old state." Prof. Kleiber suggests a "New Division of Responsibilities," which would take onboard the new principles of cooperation between science, business administration and the rest of society.

In the third article, Edwin Bendyk presents what he calls an "innovation paradox," in which he suggests that modern technology does not necessarily translate into business success. In his opinion, the key is whether a company is creating added value within the value chain. Business success requires that we stop seeing innovation as a goal, and focus on strategic imagination instead.

In the last article, Pawel Bochniarz calls for a re-framing of the national debate on innovation. He notes that many of the obstacles which until recently hampered innovation in Poland are slowly dying out. This is thanks to a greater availability of high risk funds, a reform of science which puts greater emphasis on the development of cooperation between scientists and business, as well as higher aspirations among Polish entrepreneurs. For these reasons, he concludes, Poland is standing at the threshold of an "innovative breakthrough."

I am confident that this PKN ORLEN publication will encourage you to rethink your ideas about the importance of innovation for the development of enterprises and about the role of the state in the modern economy.

Please, enjoy reading!

Jacek Krawiec

THE INNOVATION BATTLE: WHY SOME COMPANIES ARE CONTINUOUSLY WINNING IT WHILE MOST AREN'T?[1]

ISAAC GETZ

PROFESSOR AT ESCP EUROPE BUSINESS SCHOOL

It's not only economists who demonstrate in their neat models that innovation is a key lever of organic growth. Corporate executives know it from experience and to such a point that we saw several declaring to their troops that innovation is a "must win battle". To our best knowledge this battle is still raging in these, and most, companies. Indeed, most companies unable to innovate but still pressed to grow resign themselves to acquisitions of small firms who succeed where they don't. But before that strategic resignation in the "innovation battle" they did throwin huge forces. Unfortunately these forces are not what win it.

The first of these forces is the heavy artillery of a large R&D budget. Many companies, popular media, and governments believe that the size of the R&D budget is somehow related to innovation results[1]. Studies contradict this belief. Indeed, R&D budget has the same relation to innovative product sales as the scouting budget of the New York Knicks – the NBA team with the largest payroll – has to their dismal 2002-2009 playoff record. In the U.S., big pharmaceutical companies have the highest R&D budgets relative to sales of any industry. Between 1991 and 2001, total research spending rose to $30.3 billion from $9.7 billion, while at the same time the number of new drugs introduced each year dropped to twentyfour from thirty[3].

The second of the forces believed to relate to innovation is the precision bombing of the patent portfolios.Many companies, the latest being Microsoft, believe that the larger their patent portfolio the more innovative product or services they will put on the market, and hence, grow revenues. Unfortunately, research shows that patents themselves have no effect on a company's revenue: only 5% to 10% of patentshave any market relevance and only 1% of them actually bring in any profits[4]. For example, in the late 1990s, IBM boasted the world's largest patent portfolio. But when measured by citations, its relevance to profits was below that of start-ups acquired by Cisco or even of a smaller company like Micron Technology[5]. What really matters when it comes to patents is the number of times they arecited by others: the research shows that a portfolio of frequently cited patents does correlate with sales of innovative products[6].

Don't get us wrong. R&D experts are very important, but to organize their activities into large, often isolated, bureaucracies, provide them with big budgets, measure the number of patents produced and hope it will lead to a flow of profitable innovations at competitive costs never worked. Twenty years ago, Florida and Kenney asked why the Japanese seemed much better than American companies at turning scientific research into profitable innova-

1 This chapter is based on B. M. Carney andI. Getz's bookFreedom, Inc.: Free Your Employees and Let Them Lead Your Business to Higher Productivity, Profits, and Growth (Crown Business, 2009).
2 Innovation is defined as novel products, services, business processes, or business modelswhich are beneficial to company. As such innovation is very hard to measure since both the quantity and the financial outcomes of innovations vary dramatically across industries.
3 Getz, I. & Robinson, A. G. "Innovate or die: Is that a fact?"*Creativity and Innovation Management*, 12, pp. 130-136, 2003.
4 Stevens, G.A. and Burley, J. "3,000 raw ideas = 1 commercial success!"*Research-Technology Management*, May-June, pp. 16–27, 1997.
5 "The*TR* patent scorecard 2001," *Technology Review*, pp. 48–49, May 2001.
6 Harhoff, D., Narin, F., Scherer, F.M. and Vopel, K. "Citation frequency and the value of patented inventions, "*The Review of Economics and Statistics*, 81(3), pp. 511–15, 1999.

tions. Their conclusion: "white-collar scientists [were] arrogant toward shop-floor workers." As a result, "most corporate R&D labs retain [a] specialized, assembly-line model of organization" which leaves them deaf and blind to ideas that don't come from the "right" places[7].

In sum, costlyR&D programs and, sometimes, big patent portfoliosin traditional companies don't result in effective innovation. Organized around command-and-control structures telling people how to do their work, these companies are fundamentally hostile environments for the ideas proposed by the vast majority of their employees. As one of the most innovative consultants in Accenture told us, when the first time he brought up his idea to his boss he was told: "You're supposed to chop wood. Later, you will tell us where the wood is."A Gallup study proves that creative ideas dying – or killed – in companies is a widespread phenomenon. Asked whether their current job "brings on their most creative ideas," only 17% of those "not engaged" and 3% of "actively disengaged" employees agreed with the statement[8]. And according to another Gallup study, these two groups of employees make up 73% of the work force[9].

LOOKING FOR SILVER BULLETS

It's no wonder then that, despite large R&D budgets, often big patents portfolios, and plenty of talented people who can't or are unwilling to give their ideas, many traditional companies have to look for "silver bullets" as they continue to fight their innovation battle. Thus, some try to identify innovation "heroes" and champion them as example for other troops. Still others launch suggestion boxes – the most devastating tool to kill employee ideas – or idea contests which basically convey employees a message that their ideas are welcome – one time per year[10]. Yet, others create special "creativity" platforms or task forces to insure that ideas can be heard out there and transformed into innovations.

In fact, traditional companies often realize that command-and-control structure is not good for creativity and innovation, neither for employees as a whole, nor for R&D specialists. As Gordon Forward – who has a Ph.D. from MIT and worked in R&D before leading Chaparral Steel, the world's lowest cost steel producer – told us, "good ideas die every day" in traditional R&D centers[11]. So to escape their own rigidity, some companies build special platforms like Ford's Innovation Acceleration Center. Yet others go further by creating research task forces and let them organize themselves to achieve innovation goals. Like with largely self-organized special units in military – think Green Berets or Navy Seals – such an approach usually delivers.

In fact, it had already been tried in the 1930s by DuPont Task Forces and AT&T Bell Labs. Freed from the constraints of the command-and-control structure and allowed to self-direct, these special units became the drivers of innovation for their companies. Today,approaches similar to DuPont's and AT&T's are used by some companies heavily relying on "knowledge workers," be it top consulting or software companies. Google is an oft cited point in case, a seeming paradise for software developers. Yet this approach, addressing just the R&D elite, does not amount to building an organizational environment – a culture for innovation – throughout these companies. It doesn't encompass everyone, fails to see the tremendous potential for creativity in each person and doesn't seek to provide the right environment to realize this potential. As in the military, special forces are largely self-directing –

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7 R. Florida & M. Kenney, *The Breakthrough Illusion: Corporate America's Failure to Move from Innovation to Mass Production*, New York: Basic Books, 1990, p. 171.

8 "Gallup Study: Engaged Employees Inspire Company Innovation," *The Gallup Management Journal*, 12 Oct 2006, http://gmj.gallup.com.

9 The October 2006 Gallup semi-annual engagement study's results are slightly different from the previous survey in January 2006: 29% of employees are engaged, 56% are not, and 15% are actively disengaged; hence 74% total are disengaged.

10 See more critique of these approaches in Getz & Robinson, *ibid*.

11 This quote, as well as all others in this article—when unspecified, comes from the personal interviews we have conducted during our research. For more details see B. M. Carney and I. Getz, *Freedom, Inc.: Free Your Employees and Let Them Lead Your Business to Higher Productivity, Profits, and Growth*, New York: Crown Business, 2009.

the highest ranked soldier is not necessarily the one who leads the task force – extremely creative, and most often achieving spectacular results. But they don't win battles – regular troops do when their needs are taken into account and their role is recognized by their environment. Google is perhaps a paradise for software geeks but winning the innovation battle continuously will require that everyone – not only the R&D elite – participates in it. A Business Week article concludes on the most innovative companies, that "instead of relying on gimmicks or incremental line extensions, they're working to build organizations that are capable of sustained innovation."[12]

The question then is: What kind of organizational environment is needed to be built so that everyone becomes continuously involved in the company's innovation effort?

W. L. GORE – WHERE CULTURE IS BUILT TO DELIVER INNOVATION

One company, W. L. Gore – the manufacturer of the famous Gore-Tex and hundreds of other innovative products – has long understood the limits of a closed and elitist approach to innovation. So instead of confining innovation to some "elite" in-house units pursuing a limited number of sanctioned R&D projects, innovation is encouraged for everyone. This has led to a continuous flow of skunkworks-type projects, some of which, like Glide dental floss and Elixir guitar strings, have gone on to become leaders in their segments.

Glide was launched with a guerrilla marketing campaign. Gore knew nothing about selling dental floss, so it didn't try. It gave it away instead – to dentists. Patients loved it so much that they asked their dentists for some more for their family and friends. When Gore convinced some local drugstores to carry it, they could barely keep it in stock.

Now take Gore's foray into guitar strings. Its story is surprisingly typical of the way that Gore has innovated and grown for decades, without planning. Elixir guitar strings are a premium product, selling for three times what ordinary strings can command in the market. They came about, like Gore-Tex itself, through a happy accident of the sort that the company has stumbled into over and over. One of Gore's people in the medical devices division, Dave Myers, was a bicycling enthusiast who was unhappy with the performance of the cables used to shift gears on his bike[13]. So in his spare time, he set about to see whether he could improve them by coating the metal cables with PTFE – a polymer otherwise known as Teflon, which is the base of all Gore products. It worked, but the product itself, Ride On bike cables, was something of a bust. In the meantime, however, Myers had decided to work on another project – PTFE-coated wires for giant marionettes.

While working on the marionette wires, Myers hit upon the idea that would bring Gore into a whole new, and more profitable, line of business. Guitar strings age because they oxidize, and dirt and grime from the players' fingers accelerate the process. Coating them with PTFE might be just the solution. Myers didn't play guitar, so he tapped the experience of a colleague, Chuck Hebestreit, who did, and Elixir – a guitar string that sounds better and lasts up to three times as long as an ordinary string – was the result. Gore had no idea how to break into the market and its initial – traditional – efforts flopped, so it resorted to a giveaway, including sets of strings free with the purchase of guitar magazines. The product took off; today Gore controls a third of the market.

So, what is Gore's organizational environment, its culture, which allowed it to innovate continuously?

At Gore, commitments are what associates – as employees are called in the company – have instead of "jobs." For example, the above Dave Myers didn't hold jobs in a stream of innovation projects he worked on – he committed to these projects, in fact initiated them, on his own. A job is something a boss gives you, something framed in a box on an org chart. A commitment is freely entered into, and is a promise of sorts made to those working alongside

12 McGregor, J."The world's most innovative companies: The leaders in nurturing cultures of creativity," *BusinessWeek*, May 14, 2007.
13 Deutschman, A. "The Fabric of Creativity," *Fast Company*, december 2004 r.

you. Commitments are more fluid than jobs. Depending on one's workload and capacity for new projects, an associate may have one, two or several commitments simultaneously. An associate may flow in or out of a commitment as the work requires. New hires are not assigned a job; instead they are encouraged to seek out commitments where they feel they can best employ their talents, skills and experience. When a new employee on his first day at Gore asks: "Where do I work?" he gets the answer:"Find out" and this continues throughout his career in the company.

In this sense, a commitment is the opposite of a job. It is something chosen and fluid, rather than something imposed and rigid. But that's a recipe for anarchy, not for freedom, you may think. Today a person may like some activity and commit to it. But tomorrow, he may like another activity more and just "recommit" there, leaving his current team with a huge hole to fill. This is where the "credibility bucket" brings in discipline, or rather self-discipline.

A drop goes in the credibility bucket every time an associate keeps a commitment, from one to finish a memo by tomorrow to seeing through a multiyear project. The bucket also gets a drop added every time an associate helps somebody. Commitments are voluntary – but once a commitment is made, you'd better keep it. If you don't, your credibility bucket will drain quickly, and with that your ability to work with other associates dries up. Leaving your current commitment without finding with your colleagues a way to reduce your involvement gradually and without disrupting them will not only blow a hole in the team's activities. It will also blow a huge hole in your credibility bucket and with that, your chances to work in a new team. Gore's culture doesn't believe in discipline to avoid anarchy. It relies firmly on self-discipline. Dave Myers didn't just say to his Medical division colleagues, "Goodbye, I found something cooler to work on." He made sure that he honored his commitment to them all the while dedicating a part of his time to a new project.

Then there is the waterline principle, which is another way that Gore uses self-discipline to keep freedom from becoming anarchy. A "waterline decision" is one that could sink the "boat" – another local code word that originated in the creed, "we are all in the same boat." If an associate feels that a decision is important enough that it is make or break – either because it involves a large financial outlay or it could have broad ramifications for the business – then he must consult with other associates with better knowledge to guide him to the right decision. Corporate freedom of self-direction is not a blank check, it comes with responsibility, and the waterline helps ensure that freedom is used in a responsible manner at Gore. Dave Myers didn't just give away free samples of Elixir to every guitar magazine reader. He consulted with people knowledgeable in marketing and only then chose his action.

One could imagine how the "waterline," if interpreted broadly enough, could become a covert mechanism of control. But the waterline is not invoked very often in most people's daily lives. Individual initiative and risk-taking have always been strongly encouraged at Gore from everyone. Bill Gore – who left DuPont in 1958 to build a company-wide culture for innovation of what he'd experienced in DuPont's Task Force – was known for asking associates during his daily plant tour: "Have you made any mistakes recently?" And if the answer was "No," he would say: "You haven't been taking enough risks." Needless to say, if the risk is that you might fail to keep a commitment, you should warn others immediately. If you don't, you'll punch a hole in your "credibility bucket."

Even at Gore, it's a never-ending struggle to preserve these guiding cultural principles inside the company, which grew from three in 1958 to 8,500 associates today. "When you hire DuPonters, or ex-Westinghouse people, they come with another kind of mentality. That for example, honoring your delivery deadline commitment to a client is not a waterline decision, but an economic one." Thus Lewis – one of the oldest associates in Gore who participated in Bill Gore's earliest culture-building efforts – explains the difficulties he often runs into as a leader. Yet, this struggle to keep Gore's freedom- and responsibility-based culture is worth the efforts and is continuously delivering.

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13 Deutschman, A. "The Fabric of Creativity," *Fast Company*, december 2004 r.

For Gore's associates, the result is a company where they feel uniquely free to pursue their own ideas and initiatives within the framework of a fulfilling job – or rather, "commitment." But for the company as a whole, the proof is in the innovation and growth. Since its 1969 Gore-Tex innovation, Gore's associates invented over 1000 products, which led the company into markets as diverse as chemical processing, environment, aerospace, automotive, electronics, energy, medical, military, consumer products, and music. This amazing stream of innovations contributed to the continuousdouble-digit revenues growth now approaching $2.5 billion in sales.

As impressive as Gore's record is, there's no denying that founder Bill Gore had certain advantages. He started the company and was able to shape it from its earliest moments. He could hire people with the attitudes and values that fit the culture he was building. He could let them find the roles where they were willing to contribute most. He could impose a principle that no facility exceeded 150 associates, in order to keep communication fluid. More generally, he could use his privileged position as founder and CEO to keep even one drop of command-and-control culture from poisoning his corporate well – the uniquely free environment he was building in his company. Yet, Gore is not the only company who built a freedom- and responsibility-based culture for innovation.

FREEDOM CULTURE FIRST, INNOVATION VICTORIES SECOND

How does one build victorious armies? Of course, huge resources can lead to victories. But resources are limited even for the richest nations. And history is replete with examples of small countries victorious over much larger and wealthier adversaries. General Cal Waller once told to Bob Davids: "No one can bullshit the troops. Troops know who you are from your first words."[14] After retiring from military, Waller joined the board of Radica Gameswhich Bob Davids led from start-up to 8,000-strong third most profitable toy manufacturer. The phrase rung true to Davids' ears since, just like Bill Gore and several dozen other leaders we studied, he believed in the approach of "freedom culture first, results second." And building cultures based on freedom and responsibility for people requires a certain type of leadership. As Davids puts it: "It is best if you are one of the troops. A true leader subordinates himself to his people."[15] But there is much more in this leadership style – we call liberating – than just serving one's people.

Describing this style in detail requires a separate chapter (interested readers are referred to our article "Liberating leadership"[16]). Yet, here are the lessons we extracted from the styles of several dozen of leaders who built freedom cultures in their companies:

1. *Stop telling and start listening.* Then, remove all the other symbols and practices that prevent your people from feeling intrinsically equal, that is, respected and trusted.
2. *Start openly and actively sharing your vision of the company so people will "own" it*. But don't do this before step1 because people who are not treated as equals will leave you alone with your vision.
3. *Stop trying to motivate people*. Instead, build an environment that allows people to grow and self-direct – and let them motivate themselves. If they understand the vision from Step 2, they'll take care of the rest if only you let them.
4. *Stay alert*. To keep your company free, become the culture-keeper. In this role, as Bob Davids says, "one drop of urine in the soup is too much – and you can't get it out." The price of liberty is eternal vigilance.

Those principles were used by leaders to build freedom cultures in start-ups and incumbent companies, small and large, private and public, service and manufacturing. We observed them in the US and in Europe and in all these companies the results showed up. The continuous initiative and ideas from every employee led these companies to innovate victoriously and stay at the top of their industries for decades – even during crisis times.

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14 Davids, R., Carney, B. M.,& Getz, I. *The Hard Road to Fun* (book in preparation).
15. *Ibid*.
16 Getz, I. "Liberating leadership: How the initiative-freeing radical organizational form has been successfully adopted," *California Management Review,* 51, pp. 32-58, 2009.

THE NEW CULTURE OF INNOVATION

MICHAŁ KLEIBER

PRESIDENT OF THE POLISH ACADEMY OF SCIENCE

Innovation is not an end in itself, but is the key to the smooth functioning of society in a globalised world. Our goal should be that Poland adjusts itself to this fact, a Poland that I recently termed in a title of one of my texts as "Smart Poland"[17]. This in turn requires of us to take a rapid move from a general discussion of whether to support innovation into reflections on how most effectively to do so, if so. Although the new culture of innovation is manifest largely beyond politics - in business, science, indeed in the whole society - the state as the its main promoter still has a key role to play. A role completely different from that, itself ineffective, which it has already got used to.

THE NEW SOCIETY

In the thought-provoking article *Does Europe really want to be innovative?*[18], Michael Schrage of MIT argues: "innovation is not the same as economic growth; it is a dynamic that brings with it costs and risks." He rightly observes that politicians - where the striving for innovation has become trendy - often forget about the other side of the coin, presenting innovation as all good. It is hard not to agree with him that innovation can be, at best, a means of achieving goals, and alongside this instead of unreflective references to it in all cases, we should consider whether it is in a position to ensure the kind of economic growth needed in a modern society.

Schrage calls on us not to promote a "blind" form of innovation, but with full knowledge of its meaning. In Poland, we approach the problem from a somewhat opposite position: understanding the necessity of innovative actions has not yet entered the mainstream political narrative. This is why I propose to read his call a rebours. It would go then as follows: let's first understand the importance of innovation, because only then does its effective promotion and an innovative leap forward would become possible. In many countries, eg. South Korea and Singapore, the United States and Canada, and finally the Scandinavian states, they have already undertaken this kind of thinking. And if innovation is now rapidly acquiring importance there, it is not because of the usual fashion for political correctness, or for technocratic vogue, but due to the emergence of completely changed social attitudes, indeed the "New Society," which is much more aware of the challenges that we all face today. This type of awareness is characterized by ever greater weight attached not so much to material questions as to the realisation of specific values – such as life in harmony with nature, combating all forms of social exclusion or a widely understood notion of solidarity. Inter-personal relationships in such societies have been undergoing fundamental reconstruction, largely via electronic communication tools that bring an ever wider range of citizens into the 'internet society' –

17 M. Kleiber, "Enlightened Poland. Ten Commandments for the society of knowledge, skills and entrepreneurship ", PAN, January 2011

18 M. Schrage, "Does Europe really want to be innovative?", in: "Innovation: How Europe can take off", Centre for European Reform, July 2011, p. 63-68

thus facilitating interdependence, although often also focusing attention mainly on the temporary, short-term and ephemeral. The roles of the producer and consumer, authority and citizens, experts and observers have become mixed up. Social identity is becoming far less dependent on where one sits in the division of labour and increasingly on the lifestyle. This new society is ready to accept more risk for the price of an enlarged area of freedom. It is also – as Don Tapscott and Anthony Williams argue[19] - increasingly geared to cooperation, openness and sharing. On the other hand, there is the paradox of the coexistence of high aspirations and a deficit of long-term planning.

Today's Western society must face completely new challenges. Faced with demographic challenges it needs to maintain social and economic stability despite a shrinking and aging population. In ecological terms it faces a growing need to move towards a model of growth that would enable it to maintain standards of living while minimizing damage to the environment or climate change. Increasing importance is also attached to the fight against poverty and effective measures to counteract social exclusion.

The "culture of innovation" is fully integrated with this creative, open and post-material 'New Society,' simultaneously appearing as a key precondition for it to meet the new challenges. However, one should delude oneself into thinking that the new culture would arise spontaneously. Its development requires appropriate support tools from the state; such that would allow for the maximum use of pent-up energies in various circles: among businesses, researchers, teachers, civil servants - in fact among the very ordinary citizens who care about the future of their country. I would risk positing the statement that the new society needs not so much "less state" but "more new and less old state." The main task would be to support these groups in the transition towards such a structure that would allow the maximisation of the synergies between them and thus the smooth functioning of the whole society in conditions of globalization, interdependence, the digital transformation and a profound revolution in spheres of values and identity.

INNOVATIVE DESPITE THE STATE

Unfortunately, despite the structural and identification changes which have not bypassed Polish society and in particular the worlds of science and business or administration, the culture of innovation remains at an extremely low level in our country.

The main fault has to be found on the side of state institutions, which seem to be strongly embedded in the traditional mentality. Current discussions on the next EU financial perspective (for the budgetary period 2014-2020) seems to be indicative of this. Many people still argue that Poland requires, above all, to maintain the existing shape of the Common Agricultural Policy and cohesion policy - some seem to feel these indeed are the sole objectives of the negotiations. It's as if they did not become aware that the development of a modern society does not require a continued reliance on rural areas and agriculture (with all respect to the aspirations and needs of the rural population), but on cities and services. The transition from the former to the latter can already be seen in the economy and in changing public awareness, neither of which - unfortunately - have yet reached the political sphere. Secondly, it's as if it hasn't been observed that Poland is already at the stage of the transformation where a redefinition of our ambitions is badly needed. We should no longer be restricted to "making up the gaps" and "chasing the West," but increasingly brave in thinking about our competitive advantages and our participation in the economic, social, scientific and cultural vanguard.

If, as is confirmed by various statistics (including the Global Competitiveness Report; Innovation Union Scoreboard), we are placed at the end of the European tail when it comes to innovation, this is not so much because of the handicaps of the Polish economy and society, but rather due to the continuation of blinkered thinking in mainstream political discourse. A variety of environments, in business and science, and, in fact, the vast majority of society as a whole, have already learned their lessons from the transformation. However, the same cannot be said of the ruling class. Regardless of whether we look to the

19 D. Tapscott, A. Williams, „Macrowikinomics. Rebooting Business and the World", 2010

right or left, I don't see a convincing model of pro-development changes in the functioning of the state, and even politicians' belief in the need for such a model. Among the documents emanating from political circles only one, Poland 2030 Strategy, prepared two years ago by a team of the Prime Minister's strategic advisors, is tackling this problem - but we are still looking forward to even the beginning of its implementation!

Meanwhile, the list of well-known complaints about the Polish state has remained unchanged for a long time. The administrative and legislative nightmare grows unimpeded: public administration already accounts for almost half a million workers, that is three times more than 20 years ago; in turn the number of legislative petitions published in the Legislative Register is already at 2,000 per year, which makes it completely unrealistic to even keep track of them all simultaneously. Disastrous gaps in infrastructure, not only the road network and the energy network, but also broadband internet, remain. Entrepreneurship is limited by high labour costs, an ineffective system of justice and a complicated tax system. The need for strategic thinking is undervalued, evidenced not least by the lack of a National Center for Strategic Studies which is an absolute standard in civilised countries. The system of implementing innovation is ineffective, largely because it lacks pro-innovative market regulations – for example in the areas of public procurement and public-private partnerships. The administration has not yet recognised the birth of the "internet society," as evidenced by the fact that it does not take advantage of the opportunities created by a model of "open government".

It is difficult to believe that on such an unewelcoming soil the entrepreneurship is still developing in Poland while scientists are trying to re-direct their work towards more innovative research. Unfortunately, there is not much reason to believe that they will succeed in maintaining the impetus very long without a radical change in thinking by the state.

UNDERSTAND TO OPERATE

If innovation is not treated as a priority by politicians, this is because often they understand it in an opaque way. If innovation is presented only in terms of expenditure on R&D and the appearance of highly advanced and only pioneering inventions, then one can easily come to the view that this is not for us. Because we – the typical politician thinks – in contrast to Western Europe, can benefit from more traditional sources of growth, such as the large internal market, cheap labour and the enthusiasm of the young generation. Modern inventions will come when we are more affluent and when existing sources of growth become exhausted. If one understands it this way, then one can easily reconcile oneself to the low level of expenditure on R&D, the lack of a considered concept of lifelong learning and the chronic weakness in the system of innovation. No-one seems to worry that the percentage of GDP allocated for R&D in Poland is three times lower than the EU average. Worse, given our relatively low GDP, Polish research centres have at their disposal de facto up to eight times less funds than their western friends.

Innovation is significantly more than R&D. In order to get to this "significantly more," however, one must first get to the "minimum." One must ensure that measures necessary for the development of science are taken, and at the same time, take note of the fact that innovation goes well beyond an abstract idea of invention. In some place it has been already taken into account. Such countries are increasingly focusing on an "innovative administration", that is one that, both internally and externally, is operating in an open and cooperative way, based on strategic planning; one which effectively uses the knowledge and energy of citizens and representatives of business and science; one which is even able to "co-supply" public services together with citizens according to the principle of co-creation[20]. Social innovations are also growing in popularity, as innovative ways of meeting social needs and coping with social demands. As a rule, they are based on the use of modern technology. In turn, entrepreneurs are increasingly using consumer-oriented innovations in the development of new products and

20 P. Zerka, "an innovative administration: oxymoron or new practice?", report by demosEUROPA – Centre for European strategy, April 2011

services, creating demand for the modern be being involved in the construction of so-called lead markets. In short, innovators are to be found today not only among scientists or entrepreneurs, but also among public officers, consumers as well as members of local communities.

In order for such a perspective on innovation to break into the public awareness, it has to be supported by the dominant political discourse. The new culture of innovation, rumbling along "at the bottom," must be assisted through strategy, action and well-articulated words "at the top". Unfortunately, it is difficult to avoid the impression that today, instead of future thinking in terms of innovation, education and key infrastructural investments, the state allocates taxpayers' money and its entire political attention on coping with expeditious problems. The "knowledge-, skills- and entrepreneurship-based society " would not be an empty slogan nor a demagogic fantasy, but a real goal, matching both the level of development achieved by Poland as well as the full scale of our ambitions which are justifiably high! Implementation of such a project requires, however, agreement on the new rules for cooperation between the state, business, the worlds of education and science and the public as a whole.

A NEW DIVISION OF RESPONSIBILITIES

An innovative society should be based on comprehensive cooperation, which would overcome the rigid divisions between various sectors (business, universities and research institutes, governments, media, NGOs) as well as their silos identity. The need for a breakthrough has never been as urgent as it is today. This is not about any sort of misty-eyed or fashionable utopia, or a non-productive renewal of society. On the contrary, the transformation is part of the spirit of a new culture of innovation that is a key opportunity for efficiency gains in each of these spheres. This is hard to overestimate in the context of the ongoing struggle with the effects of the global financial crisis, whereby European countries are increasingly suffering from shifting earth under their feet and watching the growth of the competitiveness and global political and cultural influence of new rising powers such as China, India and Brazil.

In an innovative society, business is able to see the potential hidden in the consumers when it comes to the development of new products and services and discovering potential market niches. As enterprises advance on the production value chain, they are increasingly in a need to cooperate with scientists. This means both more and better value for the scientific community, whose influence on social, economic and cultural reality is falling as scientific research is separated from business practice and the main currents of public discussion. Going forward, modern technologies enable administrations with ever greater ease to make use of ordinary citizens', businesses' and experts' opinions and help them in developing concrete legal solutions. If Poland eventually opened public data and resources along the model of the United States or United Kingdom (data.gov), then this would open the field for innovative business projects (already formed sites along these lines are: www.jakdojade.pl and www.zumi.pl, or the Poznan cemetery search engine), and would enable a wider range of citizens to enter the political debate and a national culture. Similar positive spillovers may be found between every single pair out of the following actors: business, academia, administration, media, NGOs, or citizens.

However, for such a complex society to be able to spread its wings and strengthen cooperative ties, the right conditions have to be created and ensured by the state. The list of backlogs in the areas of business and science is well known, but to this one must add that attachment to the development of innovation among officials and citizens has so far been limited.

In the relationship between politics and business there is, first and foremost, an absolute need to eliminate barriers to the development of entrepreneurship, such as the complicated tax system, excessive bureaucracy, the inefficient judiciary and dysfunctional property rights. At the same time, the state should use all possible opportunities to stimulate growth in innovation among Polish entrepreneurs, among other things by applying the criterion of innovation in accepting foreign direct investment, choosing public procurers or implementing projects based on public-private partnership. It should be bold in the use of tax credits and incentives for innovation activities, as well as in the opening of public resources and the use of innovative financial instruments (e.g. venture capital, micro-

credit) to support innovative business projects. Priority should be given to collaboration between business and research centres and universities. For innovative business to have a chance to evolve the state must ensure basic infrastructure – which covers today not only roads and transmission lines, but also broadband internet.

In the case of science, the precondition sine qua non for its proper development is an increase in expenditure on R&D, although this should be accompanied by steps to improve the quality of scientific research. You can achieve this, firstly, through the promotion of international cooperation. In this respect, we are on the end of the Europe's tail, especially when it comes to accepting students from abroad. Secondly, you can achieve it by increasing competition in the allocation of funds for research. Thirdly, and finally, by supporting the development of cooperation between science and business. Initiatives worthy of note include: opening of commissioned or business faculties (an example of good practice is the PKN Orlen Upstream Academy of Mining with research into shale gas); the development of a system of traineeships for students; enabling people from outside academia to conduct more courses; and treatment favourably those scientists who are trying to make it in business.

In the case of administration, the key is to open data and resources, not only so that they can be used by business and the broad numbers of citizens, but also to involve wider circles in the democratic process and to reinforce pressure on the quality of public data, information and decision-making. Open public consultations should become a standard. The administration needs a thorough remodelling in a spirit of openness, efficiency and strategic thinking, which would require, among others, the integration of separated ministerial Intranets or the appointment of a special unit to help particular ministries and departments in strengthening their leadership capacity and innovative attitudes. Finally, a centre for strategic, long-term thinking over the current policy should be established as soon as possible.

But what is probably most important is to support activities contributing to the strengthening of innovation, social involvement and creativity on the part of all citizens. This applies particularly to the education system, which should be more closely geared to strengthening attitudes and competencies in today's world, such as the use of modern technology and foreign languages, as well as sensitivity towards the culture and societal problems. Such education should be extended to the whole society, in a spirit of life-long learning. All citizens should be actively involved in the democratic process and acquainted with both the achievements of science and the civilisational and economic importance of human creativity and entrepreneurship. In a new society based on a culture of innovation one can be at one time an employee, an artist, a businessman, a scientist and an active citizen. Effective implementation of the strategy to build human capital and social capital aiming to promote self-reliance, creativity, confidence and fundamental skills of cooperation - is the absolute key to our future.

It is true that many of these reforms have been long discussed in Poland. Every now and then we learn about the publication of new lists of key decisions which already at the outset are taken with a pinch of salt. The knowledge on what is needed to do is at least as large and robust as the belief that the necessary reforms could be postponed again to "the kingdom come". But this pessimistic belief is not necessarily the summary of the views of the author. Indeed, it appears that something is finally awakening Poland. We have arrived at a place in which, on the one hand, Poland has begun to overflow with the bitterness and disappointment by the promises which have not been fulfilled, and, on the other hand, there has arisen a critical mass of people and environments that actually want to make changes. Politics, business and science are being entered by a new, young generation which combines much greater openness, flexibility, tolerance and creativity. Increasingly I see also that the current model of development in Poland, based largely on internal consumption, is approaching the limits of its capacity. Without supplementing gaps in infrastructure, encouraging entrepreneurship, renewing the science and the functions of the state in its relations with the outside, we should not hope for a further "boost". We should quickly make the changes which we need as much as we need oxygen – and which we can finally afford.

I stress again: dissemination in Poland of a new innovative culture is our big chance today, maybe unrepeatable for many years when it will already be too late. But for this project to become a reality we must help ourselves. Everyone, because it is our common - and only - path to a prospering future.

ELUSIVE INNOVATIONS

There is a growing awareness that innovation is not only about new technologies or expenditure on research and development (R&D) and that the number of generated patents in itself is insufficient as a measure of innovativeness.

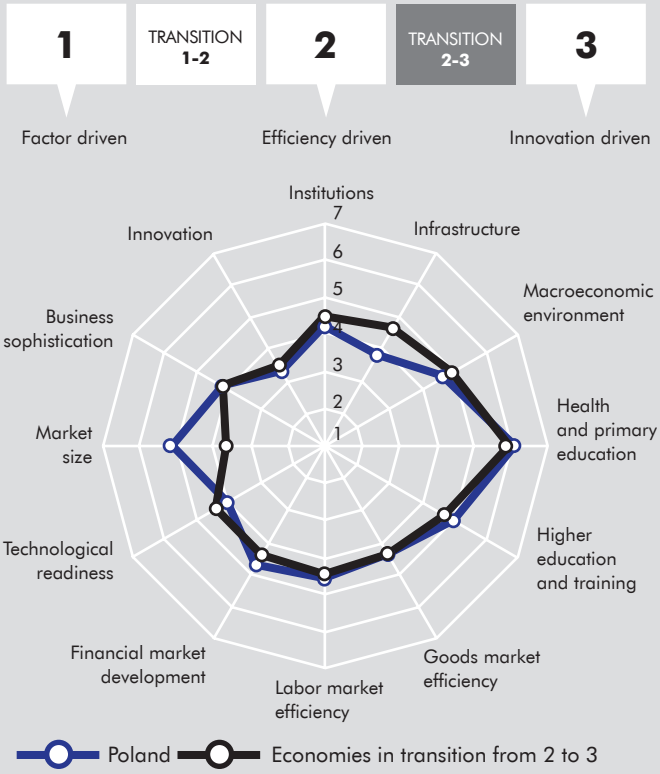
Most observers agree that the nature of innovation has changed diametrically in recent years. Patents are considered by some as a relic of the industrial era: currently, only one per hundred finds practical application and many companies even avoid publishing patents, fearing that this could allow global competitors to copy their ideas even faster than normal. Research activities are also relatively losing their importance, giving way to still difficult to measure activities promoting innovative culture within companies. Increasingly important roles are attributed to organizational innovation as well as those associated with graphic design (so-called design innovation). A huge potential of social innovation as well as the key role of business and administration in the implementation of innovation, are aslo widely recognized.

However, due to the immeasurability of innovativeness in most of these newly discovered areas, the majority of statistics are still based on traditional hard measures relating to R&D – although even that is slowly changing.

The most commonly used statistics allowing international comparisons are: the Global Competitiveness Report (prepared by the World Economic Forum), the Global Innovation Index (devised by the international business school INSEAD) and also, at the European level, the Innovation Union Scoreboard (published by the European Commission).

1. In the case of the Global Competitiveness Report, innovation is the last out of twelve pillars making up for the index of competitiveness of an economy. The rate of innovation consists of seven sub-indicators. Individual economies are evaluated from 1 to 7 according to: (a) whether the company has acquired technology through the acquisition of a license, or through its own research; (b) assessment of the quality of research institutions in the country; (c) how much large companies spend on R&D; (d) to what extent business and science cooperate in R&D; (e) if public procurement encourages technological innovation; (f) the availability of scientists and engineers; and (g) how many new utility patents are there per capita.

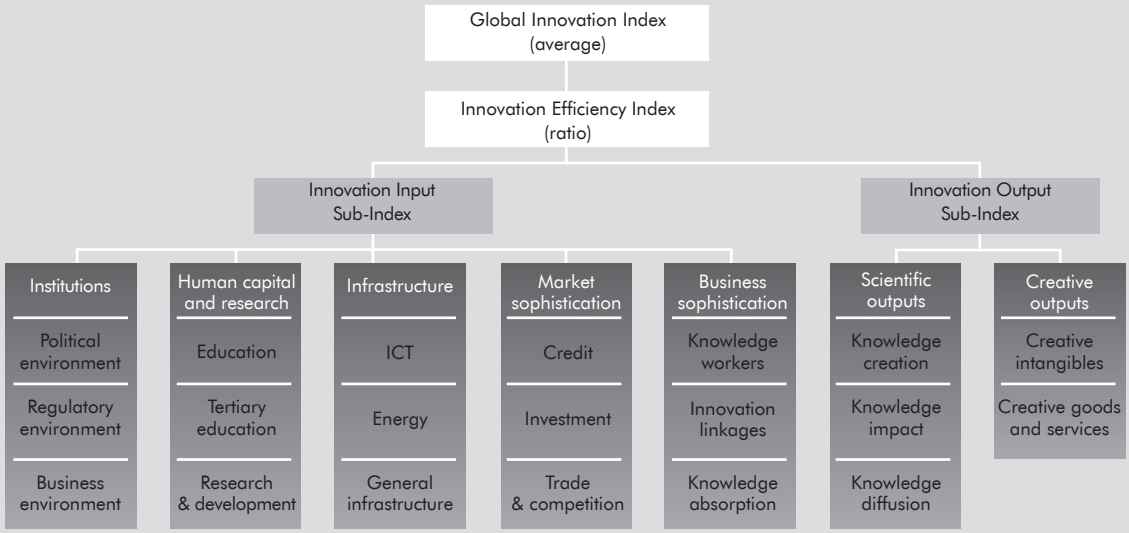
Figure 1. Stage of development



In the final report, for the period 2010-2011, the United States are leaders, followed by Switzerland, Finland, Japan, Sweden, Israel, Taiwan, Germany, Singapore and Denmark. Poland comes in a distant 54th place out of 139 countries.

Indices of innovation are sometimes analyzed in conjunction with the eleventh pillar of competitiveness, which measures business sophistication. This indicator is composed of nine sub-indicators. The economy is evaluated in terms of: (a) the number of local suppliers; (b) the quality of these suppliers; (c) the degree of development of clusters; (d) the competitive advantage of the economy, that is whether it is based on low-cost or natural raw materials, or rather on unique products and services; (e) whether the presence of local businesses in the global value chain is narrow or wide; (f) to what extent the international distribution and marketing are controlled by indigenous

Figure 2.



producers; (g) how sophisticated production processes are; (h) how often companies use sophisticated marketing tools; and (i) how often the management of companies delegates responsibility to subordinates.

If the eleventh and twelfth overall competitiveness pillars are taken together then the order changes substantively. First place in the last report goes to Japan, followed by Switzerland, Sweden, USA, Germany, Finland, Taiwan, the Netherlands, Denmark and Singapore. Poland takes 50th place.

Therefore, in both cases a strong position is occupied by the economies of Northern Europe, especially from Scandinavia. Poland, meanwhile, has typical results for countries in transition towards an innovative economy (Figure 1).

2. At the heart of the Global Innovation Index is the objective to take into account the most modern approaches to measuring innovation. The innovation index was broken down into two sub-indicators: input and output. In the first case, five pillars of the economy were estimated in terms of innovation: (a) institutions; (b), human capital and research; (c) infrastructure; (d) market sophistication; and (e) business sophistication. In the second case, (f) scientific results are evaluated, as well as (g) creative outputs of the economy. The value of each of these pillars is evaluated on the basis of further sub-indices (Figure 2).

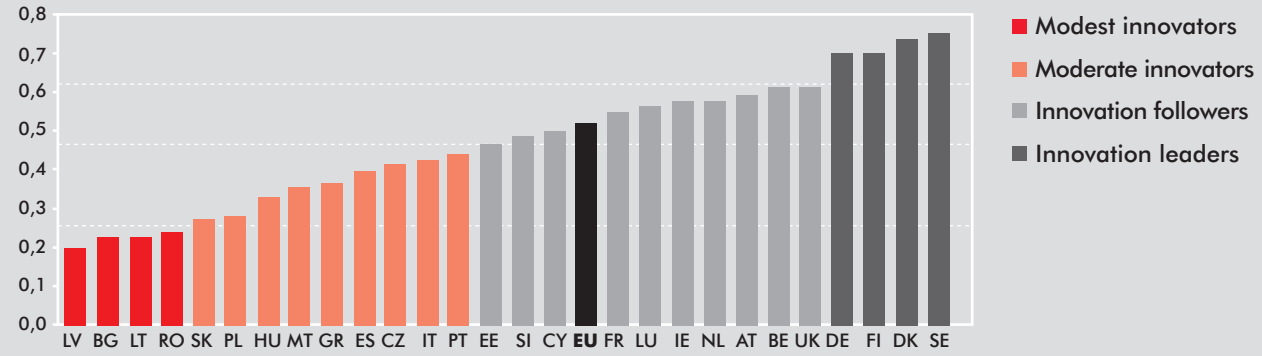
Sub-indices translate into individual pillars which define the value of the two main sub-indicators concerned, which in turn give a total for the index of innovation. When innovation is measured in such a way, it is Switzerland who leads the way, followed, much alike as in the previous ranking though in a different order, by: Sweden, Singapore, Hong Kong, Finland, Denmark, the United States, Canada, Netherlands and the United Kingdom. Poland, once again, takes a distant 43rd of 125 countries.

3. Finally, in the case of the Innovation Union Scoreboard, as in the previous rating, Enablers and Outputs of innovation are assessed, complemented by Firm activities. Under the enablers category the following are measured: human resources, openness of research systems, as well as the existence of financial support (both public and market venture capital). Firm activity is evaluated according to the level of investment, the intensity of public-private copublications, innovative business-to-business cooperation and intellectual assets held. In turn, the Outputs are evaluated according to the number of innovative companies (using a broad definition of innovation) and the overall performance of the economy (inter alia the level of employment in knowledge-intensive sectors). The total score is then standardized, i.e. to form a decimal. European economies are split into four groups: "modest innovators," "moderate innovators," "catch up innovators" and "innovation leaders" (Figure 3).

The EU economy as a whole is compared with major global competitors: the United States and Japan who lead the way, and China, Russia, India and Brazil who are catching up (Figure 4).

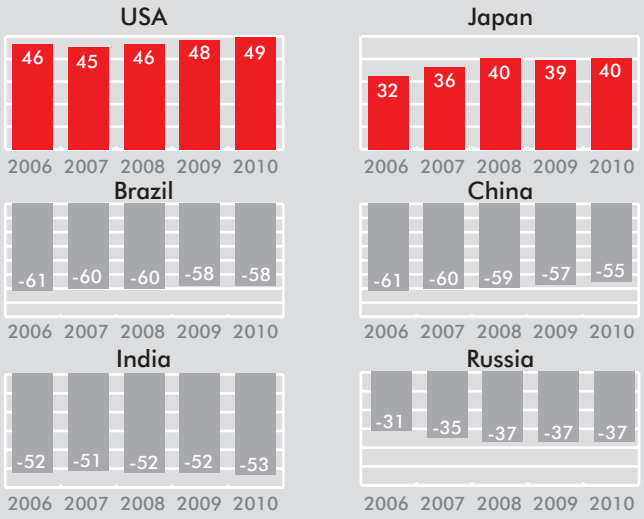
The results of each country are compared with the EU average in terms of each of the sub-indicators concerned.

Figure 3. EU Member States' Innovation Performance



Note: Average performance is measured using a composite indicator building on data for 24 indicators going from a lowest possible performance of 0 to a maximum possible performance of 1. Average performance in 2010 reflects performance in 2008/2009 due to a lag in data availability. The performance of Innovation leaders is 20% or more above that of the EU27; of Innovation followers it is less than 20% above but more than 10% below that of the EU27; of Moderate innovators it is less than 10% bellow but more than 50% below that of the EU27; and for Modest innovators it is below 50% that of the EU27.

Figure 4. EU27 Innovation Performance Compared To Main Competitors

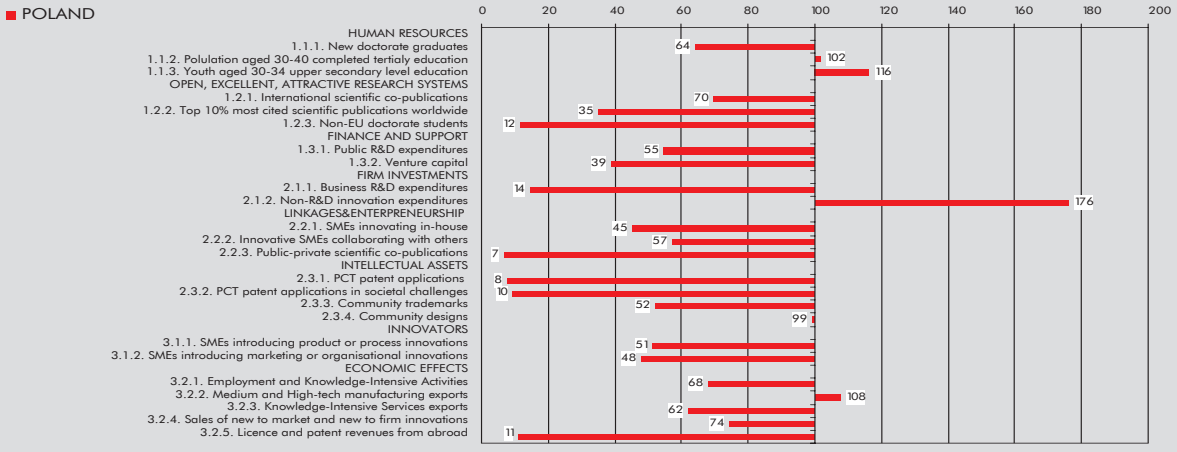


Performance is measured as 100 (X/EU)-1) where X refers to the value for the indicator for the country X and EU to the value for the indicator for the EU27. The values in the graphs should be interpreted as the relative performance compared to that of the EU27. E.g. the US in "2010" is performing 49% better that the EU27 and China in "2010" is performing 55% worse that the EU27.

Poland (Figure 5), which only recently fought its way through into the second group of "moderate innovators," has high non-R&D research expenditure at the company level and has very poor results for the presence of foreign doctoral candidates, patent activity, public-private cooperation and business expenditure on R&D.

SUMMARY

For the moment, we must accept the imperfect nature of innovation measures, and be prepared that - in accordance with the evolving approach of OECD - they will be continuously fine-tuned in the coming years. However, this should not prevent us from making international comparisons on an ongoing basis. And all existing statistics show clearly that Poland has a lot of catching up to do if we want to become a truly innovative economy.



THE CHALLENGE OF INNOVATION – A NEED FOR STRATEGIC IMAGINATION

EDWIN BENDYK

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Could an equivalent of America's Silicon Valley be created in Poland? Does Poland have the chance to create its own Nokia? These two questions have for many years driven the public discussion about innovation in Poland, but in effect they miss the point. And this is often expressed in banal but often forgotten statement – innovation is not a goal in itself, but a means by which companies and other organisations should achieve their goals. The aim is thus to maximise the added value by supplying services and products - for which there might be or might appear demand - to the market. From this simple and obvious sentence many exciting consequences arise. It is not enough to have the most successful innovative bid to succeed - it mainly depends on the place one occupies in a long chain of value creation.

THE WITCHER'S LESSON

To concretise, let's look at two domestic examples. Undoubtedly one of the most technologically advanced and successful products of Polish business in recent years has been the video game "The Witcher," produced by the CD project company. Dozens of people supported by a multimillion zloty budget have worked on the project for years. From the beginning they had a very clear objective: to develop a product capable of success on the global hyper-competitive media market. This has been achieved. The game inspired by Andrzej Sapkowski's prose has gained recognition worldwide, the best measure both its winning of dozens of prestigious awards and its high rankings on best-seller lists (in general Gamerankings classification "The Witcher" gained 81.59% in its original version and its second version in 2008, 86.24%). However, in order to access and succeed on the international market the producer of "The Witcher" had to enter into a strategic agreement with a strong distributor, who for its services would receive a large piece of the value added. De facto it is these distributors that have gained most from the innovative efforts of the Polish designers, leveraging their position at the media market.

Another example, still awaiting a happy ending, is the history of the Polish blue laser. The PAN Institute of High Pressure came up with a pioneering, innovative and highly advanced technology. Why did this not form the basis for further development of an indigenous high-tech domestic economy? Why do we still need to think of blue optical-electronics in terms of the above-mentioned unfulfilled dreams of Poland's "future Nokia"? The answer is, unfortunately, painfully simple. The technology itself, even if the most innovative, is not enough. To make it to the market you need a complex system of creating value by translating the technological excellence into a quality and functionality of products and services for which the final consumer will hand over his money.

This was always so, as unfortunately many Polish innovators forget. They later regret that they have had to share their great inventions with others. As a result, the real "market players" are the ones who, thanks to their position, gain access to the innovative energy on discount terms. Unfortunately, this asymmetry is not going to disappear soon. On the contrary, globalization, increasing

competitiveness and the complexity of international markets only reinforce this seemingly paradoxical situation.

INNOVATION IN A FLAT WORLD

The world is flat, notes the American columnist Thomas L. Friedman in his bestselling book, and this flattening is due to a constant lowering of the barriers of entry to global competition. This process can be perfectly seen in the market for innovation. The supply of inventions is increasing because their source is not only the best centres of research and development of large corporations and laboratories of renowned universities, but also less well-known centres in developing countries, or even amateurs acting on their own or in groups organized via internet. At the same time, the importance of user-driven innovation and of active consumers' participation in creating their own optimum solutions is increasing. As a result we see a 'commoditisation of innovation', by way of which it is turning into a product. Innovation ceases to be a rare good (except for break-out innovations). Christopher T. Hill, professor of public policy and technology at George Mason University, in analyzing these phenomena proposes that we begin to talk about a Post-Scientific Society.

Hill argues that the most developed countries such as the United States should no longer focus on a classically understood notion of innovation based on the development of new technologies and products based on them, because this is becoming less of a source of added value. In an increasingly globalised economy what counts is reaching those customers who, due to accelerating social and cultural changes, are becoming increasingly difficult to diagnose, reach and convince. As a result, across the value creation chain the role of technological innovation has decreased and we see a relative increase in the importance of innovation in the area of marketing, design, business organisation and logistics.

This concept is illustrated spectacularly by Apple, recognised in 2011 as the most expensive brand in the world, and at the same time one of the most highly valued companies on the New York Stock Exchange. The source of this is not, as seems at first glance, its fantastic gadgets, but a control over the entire value creation chain, from the design stage through to the web platform for marketing objects with the distinctive Apple logo interchanging with whatever other objects of desire there may be at any given time. Nokia, until recently a model of creativity and innovation, did not acknowledge the transformation noted by Hill. Focusing on the technological excellence of its products Nokia suddenly discovered that it is competing in a field where - due to commoditisation processes - the benefits of mere technological innovation have decreased. Unfortunately, it discovered this too late to establish a new source of added value.

Let's, however, return to home soil, where an excellent example for understanding how the rules of the game have changed is the global company Solaris, operating on the apparently very dull bus market, with its many powerful, incumbent players. The Olszewski family business was originally based, like most Polish business ventures since the beginning of the transformation, on trade. The introduction of a Neoplan representative, however, was not enough to meet the company's entrepreneurial ambitions. The idea arose to sell the buses produced by the company itself. After several years the vehicles with Solaris's distinctive logo now serve not only public transport in Poland, but can be found on the streets of metropolitan areas also in Germany, the Czech Republic, Switzerland and Dubai.

What is the basis of the success of this company from Bolechow? Of course it supplies to the market products that are extremely technologically advanced, but most of the key technologies used in buses came from other suppliers. Solaris vehicles are not, however, the usual "kit vehicles," but original constructs whose appearance on the market re-energised and refreshed a dull industry. It is a combination of functional values with original design, efficient administration and innovative marketing that has meant Solaris is one of the few Polish brands from the high-technology sector recognized outside the country.

SEARCHING FOR ADDED VALUE

The problem of the Polish economy is not about an abstract notion of innovation, but a question of whether we are able to create the organization across whole sectors of high value added and how the capacity for innovation may assist us in achieving this objective. The example of Solaris is very promising because it shows that we have a chance

to break into even tight markets and are not stuck searching for exotic niches. Also encouraging is the example "The Witcher" because it shows that Polish companies have the ability to create products that can compete and win on hyper-competitive markets. Maybe, however, these examples are just exceptions? Maybe the skeptics are right when they say that Polish enterprises in general are not very modern and are weakly capitalised, and as a result we can only occupy a subordinate position in the global chain of value?

The opposite thesis would appear, however, to be more appropriate: these cases are not freaks of nature or statistical creations, but actually perfectly illustrate the potential of Polish enterprises. So how to arouse this potential? In what sectors can we expect to see rapid appearances of modernity and innovation? The best way to search for answers to such questions are foresight projects. These rely on collective effort involving large numbers of experts and stakeholders looking to jointly respond to the challenges of the future and to come up with the instruments needed to modulate it in an optimal way with the interests of a given strategic industry, region or country as a whole.

A spectacular example of such a collective reflection on the future of Poland was the national programme Foresight 2020 under the direction of Prof. Michal Kleiber, President of the Polish Academy of Science, which commenced in 2006, its results being announced at the beginning of 2009. It, inter alia, identified the most promising technological Polish specialities which may serve as a basis for the development of the domestic economy in high value added sectors. Unfortunately, to the regret of journalists and many politicians, "this tedious work which involved many thousands of experts did not provide clear answers" to the questions we started by asking in this text.

It is hard to identify "safe bets" in the Polish economy and in the R&D sector, who will be worth staking today and in a few years will reap the rewards of current investment. Even if there are centres of technological development at the highest level, unfortunately their achievements are most often weakly correlated with the level of development of the market and of companies with the potential to enable commercialisation of cutting-edge solutions. If there are companies with the appropriate market strength and capital they most often complain that what the Polish research and development sector offer has little relevance to building their competitive advantage. Can these diverse potentials somehow be brought together?

POLISH NICHES

Of course they can, as we can read in the conclusions of the report NPF Poland 2020. The list of promising technological areas that may become the basis for the development of high value-added sectors of the economy is quite long and covers both traditional industries and the so-called 'New Economy.' We therefore have the opportunity to create our own niche in the area of modern materials - for industry, transport or biomedical engineering. The possibilities for developing biotechnology solutions integrated with nanotechnology and bio-niches also look promising - although this area seems very cutting edge, the spectrum of business applications is enormous, from the pharmaceutical industry through food processing and health and environmental protection. A big area of hidden potential for development is the energy sector in its wider sense. The development of poly-generational technology, diffuse sources of electricity and heat, smart energy networks, energy based on alternative sources and nuclear energy technologies associated with carbon techniques are just a few of the possible areas for creative planning.

The conclusions of the NPF Poland 2020 are not merely a list of wishful thinking. They show that on the one hand the potential of research and development is already there, waiting for productive use. On the other hand, there are the branches of the economy that have sufficient market power to provide a platform for building development strategies. Apart from that, there are public sectors, including the national health service and the state administration, which can only gain in efficiency by deploying new technologies. The problem here is that both of them, in most cases, are separated by a deep trench. How to overcome this?

How to make it that not only individual companies, but also economically and technologically developed centres occupying a high position in the global division of labour and the creation of values gather to meet these challenges? We know, for instance from the experience of the Rzeszów Aviation Valley, that it is possible. As early as in the late

1990s, the Podkarpacie region was synonymous with lagged development. On the ashes of this fatalism the WSK Rzeszów aviation company – which was taken over by the multinational United Technologies – a cluster of perfectly formed and profitable companies has emerged. This success was due to a number of factors: the enlightened decisions of the foreign investor, the accumulated human capital already built in the pre-war company, strong academic and R&D background and, last but not least, the determination of the local social, economic and political elites to establish a coherent, joint development strategy and their readiness to implement in a consistent way.

CRISIS: A THREAT OR OPPORTUNITY?

However, the analysis of Polish technology clusters conducted by the Institute for Structural Research shows that the correlation of the many positive factors needed to obtain a necessary synergy is a rare phenomenon. On the other hand, it is not impossible. And the experience of the Rzeszów aviation cluster shows that nothing helps to create such synergies as much as a harsh necessity. This observation is also corroborated by a more general reflection on innovation and development. History shows that the best stimulus for the supply of new technology and organizational and business models, is the crisis. In the 20th century the time of the great depression was also the time of the largest eruption of innovation.

Unfortunately, the crisis has also triggered some defensive actions. Representatives of those companies and organizations whose existence is under threat are the first to ask politicians for help. An example of such actions is the mobilisation of Polish politicians in the energy sector, to protect the interests of miners within the European Union by blocking anti-emissions regulations arising from the EU's energy-climate package. The assertion that Polish energy, one of the most intensive in the world, would be seriously hit by anti-emission restrictions, is well founded and this defence is in line with Poland's national interest. In the long term, however, it makes sense to help achieve the strategic goal of modernizing the Polish energy sector so that it can carry out its tasks in a competitive way, unprotected by an extremely tight-fitting jacket - energy security protected by the state. Will this happen? The answer is we don't know, because no-one has asked the strategic question so far in Poland.

STRATEGIC IMAGINATION

What Denmark decided to do after the experience of the energy crisis in 1973 constitutes a good example of a strategic question, understood here as a typo of intellectual process. The Danes asked then if it was possible to maintain economic growth without increasing power consumption. The response was positive and while searching for it Denmark created several technological-economic niches of global significance, just to mention the current position of Danish companies in the renewable energy and industrial and domestic automation sectors. One element of seeking the answer to the question was to create, by way of regulations and tax burdens, a 'crisis situation' that encouraged the search for new solutions. As a result, despite the fact that energy prices in Denmark are among the highest in the world, Danes pay low energy bills because they consume their energy very efficiently. At the same time, although initially no-one thought about it, an additional positive side effect was generated as the Danish economy proved to be capable of emissions reduction without the loss in competitiveness (on the contrary, pro-climatic regulations create new markets for Danish innovative companies).

Another example of strategic imagination in action is provided by the project "A Better Place" initiated in 2008 by an Israeli entrepreneur, Shai Agassi. He asked the strategic question: what would make people move to electric cars? Looking for an answer Agassi suggested that the problem was not technology but user experience. If we ensure that all aspects of the use of an electric car are better than in the case of the combustion engine, then it is only a matter of time before a new automotive revolution takes place. As a result, a complex project was carried out in, amongst other places, Israel aimed at shifting drivers to battery-powered vehicles. Is Agassi going to achieve the same success as the Danes? Of course, it is not known yet, because his initiative, like any innovative project, is encumbered with risks.

In Poland, as the NPF Poland 2020 report convincingly showed, we have the capabilities needed to jump into this land of innovation. However, we will not make this leap if we focus solely on this aim instead of searching for answers to strategic questions first.

POLAND: AT THE THRESHOLD OF AN INNOVATION BREAKTHROUGH?

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The debates on the system of innovation in Poland that have been going on for many years in Poland are invariably marked by pessimism and tend to be focused on barriers to the development of innovation. Often the discussion concerns the poor level of Polish science, which, apart from a few rare cases, can rarely boast of breakthrough research. At other times the subject of grumbling is the far-from-modern, or even parochial, management style of Polish entrepreneurs who after 20 years of market practices still seem not to comprehend how important innovation is in the ability to compete. Often the public administration is criticized: either for insufficient financial support to the academic sector, or for too rigid and overly bureaucratic procedures for the granting of funds for innovative entrepreneurs. The financial sector is no less guilty, not wanting to take excessive risks and not participating sufficiently in the financing of innovative business ventures.

All this is at least partly true, but is it high time that we moved beyond this stage of painful diagnosis and stopped apportioning the blame for the current state of things. When three years ago, as part of the Prime Minister's Strategic Advisory Team, we published a reports "Poland's Intellectual Capital," and a year later, the report "Poland 2030", an intense debate began on state of affairs in the Polish knowledge triangle. Then in the years 2009-2010 during consultations for the reform of science and higher education there were dozens of conferences, panels, meetings, where the deficits in a wider system of innovation as well as their historical background were far more specifically addressed. Also many competing proposals and solutions, aimed at removing these deficiencies, were aired. Today, some of these have provided the basis for legislation prepared by Minister Kudrycka and have entered into force. Other important elements of the new system of innovation, such as the National Capital Fund (KFK), after a long and not seamless startup are finally working – and they work really well. We are also at the threshold of negotiations for a new EU budget. Therefore, I believe it is time to focus attention on the future, and transfer the weight of the discussions concerning the Polish system of innovation to the theme of its further optimization and possible ways to get the most out of the potential found in these new mechanisms and institutions.

The first 20 years of democratic Poland can be termed the decades of Polish entrepreneurship – the share of SMEs in GDP increased from about 1/3 in 1995 to almost 50% in 2009[21]. - however, this increase to a very small extent came from the development of truly innovative business. As several studies show[22], most domestic companies built their competitive position more on imitation than innovation. The subsequent period, however, may bring a breakthrough in Polish innovation, as the result of several mutually supporting factors which are discussed in this

21 Reports on the state of SMEs in 1995-1996 (p. 19) and 2008-2009 (p. 29), PARP

22 According to the study of "the competitiveness of the SME sector in 2008," undertaken by "innovation as a tool for building a competitive position, it is less than 1% of companies" See: http://pkpplewiatan.pl/dla_mediow/informacje_prasowe/1/konkurencyjno347263_sektora_msp_28.

paper. We cannot, however, take for granted this success which would consist, inter alia, in the emergence and development of the first global innovative enterprises from Poland. This is why it is also worth noting the directions of innovation policy that make such success more likely.

REASONS TO WORRY OR GROUNDS FOR OPTIMISM?

Where should one search to find justifications for an apparently risky forecast of an innovative breakthrough? Three elements, which have to date accounted for the weakness of the Polish system of innovation, in the near future may prove to be, in fact, the engine for innovation.

The first is the availability of venture capital funds. The second is the collaboration between science and business. The third and final is the new aspirations of Polish entrepreneurs.

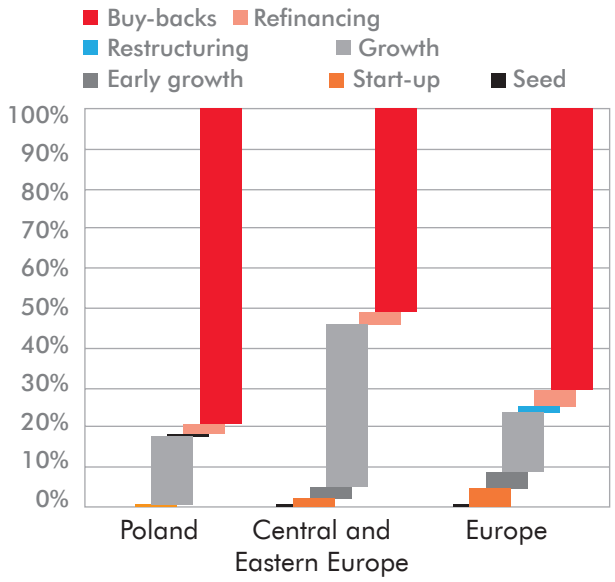
HIGH-RISK FUNDS

The value of venture funds' investments in relation to GDP is a good measure of the maturity of this market in any given country. The size of this indicator depends, on the one hand, on the availability of capital (the number and value of Private Equity funds, including Venture Capital funds), and on the other hand – on the presence of interesting investment projects and the inclination of fund managers to take risks, which in turn is based, among other things, on evaluations of the investment attractiveness of the country. In the case of Poland, the total value of investments made by venture capital funds in 2010 amounted to 0.19% of GDP, as compared to the average for our region of 0.12%, giving Poland top spot. However, when compared with the European average (0.31%), one can see that there is still a lot of catching up to do[23].

Poland is by far the largest Central and Eastern Europe market for venture capital. In 2010 it attracted investments worth EUR 657 million - over double the 2009 figure. This amount represented more than a half of the total value of investment in the region. On the other hand, although the private equity market has progressed fairly rapidly in the last decade, the activity of such funds, measured by the amount of engaged funds, has been focused on buy-back transactions, including management buy-outs, and not on the financing of the seed capital or of the early stage of firms' development. At this stages, the necessary funds are usually small, but a risk of losses is relatively high. Last year, the investments by private equity firms made their way to 44 companies in Poland, but only a few were early-stage investments - with a total amount of slightly above EUR 2.5 million[24]. In other words, the availability of investment capital for those entrepreneurs who wanted to run innovative projects was very low and considerably less than in the countries of Western Europe (see Figure 1).

Figure 1. Own figures, on the basis of data from EVCA

The activities of high risk funds in Poland in 2010, related to enterprises in the early stages of development



23 "Central and Eastern Europe Statistics 2010. EVCA Special Paper ". EVCA-European Private Equity & Venture Capital Association. July 2011. P.17-18

24 *Ibid*, p. 19

It is true that while in the last few years this segment has been strengthened by the entry of local players such as MCI Management, IQ Partners and IIF this has not qualitatively changed the situation. The likely causes of this not very dynamic development in the private equity market can be found in several sources. For sure, competition between the funds is still relatively weak and hence the willingness to bear risks is smaller and there is more selectivity in the choice of projects. VC Fund managers in Poland themselves say that the dominant attitude among them is investing in imitations or those companies that have adapted foreign solutions. Paradoxically, this often means a de facto increase in risk as the already adopted business models find quickly many new imitators. Investing only in Polish copies of Western solutions often means also that they later do not have the opportunity to go beyond the local market, which inherently reduces any expected revenue streams.

The last three years have brought a few changes, however, which may fundamentally change the funding of innovative ventures. Firstly, a new market has been created, New Connect, which provides an excellent alternative for innovative companies in view of the often difficult negotiations with directors of venture capital funds. A promising example here is Read Gene Co. - a company whose aim is the commercialisation of methods for the detection, prevention and treatment of the most malicious tumours. Professor Jan Lubiński, a co-founder of Read Gene, says his company chose a closed issue (from which approximately $5 million was raised) and listing on the New Connect after it turned out that potential investors wanted control of the company and offered in return relatively small funds. Today, Read Gene belongs to the New ConnectLead segment, which brings together the most liquid values listed at this floor. The number of innovative companies on this floor is increasingly, to mention for example Pharmena (which develops and commercializes innovative dermatological products), Aten HT (innovative technologies for the disposal of hazardous waste and the recovery of valuable materials) and Euroimplant (innovative tissue engineering solutions).

The second major change is the establishment of the National Capital Fund – which operates from funds received in the framework of the Operational Programme Innovative Economy 2007-13 and from the Ministry of Economy.

Thanks to the support of the National Capital Fund, by the end of 2016 venture capital funds will invest about $300 million dollars a year in new Polish companies. As a matter of comparison, in the period 2006 to 2010 venture capital funds invested in Poland on average less than $100 million per year. Therefore, we are talking here about a major leap in the scale of the funding available for innovative entrepreneurs.

KFK investments should work as a catalyst of for private investment, because KFK would assume most of the investment risks: where it is necessary to withdraw from the investment, the money is returned first to private shareholders of the fund. This has to encourage the funds' management teams to undertake larger risks than usual and finance innovative projects on a wider scale, not only in Poland but also in Europe and globally.

Government agencies are in many countries the major source of capital for private equity funds, including venture capital. This is also the case in our region. In 2008 the share of government agencies' capital in the funds raised in the countries of Central and Eastern Europe was at the level of 2.5%, in 2009 it was 34.8% and in 2010 - already 58.3%[25]. Given the unclear prospects for the global economy in the coming years, it seems that this high share is a positive factor, insofar as it is able to compensate for any decline in risk appetite in the private sector. In the financing structure of venture capital funds in Central and Eastern Europe one can still notice, however, a significant gap, consisting in small commitments from insurance companies and pension funds. Due to current arrangements they cannot freely engage their capital in high-risk funds, and this impedes the development of the sector. It is estimated that long-term liabilities of these two groups of entities exceed $350 billion. Engaging these funds would give pro-innovation investments an even greater

25 *Ibidem*, p. 7

impetus and would turn around the negative character of the system in which the burden of funding research and development remains on the shoulders of the state.

In conclusion, over the next five years we will witness a decisive increase in the provision of development capital for emerging companies and at the same time we can expect to see the emergence of new players – local and foreign funds, most probably coming from European countries as well as Israel and the United States. This will mean that the best projects will not only not have to fight for financing but will in fact choose which funds' offers they want to accept, as is already the case in Silicon Valley.

WILL POLISH SCIENCE FINALLY LEARN TO TALK WITH BUSINESS?

The legislative package prepared by Minister Kudrycka and her team, and in particular the law on the principles of financing science, are a clear step towards making the system of financing research and development work more transparently and effectively. Although some believe it is too far-reaching, such legislation provides a sound platform for a more modern scientific set-up. Above all, consistent efforts to ensure allocation of budgetary resources based on quality, among other things, by setting up new institutions such as Committee for the Evaluation of Scientific Units and providing them with a broad representation across socio-economic milieu, are most appreciated. What is also valuable is strengthening the system with independence mechanisms to ensure against existing or potential pathologies such as nepotism and the appearance of conflicting interests. It is important also to redirect money flows from the financing of current activities of existing scientific units towards the financing of specific programmes, including those of strategic importance. What else needs to be done for the new system to function smoothly? Certainly, one of the most important elements will be better criteria and incentive procedures which encourage those research projects which are carried out in close cooperation with the business. All in all, much will depend on the specific people who will be entrusted with the task in the framework of the Committee on Scientific Policy, Committee for the Evaluation of Scientific Units and in the units and offices of the NCBiR (the National Center for Research and Development) and the NCN (the National Center for Science).

Aside from the legislative changes, a lot of good things are already happening. The first manuals on commercialisation of knowledge have already been published[26]; at numerous academic centres spin-off companies have been created, such as the above noted Pharmena, or Novasome; finally, an academic network of business incubators is developing rapidly.

It is clear that scientists, if they really want to, they can and do establish effective cooperation with the business. The examples of companies traded on the New Connect, such as Optopol[27] or Read Gene[28], suggest that there are possibilities for cooperation at various levels and in different configurations. In the coming years, it will be important to promote this still fragile cooperation via the organization of forums and mechanisms for dialogue between the two environments. The analysis of data provided by the European Commission during the drafting of the European Innovation Scoreboard clearly indicates that the joint work of business and science is very strongly correlated with the size of exports of knowledge-intensive services and the number of with the number of reported patent applications (see Figure 2).

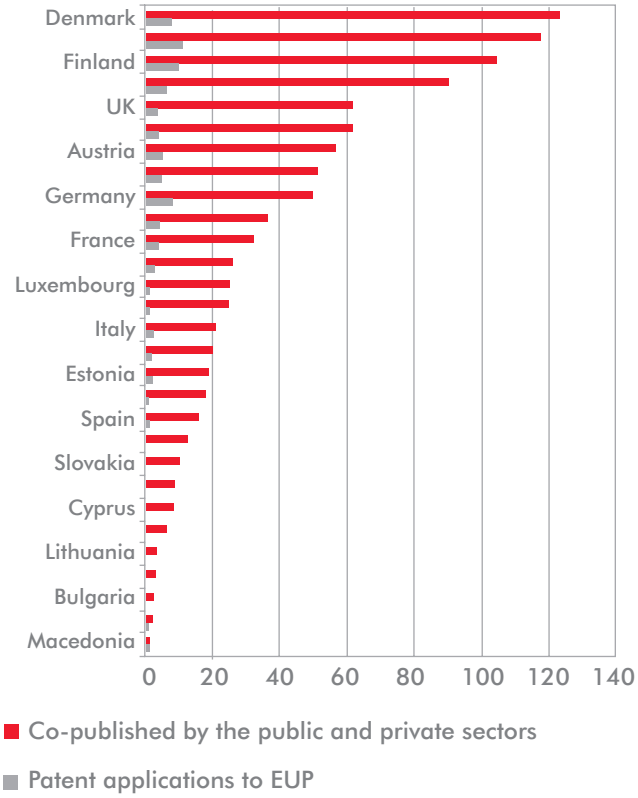
THE NEW ASPIRATIONS OF POLISH ENTREPRENEURS

Is there a Polish company whose management decisions could be commented on around the world? Is there in our country a firm whose new products would be eagerly anticipated around the world by the average consumer? Are there any commercial brands in Poland that would be recognizable on all continents? Until recently the answers to all these questions would be: no. None of the biggest Polish brands, according to a Millward Brown study

26 See, for example. www.spin-off.utp.edu.pl or http://www.nauka.gov.pl/finansowanie/fundusze-europejskie/program-operacyjny-innowacyjna-gospodarka/projekt-systemowy/praktyczna-komercjalizacja/
27 http://youtu.be/KtONMpjMLII
28 http://youtu.be/UsHD82rjb_o

Figure 2. Own figures on the basis of data from the European Innovation Scoreboard

Joint research undertaken by the private and public sectors into the degree of patent applications.



BrandZ[29], such as PKO BP, PZU and Żywiec, are present on a wide scale on foreign markets.

However, this situation is gradually changing and maybe soon we will see the first truly global Polish brand. Today, Polish brands such as Tymbark, Bella, Mokate or PKN ORLEN, are widely recognizable and known across a wide swathe of consumers.

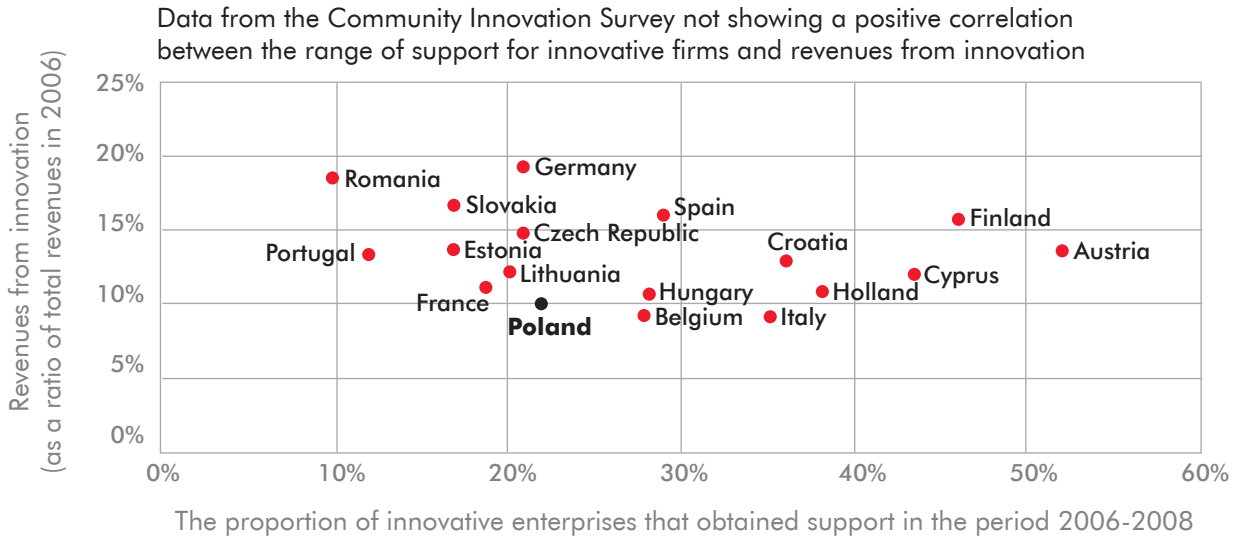
The company CD Projekt RED and its product, the computer game known worldwide as "The Witcher," is probably the first serious candidate to be found among cult global brands. The second edition of "The Witcher" has been a massive hit on both North American and European markets and according to VGChartz, a portal monitoring the global sales of computer games, is the 9th best-selling game for personal computers in the RPG (role playing games) category in history, with over 560,000 sold (data as of July 26th)[30].

When the CD Project RED announced on August 2nd, 2011 its decision to postpone the issue of its game's Xbox-360 edition, the news travelled like lightening around the globe, commented on in internet forums from Colombia to India. Search on Google for "The Witcher 2" and you will see that it has 81 million visits and its profile on Facebook has more than 114,000 Friends (August 3rd 2011). For the first time, a Polish company has succeeded in magnetising customers worldwide for an innovative product.

In this story, the revealing element is the fact that the owners of the company and the originators of the game did not hold back on the very ambitious objective of having a presence on the global market. The same also can be said of many other new Polish exporters such as Fakro, Selena, Solaris, TZMO and Inglot. The heads of these companies are not afraid to talk about their firms as global companies with international ambitions. These global aspirations are common to the heads of the most dynamic Polish companies, but also - significantly – they mark them out from the overall group of Polish business leaders. According to the annual study "CEO Survey" conducted by PwC, Polish CEOs five times less often than those from other countries (the test was carried out on a sample of 1201 managers in 71 countries) consider the expansion on foreign markets as a potential development opportunity[31]. These examples confirm that a necessary ingredient for the success of any innovative company must be a visionary and brave leadership, aiming always higher than the competition and being not afraid of new challenges. For example, with the exception of TZMO, none of the afore-

29 Millward Brown's presentation at the Congress CMO in Sopot, June 2011r.
30 http://www.vgchartz.com
31 "14. the annual examination of the CEO survey. Poland perspectives-thoughtful growth, PwC Poland, p. 11

Figure 3. Own figures, on the basis of data from Eurostat



mentioned companies existed 20 years ago and now all have their own laboratories and research programmes, thus building their own organizational and intellectual capital and gaining a competitive advantage. Visionary leaders can also build trust within the company so that the potential of creative ideas from all employees can be fully utilised.

In the Polish economy we are witnessing a generational shift. After 20 years since the beginning of the transformation to a market economy there is a new generation of managers – these are often people with international experience, being well-educated according to global standards and not looking at foreign competition with the old inferiority complex. This is an important factor that should foster the innovativeness and the competitiveness of the Polish economy.

SUMMARY. HOW NOT TO FALL OFF THE INNOVATION PATH?

The statistics on the specific parameters of the system of innovation in Poland leave no doubt that there still exist gaps between Poland and the developed economies of Western Europe and the world. But there are strong indications that we can look optimistically to the future. According to the National Bank of Poland, in June 2011, for the first time in the history, Polish cumulative direct investment abroad was equal to the accumulated annual value of foreign direct investment into Poland (for the period July 2010-June 2011). Polish companies increasingly today not only have global aspirations, but are also executing them. With this comes the opening of stronger competitive pressures, which are conducive for innovation.

Breakthrough innovation, however, will not become a reality unless in the coming years we strengthen the foundations for growth in the level of innovativeness of Polish science and economy. Innovation policy in the coming years and, in particular, policies for using structural funds to support the innovative economy, should build on those practices that were proven to work in the previous financial period. Such elements of the Innovative Economy Operational Programme as 1.4-4.1 (supporting research and development and the implementation of the results of that work), 3.1 (grants for incubation and investment in the newly created innovative entreprise) should be maintained or, as far as possible, even reinforced. Other areas, where a lot of difficulties were found, such as 8.1, 8.2 (support for e-business) should be modified.

It is also worth looking at and adapting on a larger scale good solutions originating from the non-governmental sector, for example programmes implemented by the Foundation for Polish Science aimed at Polish scientists living abroad (eg. "Homing Plus" and "Ideas for Poland"), or organisational solutions towards the commercialisation of knowledge at the Wrocław Research Center EIT+. This latter institution, combining science and business to implement its projects, employs Polish scientists who have already succeeded in managing research abroad and can now use their experience at home.

However, one should bear in mind that in innovation policy, quantity does not always translate into quality. We should not at all costs push this policy towards as many companies and businesses as possible. Analysis of innovation support schemes in other EU Member States does not confirm that any enlargement of the number of companies covered by pro-innovation support has always been translated into significantly better economic effects of innovation (see diagram below).

Innovation was, is and will remain, at least in some of its many manifestations, an elite phenomenon. Therefore the institutions engaged in the innovation system should proactively look for these exceptional companies, usually managed by exceptional leaders, which have a good chance of 'spreading their wings' in the future. It is worth helping here because the invested public money will come back faster and in bigger multiples into the coffers of the state.

This does not mean, of course, that we should give up on the widely offered support for promotion of pro-innovative attitudes, especially among executives and owners of private businesses and public sector institutions. This should consist principally on promoting business practices for building confidence, both within the organization and between organisations. Why is trust so important? There are at least a couple of reasons:

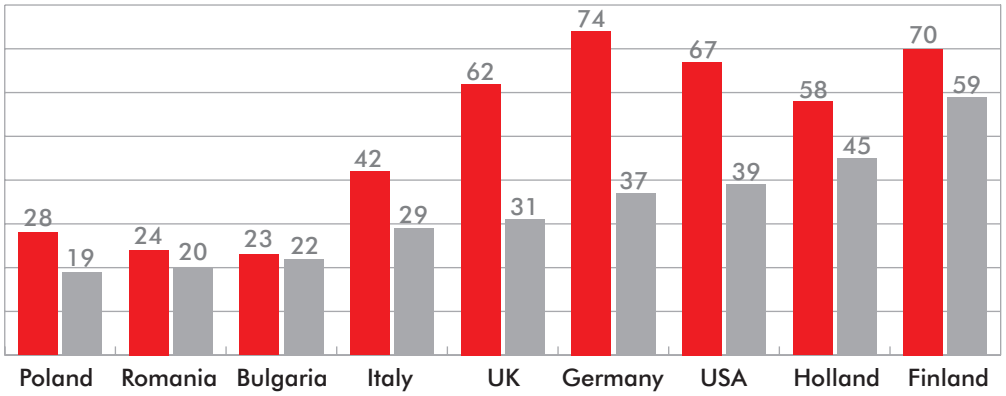
First, the so-called process innovations, important from the perspective of raising productivity and therefore crucial for the competitiveness of firms, emanate from a broad group of workers often working at several levels in the organizational hierarchy below the Board of Directors. A prerequisite for this type of innovation is the sense of trust within the organization. This trust is shown, among others, in giving more freedom and autonomy to employees, in a belief that they will use it well. For example, Google sets aside for its employees 20% of their work time for the implementation of projects of their own choice, not necessarily related to their current jobs. According to Eric Schmidt, the CEO of Google, 50% of the new products (inter alia Google Earth Outreach, Google Talk or Google News) were created in this way[32]. In turn, Damien Delaplanque, Director-General of the Adeo Group to which Leroy Merlin belongs, says: "what distinguishes us is our openness to the freedom of thinking and initiative and autonomy of workers who can propose a solution outside the standard methods of operation. (...) Not only are we supporting them in the implementation of new solutions, we also give them the right to make mistakes"[33]. It is therefore necessary to promote such practices in management that are conducive to building confidence and this is perhaps an important role for such institutions as the Polish Agency for Enterprise Development (PARP).

The second area, in which trust is critically important, is creating knowledge (research) and innovative solutions (development) at the meeting points of various organizations and milieus. Wherever we are dealing with the formulation of an added value, including in R&D, a certain risk will appear as well as potential benefits. Without mutual trust of all parties involved in such projects, it is hard to work out any accepted principles of cooperation, at a reasonable transaction costs. As someone said, legal standards are a weak substitute for social standards and should be a complement. This concerns not only the co-

32 The Administration tomorrow,' Hamel, b. Breen, Harvard Business School Press, p. 148. A comprehensive description of the history of Google and the company's unique organizational culture can be found in: Vise, D. A, Malseed, M. (2007). The Google Story. The story about the company that changed the world. Wrocław, Wydawnictwo Dolnośląskie.

33 "Relationships, trust and good jobs as a source of innovation and competitiveness of companies," Paweł Bochniarz, Maria Zakrzewski. Innovation Report 2010, PARP, p. 91

Figure 4. Innovativeness and levels of mutual trust go hand-in-hand



Own research on the basis of data from Eurostat's World Value Survey

operation between science and the business, but also between various partners in the supply chain. Innovations are now created in dialogue between suppliers and manufacturers in the framework of the so-called vertical cooperation (in the automotive sector, Toyota works with its suppliers on the basis of the rules of the so-called Toyota Manufacturing System[34]), or even between competitors under so-called horizontal cooperation (in the chemical sector, a good example is cooperation between Dow and Cargill, through a joint venture of Dow-Cargill[35])).

The graph above also shows why it is really worth investing in building trust: innovation and confidence go hand in hand – a society in which relations are characterised by greater trust, can boost a greater degree of innovation at the same time.

34 "The Toyota product development system: integrating people, process, and technology" James M. Morgan, Jeffrey K. Liker, Productivity Press, p. 44

35 "Open & Closed Innovation: Different Cultures for Different Strategies of" Philipp Herzog, Gabler-Verlag, 2010, p. 39.

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