N°2

Combining Economy, Science and Innovation for a better society

review

Periodical of the Department of Economy, Science and Innovation | October 2007

Prepare for your future

Flemish government

> Readers' corner

Reactions to the first edition of Review were mixed, ranging from the somewhat critical to the highly complimentary. Here are just a few…

"As an economics teacher, I think this is an excellent initiative."
José Vander Vennet

"I've just read the new EWI-review. It's a very dynamic magazine… "
Hans Crijns, Professor Entrepreneurship, Vlerick Leuven Gent Management School

"In my view, Review is a very unstuffy, accessible and hence reader-friendly magazine. A great initiative and a nice way of showcasing the Department of Economy, Science and Innovation and its dynamism."
Gerard Buteneers, Managing Director, Investeringsmaatschappij voor Limburg

"Review is a well-presented and above all informative and interesting publication that should be replicated in all other 13 departments."
Jan Peumans, N-VA party leader in the Flemish Parliament

"The articles in Review are of a high quality and reveal the potential that exists within EWI. This is a milestone in EWI's development into a truly policy-based department."
Jan Larosse, Policy Officer at DG RTD Unit C3 "Economic analysis and monitoring of the coordination of national research policies and the Lisbon Strategy"

"Review is a welcome initiative for those interested in the subject, but the question is whether we might not find ourselves with one too many e-zines in future. What is nice is that contributions are from staff themselves.
Keep it up!"
Kurt Van den Bunder, General Policy Coordinator, Syntra Vlaanderen

A milestone

EWI is proud to present its second collection of contributions from in-house staff and guest authors. The many requests to be added to the mailing list and the positive feedback received on the first edition have spurred us on to produce more of the same, whilst driving up the quality still further. One person even spoke of "a milestone in EWI's development into a truly policy-based department".

In addition to the usual sections, this issue focuses on a topic of particular concern to EWI: prospective (or foresight) policy. After describing the concept, we present a future vision of the international political order and its organisation and outline a practical method of applying prospective research. There follows an interview with Philippe Destatte, Managing Director of the Jules Destrée research institute in Wallonia, which ties in perfectly with our central theme. A number of other contributions also look to the future: the OECD study on Global Value Chains and post-2010 projections for the 3% investment objective, elaborating on data contained in the EWI Budget Browser. Finally, we reveal EWI's plans to conduct its own prospective exercises in the near future, with the help of the EWI Club amongst others.

I hope you enjoy the issue and wish you wonderful autumn days. Any reactions, comments or additional observations would be more than welcome: simply visit **http://www.ewi-vlaanderen.be/review.**

Peter Spyns
General Editor

Content

COLOPHON

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Giving start-ups a helping hand

How can young entrepreneurs be helped to realise their big dream? Do they know what financing is available on the market?

How can young entrepreneurs be helped to realise their big dream? Do they know what financing is available on the market?

On the formal capital market, start-ups often have problems finding funding. With conventional channels such as banks, the long-term loans on offer involve excessive risks and inadequate guarantees for fledgling companies. Even risk capital providers are, for the most part, reluctant to invest relatively small amounts in start-up businesses. This is because the intensive support needed to get these companies up and running outweighs the likely return.

For many entrepreneurs, the informal risk capital market is their only chance of securing the capital they need to launch their business. Private investors are willing to commit to start-up companies by providing practical and financial assistance, i.e. capital and expertise. These investors, known as 'business angels', usually have an entrepreneurial background themselves and, unlike other investors, their experience often makes them willing to supply the two critical success factors.

For the entrepreneur, such support can be crucial. For the business angel, the attraction is not merely the economic aspect but also the challenge and the satisfaction of helping a young entrepreneur to build his or her business. Most angels are not interested in acquiring a majority stake in the company: as entrepreneurs (or ex-entrepreneurs) themselves, they know the importance of retaining personal ownership.

BAN Vlaanderen: a 'marriage agency' for entrepreneurs and angels

The challenge with angel funding is finding the right match or 'marriage'. For entrepreneurs on the look-out for the right investor (and vice versa), searching efficiently can be problematic since many private investors are not familiar names and are not necessarily operating as professional investors. Furthermore, many start-up entrepreneurs are not properly prepared, which undermines their chances of success before they have even started.

Grouping business angels into networks can help to overcome these problems. Such networks make business angels visible and more accessible to entrepreneurs. They also provide a professional matching service based on coaching for both parties. Thanks to screening, more and better projects are finding their way to investors. In Flanders, the BAN concept has expanded significantly since its emergence in 1998. However, until recently the scheme was fragmented. In 2004, the four existing Flemish business angels networks[1] merged to form a new non-profit association: BAN Vlaanderen. Since then, the activity has achieved the critical mass needed for a professional and large-scale approach.

The network aims to support business angel financing by providing information, education, training and effective preparation. In other words, BAN Vlaanderen is not an investment fund. It does not take stakes or make investment decisions, either on its own account or on behalf of the investors. It is a marketplace that brings together supply and demand.

Following its launch in 2004, BAN Vlaanderen successfully positioned itself in the Flemish risk capital landscape in 2005 and 2006. With its expanded size, professional team and underlying ethics and procedures, BAN Vlaanderen has put business angel financing on the map and is now operating at full speed.

Nowadays, business angel financing in general, and BAN Vlaanderen in particular, is considered a strong, reliable and fully-fledged concept. BAN Vlaanderen has resolutely positioned itself as the point of contact in its field, promoting itself as "the crossroads where capital and knowledge meet". It strives constantly to build new partnerships with other networks, intermediary organisations, funding bodies and panels, business plan competitions and the like, bolstering these efforts with continual presence in the media and on the ground.

To support its operations, the Flemish government decided late last year to award BAN Vlaanderen, via the Economy Agency, a subsidy of up to €1.232 million for the period 2007-2010.

Operation in figures

The network currently boasts 133 business angels. Of the 1,094 business projects received, 299 were put to the investors. These resulted in 53 deals and 20 BA+ loans[2].

In 45% of cases, BAN Vlaanderen is consulted on the initial funding of a company or its initial growth. 70% of the companies dealt with are under two years old; just under 20% are in the growth phase (aged between two and five), while just over 10% are more than five years old.

The keen interest shown by investors in the proposed business projects was reflected in the large number of successful matchings, with 17 companies finding one or more business angels willing to invest. In six of these cases, the investment was made by a syndicate of business angels. In total, 26 BA stakes were acquired in 2006. BAN Vlaanderen's success rate in 2006 was 20%, with 17 deals for the 84 companies presented. This is slightly lower than the 24% score attained in 2005, but is nonetheless excellent.

The projects related to the following sectors: ICT (7), non-food production (3), distribution (2) and energy & environment (2). There was also one project each in the marketing & communication and e-commerce sectors, and one example of project funding in the cultural sector. No deals took place in the services sector.

The average amount invested by the angels per company in 2006 was €141,475 up 55% on 2005. However, this average figure was bloated by a huge €1 million investment deal. Discounting this, the average investment per company totalled €87,818. The total amount invested by the business angels in 2006 exceeded €2.4 million.
The BA+ loan too is seeing its success grow, with eight loans awarded in 2006 compared with five in 2005. The average value of a BA+ loan in 2006 was €96,250.

If we add the amount contributed by the business angels to the successfully negotiated BA+ loans, this gives a total direct risk capital provision via BAN Vlaanderen of some €3.175 million in 2006. Including the various other financing sources, the overall investment total associated with this is estimated at €11-13 million for operational year 2006.

The EWI Department is committed to working effectively with BAN Vlaanderen. To keep policy as closely in line with the market as possible, new developments in Europe are monitored closely and current operation is regularly evaluated. This

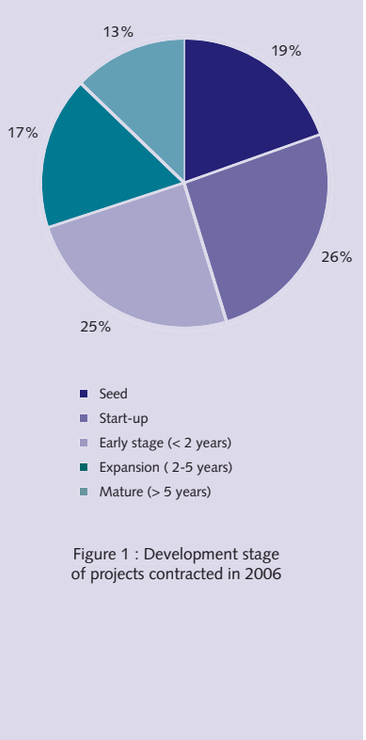

Figure 1 : Development stage of projects contracted in 2006

should enable angel financing to become a reliable tool for young entrepreneurs and investors in Belgium, just as it is elsewhere.

Blik op BAN

Reginald Vossen, Managing Director of BAN-Vlaanderen, looks back at the past and ahead to the future...

Looking back at BAN's work in Flanders, are you pleased?

Reginald Vossen: "We are currently sealing around 20 deals a year, making us one of the best performers in Europe. But we want to do more and better. To give a tangible example of this, BAN Vlaanderen is currently setting up its own sidecar (or co-financing) fund. The ARK-ANGELS FUND nv will bring together capital raised by Flemish business angels and will be used to invest alongside BAN Vlaanderen members in promising projects launched within the BAN Vlaanderen network. We are also applying to the ARKimedes Fund[3] for an ARK accreditation which will allow us to double our capital. Sidecar funds are a recent phenomenon, typically found in the Anglo-American system, but which Flemish companies and investors now also have the chance to exploit."

Is it easy for start-ups and investors to find each other?

Reginald Vossen: "Nowadays, companies have a wealth of financing sources available to them. That's inherently a good thing, of course, but start-up entrepreneurs risk missing the wood for the trees. When looking for financing, it is vital to work efficiently and waste as little time as possible. With this in mind, BAN Vlaanderen aims to bring together the various financing sources (business angels, risk capital funds, banks, subsidy bodies, etc.) around one table to provide the necessary knowledge and contacts to selected companies seeking capital. We plan to launch the project late this autumn."

How do business angels plan an exit strategy?

Reginald Vossen: "It is important that business angels can withdraw from the company a few years after making their investment, preferably in a successful way. Europe's largest stock exchange, Euronext[4], will be actively targeting promising young companies through Alternext. With its less formal method of securing resources publicly, less stringent access conditions and accessibility to all sector and countries, Alternext is an ideal springboard to listing on Euronext. And naturally this creates conditions which allow the business angel to withdraw. For this reason, we are working hard to achieve a partnership between BAN Vlaanderen and Euronext Brussels".

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1 Limburg BAN vzw, Bizzbees bvba, Vlerick BAN vzw and Flanders Business Network vzw

2 Loan issued by the Participatiefonds/Fonds de participation (Participation Fund) to entrepreneurs who meet part of their capital needs through angel financing. The maximum loan is €125,000, and the Participation Fund must contribute at least €7,500. The term of the loan can be five, seven or 10 years, depending on the type of investment being financed.

3 See EWI Review 1 (1): pp.32-33.

4 http://www.nyse.com/nyseeuronext/nl/?sa_campaign=/euronextLanding/landing_du

5 Public-private partnership
6 http://ewi-vlaanderen.be

Subsidies for business sites: where and how much?

That business sites are key to a region's economic growth and competitiveness is beyond dispute. But nobody exactly welcomes them with open arms. What are we afraid of? Noise, increased traffic, smell, loss of green space…the list goes on. Entrepreneurs are only too aware of this and prefer to set up shop on well laid-out and well maintained sites. The Flemish government aims to bolster this trend by supporting developers of high-quality business sites.

Developers – businesses, public bodies or PPP[5] structures – can apply for a subsidy to the Economy Agency. Applications are assessed based on the various plans submitted by the developer:

- The development plan consists of several sub-plans dealing with CO2 neutrality, social inclusion, environment, safety and aesthetics. Where an old business site is being redesigned, a 'redevelopment plan' is submitted instead.
- The allocation plan is used to assign business units to particular businesses: it sets out the rules that companies are required to follow in order to set up on the business site. It is based on the intended use and development of the area.
- The management plan sets out measures aimed at ensuring that both public and private land is sustainably maintained. The key concept here is 'park management', i.e. administration of the built environment and overall management of the site.

Level of the subsidies

Level of the subsidies

The preliminary stage can only be subsidised if the site in question is a strategic business site located on a brownfield or existing business site undergoing regeneration. The preliminary stage comprises a feasibility study or process guidance procedure. The subsidy for both covers up to 40% of the costs, not exceeding €250,000 per site.

For development or redevelopment of the business site, the subsidy covers 30% of the cost of the works and the eligible costs. This can rise to 60% for strategic sites and 70% for hard-to-access sites.

For management of the business site, 10% of costs can be subsidised. Management is - more so than maintenance - geared towards following up the conditions laid down in the allocation plan and monitoring CO2 neutrality.

The subsidy awarded by the Agency can be combined with other subsidies to a maximum of 85% of the cost of the works and the eligible costs.

Sustainability: an extra asset

At 'sustainable business sites', companies and the authorities work together to achieve better economic results, reduced environmental impact and more efficient use of space. One way of implementing sustainable business processes is through the exchange of energy, raw materials and water. Other possibilities include pooled use of public utilities and joint public and private transport facilities.

Flanders was keen to organise trial projects in this area and submitted a programme to the European Commission. The application was selected and received the maximum €3 million grant from the European Regional Development Fund. Flanders itself provided an additional €2 million in co-financing. The first pilot projects in Flanders - including the Itterbeek SME park at Duffel, the commercial exchange site in Ghent and the Genk-South Mobility Centre - are now inspiring others to follow suit.

In 2006, the Flemish government set out to find Flanders' top business site, a textbook example of a site combining quality with sustainability. In the end, the jury's vote went to the Deltapark at Leiedal, for both the vision of sustainability underlying its development and for its park management, as exemplified by its four wind turbines, green power plant and network of footpaths and cyclepaths. On the strength of its victory, Leiedal was awarded an enlarged subsidy of almost €3.35 million. Which just goes to show: when developing a business site it pays to keep quality and sustainability in mind...

Want to know more?

For more information, see the decree of 16 May 2007[6] aimed at promoting high-quality and environmentally responsible development of business sites. The Economy Agency's Spatial Economics Unit has an annual budget of €14.5 million for achieving this goal. The decree is being implemented retroactively from 1 January 2007.

Liesbet Schruers,
Research Valorisation and Industrial Policy Team

Are OECD countries becoming weak links in a global value chain?

7 Organisation for Economic Cooperation and Development. Its members are: 19 EU Member States, Norway, Iceland, Switzerland, Turkey, Australia, New Zealand, Japan, Korea, Mexico, Canada and the United States.

8 See EWI Review 1 (1):pp. 20-23

9 See also p. 14 of this issue.

Are jobs in Flanders under threat from economic globalisation? Will its prosperity suffer from competition with low-wage countries? Does the threat from relocation extend to knowledge-based jobs? Flanders is far from alone in facing these challenges, with globalisation high on the agenda in many OECD[7] countries.

Globalisation in itself is nothing new, but the pace and scale of its current progress are unprecedented. The creation of 'global value chains', where value is added by different processes and activities at each stage of the production process, is accelerating this development. The whole production process, from raw material to finished product, is sliced up into sections. Each component of the value chain can be performed wherever the necessary expertise and materials are available at competitive prices.

What effects is this having on employment and labour productivity? Can OECD countries remain competitive in the globalised economy? This article summarises the findings of a recent OECD study on the issue.

The effect of globalisation on the value chain

The process of international economic integration has been under way for some time, facilitated by more open economic policies and trade liberalisation in a growing number of countries. Technical advances, notably in transport and communication, have lowered costs and fostered globalisation. Strawberries, for example, are now available in Flanders all year round at reasonable prices, thanks to imports from Spain.

The current wave of globalisation is distinguished not only by its pace and scale but also by the related phenomenon of relocation. Parts of the production process are subcontracted to specialist firms either within the same country or abroad (outsourcing), and production capacity is located or sought in another country (offshoring). The vehicle assembly sector is a striking (and painful) example of this: we only need think of Renault Vilvoorde, Ford Genk and Opel Antwerp.

Another feature of current globalisation is that it is no longer restricted to OECD countries, but also involves large emerging economies like Brazil, Russia, India and China (known as the 'BRIC' countries).

All of this means that for many economic activities the value chain is assuming a global character. This makes sense for companies that are constantly working to boost their efficiency and lower their costs under the pressure of growing worldwide competition. The result is a decreasing share of production taking place within national boundaries. By way of example, North Sea brown shrimp are flown to Morocco to be peeled and then flown back to Belgium to be sold in our shops. Even with transportation to and from Morocco, the overall cost - and therefore the price paid by the consumer - is lower than if the shrimp were to be peeled in Ostend or Zeebrugge.

Across industries and sectors

High-tech companies are tending to become more international as they no longer have all the knowledge they need in house. Computer manufacturers, for example, do not make their own chips. And chip manufacturers work together to some degree in order to share research and infrastructure costs. This requires them to be more open and to work together internationally (with organisations such as the Flemish IMEC[8]).

While goods still account for the largest share of international trade, globalisation increasingly extends to foreign direct investment and services. Technological progress, standardisation, infrastructure growth and decreasing data transmission costs have facilitated the sourcing of services abroad. In particular, 'knowledge work' - such as data entry and research and consultancy services - can easily be carried out via the Internet, e-mail and through tele- and video-conferencing. For example, many US hospitals send digital recordings of diagnoses made by their doctors to India in the evening and the following morning receive typed-up paper copies of the corresponding letters and reports.

Effects on employment

In many OECD countries there is major concern about the effects of globalisation on employment, not only in industry but also in the services sector. Some, including Flanders, are experiencing the effects of relocation for themselves. This highly visible and directly measurable impact usually gains most attention. However, the long-term advantages - such as a general increase in productivity and the creation of a knowledge economy with better paid jobs - are difficult to demonstrate.

Job losses due to relocation may be high in absolute terms but are relatively low in comparison with job creation and losses on the labour market as a whole. Globalisation seems primarily to affect the type of jobs that are available more than the number of jobs. The policy challenge in many countries is not so much how to support overall employment as how to reintegrate specific groups of unemployed people (mainly older and low-qualified workers) into the labour market.

Does investing in knowledge help?

If developed countries are to remain competitive in the global economy, they will have to rely more on their knowledge, technology and intangible assets. Investment in knowledge is therefore crucial. Most OECD countries are shifting into higher technology-intensive manufacturing industries and into knowledge-intensive market services. High-technology industries are the most dynamic manufacturing industries, representing about one quarter of total OECD trade. However, many OECD countries still have a major comparative advantage in medium-low-technology and low-technology industries.

However, high-skilled jobs, such as those in research and development, also no longer seem immune to outsourcing and offshoring. This has led to concerns about the future of the domestic knowledge base and the resulting impact on our competitiveness, since its know-how and expertise are among the factors that make a country attractive to investors. The large increases in foreign R&D investment in Asia, in particular China and India, have created a shift. This is expected to persist as long as these countries continue to offer relatively low wages combined with a good education system, since this combination creates a large pool of well-trained staff. A good example is India's huge pool of IT experts, some of whom were to be encouraged to come to Flanders under plans mooted a while back.

Where are we headed?

Developed economies can only grow by innovating technologies, products, processes and management techniques. To foster and support the innovation process, several steps could be considered:

- increase the level of knowledge and technology in production and exports by means of innovation policy;
- upgrade the human knowledge base of the economy to meet the demand for highly skilled staff or for workers with a mix of skills;
- foster entrepreneurship and develop new areas of economic activity;
- cluster policies and efforts at the regional/local level to capitalise on local and regional strengths;
- enhance attractiveness for foreign direct investment and foster new areas of economic activity;
- strike an appropriate balance between diffusion of technology and providing incentives to innovation, in particular regarding intellectual property rights.

Governments also face adjustment costs if their economies are to benefit from the innovation, productivity growth and job creation arising from globalisation. For instance, employment regulations must be reformed in cases where they inhibit change, wages should adapt to the new economic patterns, and geographic mobility should be stimulated. The costs of globalisation must be tackled directly and compensation provided to those who suffer short-term loss of income.

If adjustment costs are to be kept down, complementary structural policies are necessary to train workers properly and help them move between companies and sectors. In some OECD countries, short-term employment loss has led to demands for protection from competition. However, protectionist measures are likely to raise costs for firms and reduce their efficiency, as well as having detrimental effects on other, often poorer, countries.

Needless to say, EWI keeps its finger on the pulse of these important issues. Its foresight studies[9], for example, will undoubtedly chart the effects of globalisation. Such phenomena also highlight the importance for policymakers of taking a holistic approach covering all policy areas.

This text is a summary by Peter Spyns (Office for Policy Research and Prospective Studies) of the OECD policy document Moving Up the Value Chain, ISBN 978-92-64-03365-8, 126p., €35 (see also www.oecd.org).

Shaping tomorrow's policy

The main task of a public policy department is to set up and assess policy; the EWI Department dedicates itself to the fields of economy, science, and innovation.

If we are to perform this task effectively, we need to break out of the short-term mindset. The launch of the EWI Club [10] this Autumn is a first step towards a creative prospective policy, and the development of a long-term vision for our society. In other words : what can be done in terms of economy, science and innovation to make our society tomorrow better than it is today?

'Foresight', this is called in academic circles - looking at what lies ahead, developing a vision that can lead to knowledge to be integrated in today's policy. As such, prospective policy builds on the results of foresight studies.

Thus, researchers, business leaders and public administration executives will join forces in the EWI Club to work out a plan for the future. They will perform productive, lasting research, and look at things the way they really are; distance themselves from today's problems and consider what lies ahead.

The aim is not to reinvent the wheel, to oppose other future-oriented initiatives, or to set-up heavy structures. The EWI Club will be part of a dynamic network and will be a forum to share views on foresight.

Moreover, this brainstorming on prospective policy between academics, top executives from the private sector and public institutions, should enable the EWI Club to participate actively in the dis-cussions on foresight that are currently being held within the EU and in the rest of the world.

The EWI Club wants to lead a creative learning process, with the necessary flexibility and through a dynamic and pro-active debate, resulting in regular publications and policy proposals. The initiative should create a momentum regarding strategic policy planning, performing far-reaching and long lasting foresight studies, as well as working out efficient prospective policy strategies.

In short : by developing policy scenarios, in a joint effort with other government initiatives, by exchanging know-how within an international network, the EWI Club should become today's partner of all those who are involved in shaping tomorrow's policies in economy, science and innovation.

The EWI Department wants to prepare policy in a prospective way, because the economy, science and innovation are not only essential for today's world, but also for the day after tomorrow. Therefore, we have chosen prospective policy as the main theme for this second EWI Review.

This issue is also meant to be an appeal to all free spirits willing to engage in a non-partisan brainstorm about what lies ahead… in 2050.

Frank Vereecken
Office for Policy Research & Prospective Studies

10 See also p. 28 of this issue

Looking to a future

"To govern is to foresee", as the old proverb goes – something today's policymakers need to bear in mind when preparing for the future. One tool at their disposal is foresight.. Foresight exercises aim to develop ideas of how science, the economy and society in general will look in the future, and, on this basis, identify the strategic research areas and new technologies capable of generating the biggest economic and social benefits. They also have a track record of improving coherence between policies in different areas and at different levels.

A foresight exercise is a process of collective learning, both spontaneous and managed. The process generates challenging visions of the future and strategies for realising those visions within a timeframe of 10 to 50 years. A foresight study is a pronouncement on the future based on a systematic analysis of complex dynamic systems developments, and on the views and preferences of stakeholders concerning this analysis[11]. Factoring in a range of perspectives and aspects, it does not seek to impose one normative view of the future. A parallel approach, known as 'backcasting', involves examining the best way of realising a specific vision of the future.

Collective learning: the basis for decision-making

The combination of available information on the current situation, expert knowledge, the views of stakeholders and future projections offers a solid basis for making today's decisions - decisions which, in the shorter or longer term, will deliver economic and social progress founded on technological development. How the future will ultimately pan out depends on the decisions not only of policymakers but also of a multitude of players in the global economy. Even doing nothing or avoiding decisions influences the future. Foresight studies differ from visionary novels such as those of Jules Verne – even though much of his vision did become reality. This type of future-oriented exercises are conducted in a way that their outcomes are useful for, and usable by, policy- and decision-makers.

One famous futures research study, also not a full foresight in the proper sense, was conducted by the Club of Rome[12] in 1972. Limits to Growth was the first report to raise the issue of finite natural resources and man's impact on the environment. It generated huge interest among politicians, particularly when the oil crisis hit a few years later. Although its specific predictions (such as tin supplies running out due to growing industrial production) were not borne out by subsequent events, its core ideas have stood the test of time. For instance, in the wake of the report, energy-saving methods were deemed important enough to merit research. This shows that foresight studies can still have a major impact even if the type of future they predicted fails to materialise.

Methods

Such future-oriented activity has several stages. The first is to analyse trends and developments. This is then used to distil strategic knowledge about players, key factors and the social relevance of technological and scientific developments. A range of stakeholders debate different pictures of the future to ensure that there is adequate grassroots support for the vision(s) to be realised, and decisions are taken to establish which technological and scientific developments are most needed to achieve them. Finally, strategies are developed and passed on to the various decision-makers (government, industry, etc.) so that building the future can begin. The practicalities of foresight studies vary from case to case, but they usually combine a number of different techniques. The most

important of these are outlined below.

Expert panel

Expert panels have become a common phenomenon, both in prospective research contexts and elsewhere. Think tanks, for example, can be described as standing expert panels that meet regularly to examine a particular subject. In foresight exercises, it is important that the assembled knowledge should be complementary and include enough different points of view (academics, end users, financiers, officials, trend watchers and so on). Bringing together experts is a quick way of pooling a mass of relevant knowledge to generate new and creative ideas about the future. Specific meeting techniques can be used to stimulate discussion and brainstorming, and a skilled discussion leader who can channel the debate effectively is key.

The experts also act as conduits to those they represent and their working environment. In some cases, panel meetings foster stronger relationships between experts, resulting in the creation of new - unplanned - networks. Needless to say, the experts who sit on these panels must be chosen carefully. It is not only their knowledge that is important, but also their creativity and social skills: how open they are to different visions and their flexibility during discussions.

Companies too, particularly larger ones, are using foresight techniques. The multimedia and communication technology sector, more than most, is keen to probe future trends and technological developments. For companies to become - and stay - market leaders, a bold and revolutionary vision is no longer enough. The executives at L&H, once Flanders' flagship speech and language technology company, certainly had a vision. But aside from accounting issues, they would have been better off conducting an effective foresight exercise and convening expert panels in order to bolster their vision (and test its technical merits).

Turning to social issues, we can cite the discussions about genetically modified food. Or new combinations of technologies that take over failing bodily functions. Everyone is familiar with hearing aids, for example, but in the future it could be imaginable to insert microscopic electronic devices known as 'nanobots' into the body to repair cells[13]. Other possibilities include prostheses, where mechanical parts are connected to the human nervous system (e.g. a prosthetic hand enabling the use of fingers). A professor in the UK has literally 'connected' himself to his computer by means of an implant. With scenarios from films like RoboCop and Bladerunner on the verge of becoming reality, a social debate on these issues is needed. The Flemish Institute for Science and Technology Assessment (viWTA[14]), in conjunction with the King Baudouin Foundation, published a report[15] following a round table and conference on converging technologies in the 21st century.

SWOT analysis

Another common method of mapping the factors that influence a decision is the SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis. In the context of foresight exercises, SWOT analyses are used to have stakeholders determine the direction in which things should or should not move. From this, strategies could be developed that are best for a region, a sector, a company etc., taking into account key social, economic, technological, political and environmental factors. Table 1 presents an overview of a SWOT analysis.

A systematic SWOT analysis can be used in all types of decision: whether to use a new production method, take on an employee, undertake a reorganisation, etc. For example, a Dutch firm that builds floating homes would most likely include current media reports of possible rises in sea levels due to global warming as an opportunity in its SWOT analysis.

The Delphi approach[16]

The Delphi approach uses surveys based on standard questionnaires in order to gather the opinions and ideas of a range of experts regarding future scientific, technological and social developments. The responses instantly highlight areas of agreement and divergence. There are methodologies to run a Delphi without an attempt to reach consensus or unanimity, and others for situations where finding common ground amongst experts is important. This method has proved particularly valuable in exercises covering a timeframe of 20 to 50 years, where experts are the most valid source of knowledge.

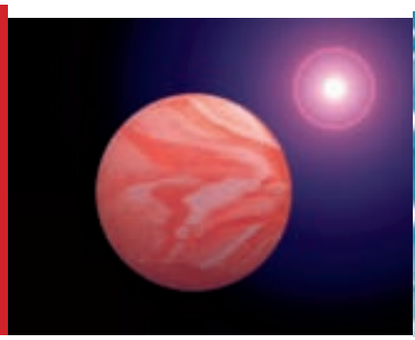
The experts are usually asked to indicate when they believe expected events or hypotheses are most likely to happen. Further questions gauge the influence of particular factors - economic, scientific, social and political - on the expected events. In contrast to group discussions, the exchange of ideas takes place without direct interference. Nonetheless, participants can learn from one another. During follow-up rounds, they find out about each other's opinions, usually by means of anonymous summaries. They can then revise their opinions if they choose. Diverging viewpoints are explored in a subsequent round, from which new ideas can emerge. A succession of follow-up rounds may be held, until no new aspects emerge.

Delphi studies are intensive, take up a lot of time and require effective preparation in terms of selecting a topic, compiling the questionnaire, choosing the experts and analysing the results. ICT applications, such as on-line forms, speed up the process. They are also useful if consensus is the objective, because they allow immediate and evolving group feedback to every participant.

In Flanders, the Flemish Science Policy Council (VRWB) recently used the Delphi method in a two-round process involving 130 experts[17]. The VRWB wants the findings to serve as a guide for policymakers in developing science and technology policy in Flanders and making the appropriate choices. Biotechnology and ICT, for example, are high on the list of priorities.

Table 1: How to fill in a SWOT table

	What are the possible opportunities?	What are the possible threats?
What are the strengths?	How can we exploit the opportunities using the strengths?	How can the threats be averted using the strengths?
What are the weaknesses?	Which opportunities could we miss out on due to the weaknesses?	What has to happen to prevent the weaknesses from becoming threats?



Scenarios

Scenarios reflect potential visions of the future. Herman Kahn described them as follows: "A scenario is a hypothetical sequence of events that could lead plausibly to the situation envisaged in the form of a living but realistic narrative constructed for the purpose of focusing attention on causal processes and decision-points."[18] Although speculative in nature, they contain coherent depictions of the future that are both challenging and credible. They are created transparently and written in an accessible style. Some have even been turned into films or plays. They outline trends and situations that might result from particular decisions. Qualitative and quantitative elements are combined in a logically constructed and consistent vision of the future. They also indicate how likely a hypothesis is to materialise.

Scenarios can be used to investigate the effects of possible developments and assess to what degree actions are required. In most cases, a number of alternative scenarios are proposed, or one scenario depicting a 'desired' (and achievable) future and specifying the actions needed to realise it (and avoid less desirable scenarios). Scenario thinking can be organised in a number of different ways, including workshops, meetings of experts and modelling exercises based on computer simulations.

Familiar examples of scenarios are ocean warming predictions, whereby sea levels will rise by X number of metres depending on the timeframe and other factors such as CO2 emissions. Other scenarios relate to glacier melting in the Himalayas, which predict severe flooding in India and Pakistan due to additional meltwater, followed a few years later by drought as the flow of mountain water dries up. Action is therefore needed to prevent flooding and build up water reserves.

Cross-impact analysis

The cross-impact analysis is a useful tool in developing scenarios. While it also uses experts to produce qualitative or quantitative results, it supplements these with statistical processing methods. In such an approach, the experts are asked how likely certain events can occur and how interdependent they are.

Focusing on the causal chains of events, this method is less frequently used since it requires considerable input from the experts concerned, who must assess various combinations of events. The events being investigated must be selected carefully to ensure their suitability, since every additional event adds considerably to the workload. Unforeseen circumstances are left wholly out of the picture.

Experts: a critical factor

The experts who take part in future-oriented research must be seen to be impartial and free from any suspicion of conflict of interest. In a Flemish context, it can be difficult to find neutral experts, so international experts are often invited too. Experts usually make a declaration to the effect that the views they express are their own. Representatives of interest groups or other social opinion-makers, who are asked to take part in this capacity, must speak (or be able to speak) on behalf of those they represent. Though some people dismiss foresight exercises as based more on opinions than facts, provided enough relevant experts take part, a thorough scientific method is applied (reproducibility of results and method transferability are musts) and the process is implemented in a fully transparent way, the seriousness and authority of the exercise will be guaranteed.

As a recent and close-to-home example for the importance of these aspects, we can refer to the recent discussion over whether to close down or partially modernise Belgium's nuclear power stations. The federal government set up a committee of experts - the Energy 2030 Committee - which was attacked by opponents on the grounds that most of the members had (indirect) links with the energy sector. For environmental organisations, the Committee's conclusions were discredited in advance, mainly because their own preferred alternative scenario, which placed more emphasis on green energy, was not taken into account. Politicians openly in favour of scrapping nuclear power questioned the Committee's impartiality from the outset, claiming that it only examined one desired future scenario: continuing with nuclear power. This could be a legitimate way of conducting a prospective exercise, provided the starting scenario is clearly indicated. However, from a social point of view, this restriction results in insufficiently broad support from opinion-makers.

A proactive approach to prospective policy

All over the world, governments in general, and particularly departments addressing innovation issues, have every interest in organising prospective studies. The results add substance to policy papers and briefs, while fostering a clear vision of the desired future (e.g. for a region) and stimulating the commitment of various stakeholders to develop their own prospective policies for the benefit of the whole. For this reason, EWI has set up a special Office for Policy Research and Prospective Studies to focus on the issue[19].

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Summarised and "regionalised" for Flanders by Peter Spyns (Office for Policy Research and Prospective Studies).

11 De Smedt, P., 2005. Verkennen van de toekomst met scenario's. Research Centre of the Flemish Government, Brussels.

12 http://www.clubofrome.org/

13 http://www.nanosoc.be/

14 http://www.viwta.be/content/nl/inf_viWTA.cfm

15 http://www.viwta.be/files/rapport%20EPTA%20Conference%202005.pdf

16 In Antiquity, the Greek Oracle of Delphi gave ambiguous answers which were usually interpreted by the questioner in a way favourable to him/herself – sometimes erroneously. On one occasion, when asked whether a battle would end favourably, the oracle replied that "a great army would be destroyed". Unfortunately for the questioner, that army turned out to be his own.

17 E. Smits, E. Ratinckx and V. Thoen, (2006), Technologie en Innovatie in Vlaanderen: proces van prioriteitsstelling en resultaten, VRWB Study 18, Brussels (http://www.vrwb.be/MFiles/VRWB18B-def.pdf)

18 Kahn, H. and Wiener, A. (1967) Towards the Year 2000: A Framework for Speculation on the Next Thirty-Three Years, New York: Macmillan., p. 8

19 See also p. 28 of this issue.

From a world of states to a world of regions

We live in a world of states. Practically the entire planet is split up into sovereign territories, territories that provide political governance and confer national identity on their subjects. These states are embroiled in all manner of rivalry and disputes, sometimes territorial, often purely economic. Yet states also work together voluntarily to tackle transnational problems. This is known as multilateralism: states recognise each other as equals and try to find shared solutions to shared problems. In many cases, they agree on standards and rules of conduct under the auspices of the United Nations.

However, under the pressure of globalisation, conventional state units are increasingly having to share their hegemony (i.e. governance) with other players, along with their management of political and economic transformations. In other words, states are abandoning part of their sovereign power to a larger entity. This phenomenon, known as 'regional integration', is at its most developed in Europe, and leads to world regions emerging as players on the international stage. In such cases, we talk not of multilateralism but of 'regionalism'.

From integration to centralisation

Alongside the trend towards integration, a parallel trend toward decentralisation can be seen in many sovereign states. In some countries, such as Belgium, this has resulted in 'constitutional regions' with specific political powers. What effects has this had? On the one hand, an erosion of state sovereignty from above and below; on the other, increasingly complex international relations. The world is globalising and localising at the same time. World regions such as Europe and local regions such as Flanders are becoming important international players alongside states. But what role can and should be played by an institution like the UN in such a *localised* world?

Future thinking must include regions

Today's administrative world is a complex one in which regions, as well as states and global institutions, have a role to play. For the UN, these regions present a challenge. How can regional organisations gain admittance to the club of nations? Could cooperation between the UN and regional organisations increase the UN's effectiveness?

It is hardly surprising that the *United Nations University* (UNU), a UN think tank, launched a research and training programme on regional integration in 2001. Set up in 1973, the United Nations University has its headquarters in Tokyo and departments worldwide. It is not a conventional university but rather a networked think tank dealing with the major UN issues of peace and security and sustainable development.

Since late 2001, EWI has funded a UNU research centre called UNU-CRIS *(Comparative Regional Integration Studies)* in Bruges. The subsidy for 2007 is just under €1 million. The centre's research is geared towards a number of core questions:

- What is happening in the world - past, present and future - with regard to regional integration processes?
- What governance structures are emerging through regional integration?
- How can regional integration contribute to peace and human security in the frame-

work of the UN?
• How can regional integration contribute to the development of LDCs (least developed countries)?
• How do people and societies deal with regional integration?

The challenge for UNU-CRIS is not only to describe and analyse the transformation from a world of states to a world of states and regions, but also through research to generate new ideas about how the process could develop. Below we present two real-life examples to illustrate this.

What future for the Benelux countries?

At the request of the Flemish government's foreign policy department Internationaal Vlaanderen, UNU-CRIS, in partnership with the Institute for International Law at KU Leuven, carried out a study into the future of the integration model in the Benelux countries (Belgium, the Netherlands and Luxembourg), with the 50-year Benelux Treaty due to terminate in 2010. The question is whether a new treaty should be signed and, if so, what form it should take. These are pertinent questions, since the process of integration between the Benelux countries has been partially overtaken by the European integration process. Furthermore, local integration schemes such as the Eurregios and Interreg also enable cross-border cooperation. Finally, any new treaty would have to take account of the fact that one of the partners is now a federal state.

As well as providing the Flemish government with specific technical recommendations about the treaty, the study also presented a coherent vision (as seen by the researchers) of the future aims, key tasks and organisation of the Benelux union. It even suggested that there was scope for a *'Benelux-plus'* system, i.e. an integration project incorporating the neighbouring French *regions* and German *Länder*. This would reconcile the traditional ideals of Benelux integration with the growing importance of regions within states. Benelux-plus would also represent a unique combination of different forms of interstate and interregional integration within a European framework[20].

From United States to United Regions?

Let us step back in time: in 1945, 50 countries worked on the UN Charter during a nine-week conference in San Francisco. One of the big debates was whether security could best be organised at global or regional level. Should all conflicts be settled 'centrally'? Or should regions be left to organise their own security wherever possible? Quite a few countries – including Belgium – strongly advocated a regional approach. At one point, around 30 of the 50 delegations were in favour of the regional security model, with Winston

Churchill one of its most zealous supporters. In the end, however, the universalistic approach won out, although the Charter did provide for cooperation with regional bodies.
Today's world is a very different place. The East-West divide has gone and countries around the world are increasingly involved in regional cooperation. Regional groupings - not just the European Union but also the African Union, MERCOSUR, ASEAN and so on - are now international players. Perhaps it is time to give world regions and their organisations a more clearly defined place in the UN and its Security Council. In today's unstable environment, the role of regional organisations seems increasingly important. They have the potential to restore some of the UN's legitimacy, for instance by undertaking a representative, reporting and executive function on behalf of the Security Council, with respect to both recommendations on the peaceful settlement of disputes and resolutions concerning peace missions and interventions.

This is not some utopian vision. On the ground, regional organisations have shown a willingness to perform this kind of task - witness the EU in Congo, the African Union in Darfur, to name but two. Moreover, the UN Secretary-General has been systematically consulting regional organisations since 1994, with meetings focusing on counter-terrorism, conflict prevention and peacebuilding. Since 2005, UNU-CRIS has been closely involved in preparing these, undertaking short research projects whose findings were discussed at the meetings. Funded by the Belgian, Canadian and Portuguese governments, this research led to a framework agreement setting out cooperation procedures for conflict prevention. In September 2006, Kofi Annan presented a report on cooperation with regional organisations (the first of its kind) to the Security Council. It was based largely on research undertaken by UNU-CRIS in Bruges and compiled into a study called Regional Security and Global Governance[21]. That work also develops a number of suggestions for reforming the composition of the Security Council and promoting regional representation.

The idea, therefore, of creating a security architecture in which regional organisations have a role to play alongside the UN is growing. This is highly significant in itself, and in the longer term may also pave the way for reforming the composition of the Security Council. The solution may lie in a hybrid composition, combining countries that merit permanent representation for geopolitical reasons with countries representing regional organisations. Whether this vision ever becomes reality will depend partly on the type of global player Europe wants and is able to be in future[22].

Towards a realistic idea of multiple identities

Nadenken over de toekomst op een wetenIt is possible to think about the future in a scientific way. Naturally, the aim is not to predict the future but rather to mobilise knowledge in an effort to contrive potential futures. Research into regional integration and the role of regions in local and global governance is important for determining how tomorrow's world will look. Indeed, the increasing complexity and interdependence of virtually all policy areas is forcing every level of governance to continually rethink its functions. But we can go further. A world of states alone divides humanity into rigid categories: "I'm Flemish, you're …". It gives people what Nobel Prize winner Amartya Sen termed an "illusion of destiny". A world of states and regions implies multiple identities and connections with others at a variety of levels. Regions can therefore replace the illusion of unequivocal national identity with a more realistic conception of multiple identities.

For more information, visit: www.cris.unu.edu

Luk Van Langenhove, Director of UNU-CRIS, (Comparative Regional Integration Studies) – United Nations University, Bruges

More about UNU-CRIS's research activities

Much of UNU-CRIS's research is geared towards monitoring regional integration processes worldwide. One example is the recently published World Report on Regional Integration[23], a UNU-CRIS initiative undertaken in partnership with the United Nations Conference on Trade and Development (UNCTAD) and the five UN regional Economic Commissions. Another key area of focus is research into multi-level governance, including EU-UN relations, regional cooperation processes and relations between micro- and macro-regions. The research output is aimed at both academics (via publications) and policymakers (via policy briefs and partnerships). UNU-CRIS also plays a leading role in GARNET, a European Commission funded excellence network of 43 European universities and research institutions which studies themes such as Europe's role as a global player.

Part of UNU-CRIS's research programme is driven by intellectual curiosity and is overseen by a Scientific Advisory Board. It also undertakes research on behalf of third parties such as governments or international institutions. At Flemish level, it has researched the impact of expanding the new European Neighbourhood Policy to Central and Eastern Europe. Internationally, it has recently joined forces with the International Labour Organisation (ILO) to examine the social dimension of regional integration. One recurring element in UNU-CRIS projects and activities is collaboration with universities. In Flanders, it has teamed up with the College of Europe as well as the universities of Antwerp, Brussels, Ghent and Leuven.

UNU-CRIS research aims to be more than simply descriptive and analytical. From the outset, a prospective approach has also been adopted with an emphasis on the methodology of future-oriented research. This is exemplified by a project it carried out on behalf of the King Baudouin Foundation and the Flemish Parliament (more specifically the Flemish Institute for Science and Technology Assessment (viWTA): a sort of 'recipe book' containing methods and techniques of prospective and participative research.

20 : J. Wouters, L. Van Langenhove et al. (2006). De Benelux: tijd voor een wedergeboorte? Antwerp: Intersentia

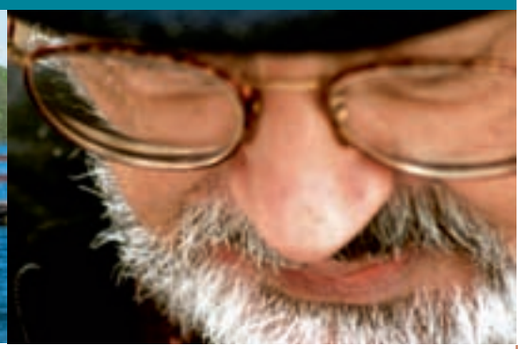
21 K. Graham & T. Felicio (2006). Regional Security and Global Governance. Brussels: VUBPress

22 F. Soderbaum and L. Van Langenhove (2006). The EU as a Global Player. London: Routledge

23 ed. Philippe De Lombaerde, Dordrecht: Springer verlag

Colourful Flanders in shades of grey





In spring 2004, the Flemish Institute for Science and Technology Assessment (viWTA), in conjunction with the Flemish Parliament, implemented a project called Kleurrijk Vlaanderen kleurt grijs (Colourful Flanders in Shades of Grey), combining scientific research with public and expert participation. The method was appropriate, given the aim of the project: to explore information and communication technology (ICT) in the society of the future with a group of over-50s and work out the best possible way of reconciling the ICT of the future with the abilities and needs of older people.

Researchers from KU Leuven's Department of Communication Science examined available literature, consulted experts through a Delphi survey and spoke (in the initial phase) to two groups of 10 or so older people. Based on their findings, they drafted four future scenarios ranging from the futuristic to the realistic and depicting both optimistic and somewhat more pessimistic visions of the future.

In the next phase, an artistic team from production house OpenDoek worked the four scenarios into a stage play. The play was performed five times - four at the Flemish Parliament and once at the 'De Vijvers' care home in Ledeberg - to an audience of around 600 Flemish over-50s, in May 2004.

The future older people want to see

After each performance, the audience was split into groups of up to 15 people. Working to a pre-prepared format, they discussed their vision of the relationship between ICT and older people in the future under the guidance of professional discussion leaders. They discussed what they would like - and definitely not like - to see happen in a particular (pre-selected) field of everyday life (health, family and social relations, mobility and so on). Each group also reacted to the four proposed pictures of the future. The results were recorded, discussed with the whole group and added to. Finally, each participant was asked what he or she considered the most important message to pass on. Material from 43 groups was collated by the research team, processed and translated into the 'best possible picture of the future'.

Backcasting and policy advice

In the final phase of the project, that picture was presented to a group of 16 experts from various disciplines. Their task was to answer the following question: "If this is the future we want to achieve, what must we do to make it possible?" As part of this backcasting process, the experts formulated a whole array of policy suggestions which formed the basis for a raft of recommendations presented by viWTA to the Flemish Parliament. In the older people's vision of the future, four main areas stood out.

- **Improving quality of life**

Older people are not opposed to ICT itself or even to extensive use of ICT. Quite the opposite. But ICT is, and always will be, a means rather than an end in itself. Older people welcome the use of ICT to improve their quality of life, enabling them to play an active role in society for longer. The most important areas for ICT use are: health, housing, mobility and maintaining social contacts. In other words: anything that allows people to live independent lives in their own homes for longer.
Technology must not be allowed to dehumanise society
Older people are not averse to technology but they are wary of it. In all the discussions, participants expressed a concern that

technology cannot and should not be the only option. Whilst they are open to new ICT applications, older people stressed the need to retain sufficient non-technological alternatives in future. Ordinary person-to-person contact must remain possible.

• Accessibility of technology

Older people believe that they must have access to information and communication technology. There are several aspects to this. Obviously, the physical limitations of older people must be taken into account: some have sight and hearing difficulties, others are not as dexterous as they used to be. Older people also want to see information and training tailored to their needs, e.g. not just in English, and stress that ICT must be affordable to all, including older people with limited incomes. The aim of all this is to prevent a digital divide opening up between the generations (knowledge divide) or between older people themselves (social divide).

• Privacy must be safeguarded

Besides being accessible, the ICT of the future must also safeguard personal privacy. Older people want to see secure e-commerce and e-government applications. Health care (e-health, electronic patient files, etc.) is an area in which people are particularly concerned about the misuse of personal data.

To be continued…

The play was recorded by viWTA and a DVD version produced, while the post-performance discussion manual was carefully edited and supplemented with any relevant additional information. All these documents, together with a presentation and summary of the project, have been combined in a training kit aimed at stimulating further debate.

For more information, visit: www.viwta.be

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Contemplating a future

Interview with Philippe Destatte

Philippe Destatte teaches a foresight course at Diderot Paris VII University, regional foresight and foresight methods at Champagne-Ardennne University in Reims and a course on institutions and society at the University of Mons.

He works as an expert for the European Commission (regional and national foresight, governance, citizenship, entrepreneurship – assessment, innovation, regional development, innovation systems – foresight analysis) and is currently focusing in particular on the Seventh Framework Programme.

Since 2003, Philippe Destatte has been a member of the scientific board of the Interministerial Delegation for Regional Planning and Competitiveness (DIACT) in Paris and chair of the European Regional Foresight College, set up at the initiative of the French government.

He is also chairman of the Brussels-Area Node[31] for the (US) Millennium Project[32], a think tank comprising a worldwide network of foresight experts set up by the United Nations University. In this context, Philippe Destatte organised an international conference entitled The Futures of Europeans in the Global Knowledge Society in 2005.

Prospective studies have yet to take hold in Flanders to the same extent as in other EU Member States and regions. In Wallonia they have been around for a couple of decades, inspired by internationally respected expert, historian and futurist Philippe Destatte. Destatte is Managing Director of the Destrée Institute, situated on the banks of the Meuse in Namur.

Founded in 1938, the Institute has expanded under Destatte's influence to become a European research centre and think tank on regional development issues. His own research field includes the development of strategic intelligence to support policy and regional development.

With the Walloon Parliament just down the street and the Minister-President's residence across the river, we are in the beating heart of Wallonia's administrative centre. EWI Review visited the Destrée Institute, and spoke to Philippe Destatte about 'contemplating a future'.

A priest, a Marxist professor and a liberal Freemason

Could you explain briefly what the Destrée Institute is all about?
Philippe Destatte: "The Destrée Institute was founded in 1938 - in the midst of the Walloon Movement - as what was then called a 'learned society'. The founders' aim was to reflect on the idea of Wallonia and its history and bring the two together. You have to remember how revolutionary that was in the context of Belgium at that time. A priest, a Marxist professor and a liberal Freemason lawyer decided to think in a scientific way about the Walloon region in all its aspects. Even today we are still working in that pluralistic spirit.

Its work was initially confined to studying regional identity. The founders joined the resistance during the war, then helped organise the celebrated Walloon Congress in 1945. To put it in today's terms, the Congress aimed to sketch scenarios for the development of Wallonia and devise alternatives for the region.

In early 1960, the organisation got a new lease of life when it was renamed the Jules Destrée Institute. Aimée Lemaire became its first director, and under her influence the Institute moved from amateur to professional research. This was reinforced by her successor in the 1970s and '80s, former education minister Jacques Hoyaux.
A key moment in the Institute's history was when it helped to set up the first course on Walloon history at the Université Libre de Bruxelles, taught by Hervé Hasquin. That course was later published as a book by the Institute.

That was also how I came to join the Institute in 1987. I had just set up an inter-university centre for the history of Wallonia and the Walloon Movement and became director at the time of the La Wallonie au futur congress. For us, this signalled the first move towards prospective studies. It led to a new paradigm in which 400 Walloon intellectuals thought about a different Walloon region, a changing society, a way out of the old industrial framework of Wallonia.

At that time, I began to work on prospective studies carried out by American historians. Looking back, it seems remarkable that we didn't team up with the French futurists, who were using the most advanced methods at that time. In 1999, we decided to set up a prospective studies unit, modelled on the one set up at the European Commission by former Commission President Jacques Delors. That was also when we began working with the French futurists."

Freedom of speech: a precondition of prospective exercises

Why the name Jules Destrée? Doesn't he - and by extension the institute named after him - have particular connotations?
Philippe Destatte: "The name has been something of a problem because Jules Destrée is seen by many as an out-and-out Walloon socialist. In fact, Destrée stood somewhat apart from the socialist party, despite being one of its founders. He was too open-minded and culturally oriented. He even had a brother who was a Dominican monk.
What matters to us is his pluralistic attitude; personally I think the name is quite appropriate. True, the letter he wrote to King Albert I in 1912[24] was not a prospective study - more an intellectual exercise that posited a number of truths. Freedom of speech is one of the preconditions of a prospective exercise. I remember an enthusiastic Togolese man who came up to me after a lecture and said he wanted to conduct a prospective study in Togo. There was no freedom of speech in Togo at that time, and I warned him to be careful in case he landed up in jail. Alternatively, his efforts would have had little effect at all."

Unlike in other countries and regions, foresight studies failed to take off in Belgium for a long time. Why do you think that was?

Philippe Destatte: "The OECD asked me the same question in 2000. As I see it, for a long time it was very difficult in Belgium - Flanders, Wallonia and Brussels - to make comprehensive, well-founded projections over a 20-year period. Attempts were made, of course, but they came to nothing. Politicians seem frightened to develop future scenarios, fearing that it will spell political commitment."

Pragmatic and philosophical movements merge

The terms 'foresight' and 'prospective studies' are often used interchangeably in the same context. Is there (still) a difference between the two?
Philippe Destatte: "Originally, they were two different movements. In America a movement arose shortly after the Great Depression which continued to develop through the Second World War. This was pseudo-scientific in origin, but highly pragmatic. The movement also created a dynamic in universities worldwide regarding technology assessment[25]. The basic premise of this was that it is not enough to have inventers: society must be willing to take the technology on board. Analysing key technologies is one thing, but society's likely reactions to those technologies also need to be examined. Technology assessments must dovetail with the economy, other scientific disciplines and society as a whole. In other words, the whole thing is opened up and approached in a very holistic and systematic way.
The prospective movement originated largely in France - with Gaston Berger, amongst others - in the philosophy of action, which included a time dimension and the concept of purposefulness. It combined looking ahead to the future with strategies, although the philosophical

dimension remained important. It was applied to industry and technologies.

The two movements were clearly differentiated until about a decade ago, when they began to converge. And then a watershed moment occurred, which came as something of a shock to me. In 1997-98, the European Commission and a number of professionals began to equate the two terms. 'Foresight' was translated as études prospectives (prospective studies) and vice versa. Initially the Commission and its officials came in for some heavy criticism, but their reaction was always the same: we know that they originally meant different things, but they are converging. Nowadays, I would argue that both terms are used to mean the same thing; and indeed this was reflected in a booklet containing translations of 70 key terms relating to prospective studies/foresight which I produced with various international colleagues at the European Regional Foresight College[26]."

Wallonia looks to the future

What prospective studies has the Institute carried out for Wallonia?
Philippe Destatte: "First and foremost, there was Wallonie au futur, which comprised six prospective exercises carried out between 1985 and 2004. These are available on-line[27]. The focuses included the challenge of education, employment strategies, assessment and innovation. In November 2004, these studies were replaced by a regional foresight college: 30 or so players come together regularly to work on implementing a system of regional change. Their starting point is a foresight analysis based on a diagnosis of the values, norms, perceptions and behaviour of Walloon stakeholders.

A second component involved three foresight initiatives carried out for the Walloon government and its administration between 1999 and the present day. This included the foresight mission Wallonie 21, which aimed to study and produce a regional scale for prospective views and action programmes in the context of the Contrat d'Avenir pour la Wallonie (Contract for the future of Wallonia)[28]. Within this second component, we also undertook a foresight study for companies in Wallonia on behalf of the Walloon Minister for Economic Affairs, in the context of "4X4 for entrepreneurship". The aim of the study was to help the minister and his department to redefine regional company support policy, taking into account the challenges for the next 20 years. A host of business leaders and experts took part, as did the Union wallonne des Entreprises (Walloon Union of Enterprises).

A third component was the creation of a territorial intelligence platform on behalf of the Walloon Minister for Town and Country Planning. The platform provides information for foresight projects at municipal and supra-municipal level. It was launched in 2005 and meets every four months."

A foresight exercise must not end in a void

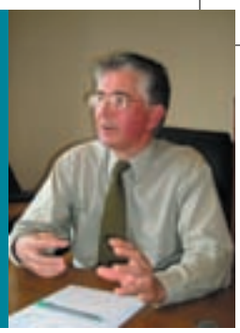
Does the Institute also develop future scenarios for Wallonia?
Philippe Destatte: "We do not deal much in future scenarios. In general, I see scenarios as one of the most ambiguous elements of prospective studies. While they can be useful for educational purposes and enable several different pathways to be sketched, they have been used manipulatively in both prospective and foresight studies.
This misuse takes place at the transition point between an exploratory and a normative study. What usually happens is that a number of exploratory future scenarios are sketched, out of which suddenly - as if by magic - the desired scenario or the strategy to be realised comes to the fore. Regardless of what method is used to make the choice, I think this is a dangerous way of working. Those who prepare and develop scenarios are also responsible for the scenario that is ultimately selected. In my view, that is a form of influence and distortion that cannot be tolerated from a methodological viewpoint. Scenarios should be devised at a later stage. Once it is clear which areas and themes will actually be used, a normative prospective exercise can be conducted to determine the strategy.

However, a prospective study must not end in a void: it has to lead to something. You can't bring people together and enthuse them with a vision of the future and then just leave it at that. That might work once, but people will think twice before helping you again. That's why there has been such heated discussion about whether what counts with prospective studies is the process or the end result. Some people quote General Giap's[29] words "the project is the road" to suggest that the most important thing is mastering the method. My own view is that a serious strategic plan which can be evaluated and which matches budgets with implementing mechanisms is just as important as the process. A prospective study is a heavy-duty exercise in which the appropriate amount of time must be invested. It also has to make progress: participants need to feel they are achieving something."

Assessment and foresight are often spoken of in the same breath. Is there a link between the two?
Philippe Destatte: "Yes, in Wallonia a Société wallonne de l'évaluation et de la prospective (SWEP[30]) has been set up, a recognition of the implicit supposition that a link exists. And, as I see it, foresight is indeed very closely connected with many aspects of assessment: professional conduct, methods, ethical aspects, the way in which society is viewed. They are two distinct yet closely-related practical methods, each of which has a different reading. The rationale is somewhat different, although ex-ante assessment does include a prospective dimension. Assessments are sometimes termed scientific, but in many cases this fails to take into account the wider picture. Then there is another type of assessment, one that analyses, factors in all the different parts and in so doing creates additional knowledge. Nonetheless, both examples are valuable and positive learning methods. Obviously, assessment is a more stable method than foresight. Despite the Commission's efforts, there is still a lot of work to do to increase the stability of foresight."

Achievements - in culture and in practice

Prospective work has been going in Wallonia on for 20 years. Has it led to real changes in the region?
Philippe Destatte: "I believe there have been real changes, although that has traditionally been very hard to prove. It depends on the type of achievements you look at. For instance, the 1998 La Wallonie au futur congress on innovation, assessment and prospective studies highlighted the importance of contracts. The prospective work came to a similar conclusion, advocating a contract between the government and citizens. This resulted in the Contrat d'Avenir pour la Wallonie, whose original format was as we wanted it. In other words, all Wallonia's major players, the Union wallonne des Entreprises, the trade unions, the economic and social councils, the provinces, etc. would sign a contract for a strategic plan to be further developed at government level. In the end, though, the Contract didn't



get the signatures. Although the idea was supported by the Walloon government, the players on the ground wouldn't follow suit and as a result the press labelled the Contract a marketing stunt, despite the fact that it did have a solid foundation. The contract idea was then sidelined. That said, some partnerships were created and the 'contract mentality' found its way into political thinking. The Contract can therefore be termed a partial success.

Another example is the prospective study on regional support policy for companies, conducted by Rudy Aernoudt, then Deputy Chief of Staff to Minister Serge Kubla. At a preparatory meeting for determining the approach to be adopted, both the Institute and the Union wallonne des Entreprises stressed the importance of involving business leaders. In the end, we brought together 40 players, one half business leaders and the other half experts. These included the heads of some large companies like Glaverbel, Sonaca and Iris. Work went on for a year, with no areas off limit. At that juncture, Rudy moved up to federal level, leaving behind other chiefs of staff who were unfamiliar with the work that had gone on. In the end, the minister received a document setting out some very daring proposals: or what felt daring at the time, anyway. For that reason, he preferred to wait until after the elections before doing anything with them. However, with the minister's permission we distributed the document to participants, who used it as the basis for their memorandum to the new government. The new minister's office contacted us to find out more and as a result temporary interministerial task forces were set up to deal with specific issues and competence centres were created. Though taking credit for particular ideas is problematic, the prospective study definitely had an impact – not least because the participants took ownership of the process and the outcome. It was not the Destrée Institute or some foresight guru proclaiming a vision of the future: the ideas came from business leaders themselves. The momentum was there to bring about a change in culture. That can only happen if the different players work in harmony."

The Destrée Institute also operates at international and European level, doesn't it?

Philippe Destatte: "It does. Without giving an exhaustive list: for several years we've been asked to take part in an array of new foresight developments at the Commission. For example, we participated in the high-level group to develop blueprints for foresight activity in the regions, so-called 'regional foresight'. This resulted in five blueprints. We were personally responsible for developing a foresight blueprint for cross-border regions (Saarland, Lorraine, Luxembourg, Rhineland-Palatinate, Wallonia).
In addition, the Institute was involved in the Mutual Learning Platform, a joint initiative by three Commission Directorates-General and the Committee of the Regions, where we oversaw the issue of regional foresight and fostering regional potential.
Another acknowledgement of our expertise can, I believe, be seen in the Commission's invitation to help work on the foresight section of the Seventh Framework Programme. The Institute had previously evaluated another Commission programme - FORLEARN, aimed at developing foresight for education - back in 2005.
I would also like to mention our involvement in the European Foresight College, set up in 2004 by the predecessor of the current Interministerial Delegation for Regional Planning and Competitiveness in France. It main aim is to construct a European network for honing the skills required for foresight exercises and developing regional foresight concepts, methods and practices."

Dine with a futurist

As befits an interview on prospective policy, we'll finish with a question about the future. In your view, what is the most interesting development taking place in this area?

Philippe Destatte: "There are several, but I'll choose one. A Portuguese expert once described foresight as the process of spurring on an organisation, region or country and getting it moving. From that perspective, the impact of futurists on a society deserves further examination in the future. In the US, there is an initiative based around service clubs such as the Rotary Club. In every American city, one or two days a month, people meet up to listen to foresight experts over a meal. As a result of such initiatives, people's attitudes towards prospective studies and the way they look at the future changes completely. Something similar is happening in Germany, although there the initiative operates through schools: mainly secondary schools, but some primary schools too. This brings the prospective dimension into children's everyday experience. As well as building on their parents' experience, they must also take ownership of the future themselves, and do so in a structured, rather than purely empirical, way. For me, this is where the work will really take place in future."

Pierre Verdoodt en Peter Spyns, Office for Policy Research and Prospective Studies

Meer info op: http://www.institut-destree.eu
Meer info over de persoon Jules Destrée: http://www.wallonie-en-ligne.net/1995_Cent_Wallons/Destree_Jules.htm

24 In which he called for a federal state, before such a thing existed, and which includes the famous phrase: "Sire, il n'y a pas de Belges" (Sire, there are no Belgians).
25 In Flanders, technology assessment is the responsibility of viWTA – see also p. 22 of this issue.
26 http://www.prospective-foresight.com/secteur.php3?id_rubrique=35&lang=en
27 http://www.wallonie-en-ligne.net/wallonie-publications/Wallonie-Futur_Index.Congres.htm
28 http://www.wallonie-en-ligne.net/Missio-Prospective_Wallonie-21.htm
29 Vietnamese general who triumphed over both French colonial forces (in the 1950s) and US troops in Vietnam (1970s). See also: http://en.wikipedia.org/wiki/Vo_Nguyen_Giap
30 http://www.la-swep.be/index.php
31 http://www.acunu.org/millennium/brussels.html
32 http://www.acunu.org/

Flanders in 2050?

Prediction is difficult, especially about the future (Pierre Dac)

A fascination with the future is common to every age: just think of the Delphic Oracle or H.G. Wells's time machine. Since the 1950s, in the United States in particular, both the government (Department of Defense) and the private sector (Shell) have systematically looked to the future, at a variety of time horizons, to enable strategic policy choices to be made.

The importance of such studies has increased over time. In the 1970s, with the economic crisis in full swing, foresight studies such as the Club of Rome's pessimistic Limits to Growth and The Third Wave, the book in which Alvin Toffler predicted the information society, burst onto the scene.

Foresight as tool

Over the past 20 years, foresight has become an enormously popular tool, not only with international and intergovernmental organisations (OECD[7] and the United Nations) but also with multinational companies and national and regional governments. A foresight unit headed by European Commission President Jacques Delors operated for a number of years in the 1990s: one of its achievements was to develop scenarios which paved the way for the single European market.

Nowadays, foresight exercises are heavily promoted by the European Commission, focusing on the regional dimension of prospective studies as well as scientific and technological assessments. These exercises are also seen as a way of building up strategic knowledge. A European knowledge platform on foresight catalogued over 1,400 studies in recent years, employing a range of different methods[33]. There are countless ways of defining prospective and foresight studies. In general terms, we can say that they are a proactive way of gathering information in order to develop medium- and long-term visions. They are about reflecting on, discussing and moulding the future.

EWI and prospective studies

EWI strives to achieve synergy between economy, science and innovation. Encouraging entrepreneurship, creativity and innovation is a top priority if Flanders is to develop into a creative knowledge region. EWI aims to use foresight as the inspiration for a new way of thinking, by moving off the beaten track ('out of the box thinking') and breaking prevailing thought patterns ('disruptive thinking'). The ultimate goal is to stimulate policy by developing and discussing scenarios. These various future scenarios will be based on an ambitious strategy, pepped up with a large dose of change readiness, to ensure we maintain our advantageous initial position. After all, to quote Heraclitus: "The only constant is change"[34]. The scenarios will reflect a potential, desirable future that we want to see for Flanders. It is definitely not about dreams or instincts, but rather shaping a vision based on facts and documentation.

Challenges aplenty

The initial question, therefore, is how Flanders should look in 2050: Flanders, one piece of fabric in the great patchwork quilt that is the world. How will Flanders address globalisation, a decades-old phenomenon but one whose accelerating pace demands properly thought out responses? New competitors (Brazil, Russia, India, China and South Africa) will make life hard for Europe[35], especially geographically small units like Flanders. Furthermore, according to various recent simulations, 56% of the world's future population will be of Asian origin.

How are we to address the ageing population? Merely attempting to balance future state budgets will not suffice. What structural changes are needed? These questions point to yet another problematic issue: employment and the composition of the labour market.

In addition to all this, the OECD regularly points out that enormous investment will be required over the coming decades in order to maintain the infrastructure - telecommunications, land and sea transport, electricity - on which every economy and society is based. How will factors like urbanisation, climate change and globalisation affect the development of infrastructure? How will the private sector and government address these issues? What will that mean for Flanders in 2050?

The EWI Club is born

In September, the Department launched the EWI Club, a discussion forum for a group of business leaders, senior officials and academics. They will act as a think tank and sounding board for an initial set of themes. Each theme will then be further developed by a coordinator and various experts. The first five themes are: biotechnology (bio-economy), e-commerce and ICT, government efficiency as an economic factor, the future of industry in Flanders (de-industrialisation v. relocation) and the services sector as an export sector (e.g. health, education). The Office for Policy Research and Prospective Studies will support and develop this project over the coming months.

At any event, the Department wants these foresight exercises to represent a tool in the drive towards strategic intelligence and thereby contribute to the development of a high-performance knowledge economy in Flanders. EWI will engage in structured dialogue with other Flemish government departments responsible (either now or formerly) for individual aspects of this issue, in the awareness that optimising cooperation between players both inside and outside the policy area will be of benefit to all.

Belgium versus other countries

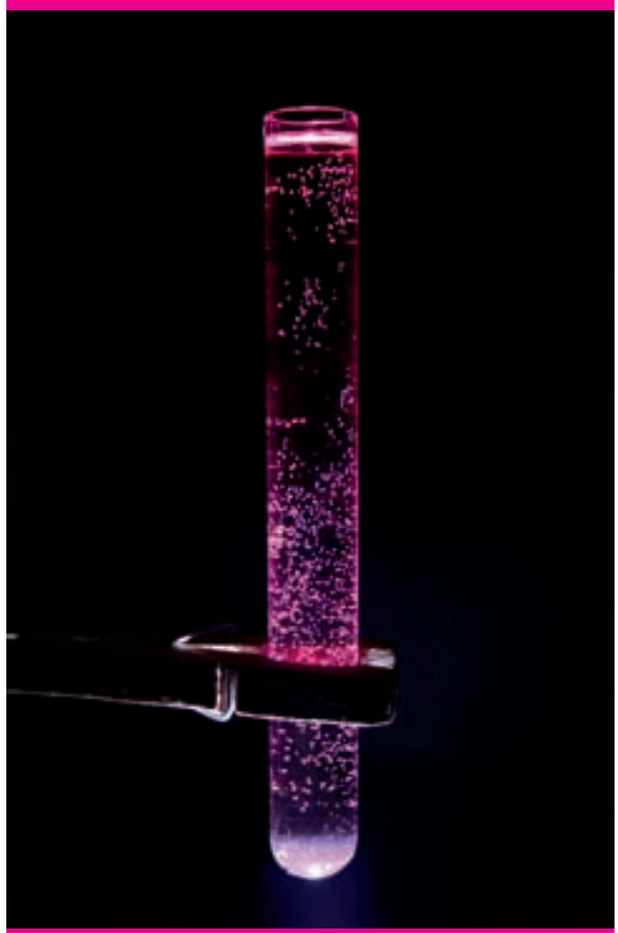
In Belgium, there is still little going on in the way of large-scale foresight work. This is in contrast to neighbouring countries, with France 2100 in France, Horizon Scan in the Netherlands, Futur in Germany and Horizon Scan in the United Kingdom. The Netherlands, the UK, Malta and Denmark even have a joint initiative in the pipeline, known as Joint Horizon Scan.
That said, a number of exercises have been carried out in recent years: by the Federal Public Planning Service Science Policy (sustainable development); the Jules Destrée Institute[36] in Wallonia; the Federal Planning Bureau (energy forecasts to 2030 and economic forecasts); the Flemish Science Policy Council (technology assessments) and the Flemish Institute for Science and Technology Assessment (mainly technology assessments involving a representative sample of the population[37] – e.g. on energy in 2050).

Pierre Verdoodt,
Office for Policy Research and Prospective Studies

33 See p. 14 of this issue.
34 http://en.wikiquote.org/wiki/Heraclitus
35 See p. 11 of this issue.
36 See p. 24 of this issue.
37 See p. 22 of this issue.

Hercules: a strong foundation for research

Hercules was a Greek demigod, renowned for completing 12 near-impossible labours; the quintessential hero, his combination of immense strength and quick intellect enabled him to perform mighty deeds. With this in mind, 'Hercules' seemed the ideal name for a new programme aimed at financing research infrastructure.



In many disciplines, the availability of state-of-the-art infrastructure is a precondition for conducting significant research, while the quality of available infrastructure is a major factor in attracting top research talent. In this context, 'research infrastructure' has a broader meaning than simply large and small equipment or apparatus. To develop models, IT experts and mathematicians require the processing capacity of computer grids or supercomputers. Biologists and biomedical engineers can no longer operate without high-tech visualisation techniques or image processing. For linguists, large corpora of spoken and written language are invaluable.

By adopting the Hercules Programme in late June 2007, the Flemish government has given a major boost to Flanders' research infrastructure. The programme will be run by a newly created Flemish agency called the Hercules Foundation, governed by a board comprising representatives from the Fund for Scientific Research - Flanders (FWO) and the Institute for the Promotion of Innovation by Science and Technology in Flanders (IWT). A new foundation was not strictly necessary since the programme could equally well have been run by the IWT or FWO, but since the Foundation does now exist EWI is resolved to meet its responsibilities as a policy assessor.

With funding in place, let the research begin

Hercules will launch in 2007 with a budget of €5 million, plus an additional one-off payment of €10 million from the FWO. For medium-size infrastructure requiring investment of under €1.5 million, associations - universities and their associated institutions for higher education - have a central role to play, organising calls for funding applications and ranking the proposals received. The final decision is taken by the Hercules Foundation, based on an expert assessment. Interuniversity competition for project proposals is avoided in this part of the programme. Each association is allocated part of the funding based on a distribution key.

For research infrastructure requiring investment of over €1.5 million, there is a more open and competitive application procedure. As well as universities and university colleges, eligibility extends to strategic research centres and 'post-initial' higher education institutions. The Hercules Foundation organises calls for applications and assesses project proposals. Two committees give their verdicts on the projects: the Hercules-Science committee, focusing on scientific quality, and the Hercules-Invest committee, which analyses the feasibility of the proposed investment plans. Companies and other organisations that carry out research may participate in Hercules projects in partnership with universities, institutions for higher education or research centres, although they are not entitled to subsidies.

Let's hope that this modern-day Hercules proves capable of mighty deeds. Researchers and research administrators: it's up to you.

Veerle Lories
Policy Support and Academic Policy Team

The 3% investment objective: a Flemish fantasy ?

The Policy Research Centre for R&D Indicators[38] calculates R&D intensity in the Flemish Region, i.e. R&D expenditure (GERD)[39] expressed as a percentage of gross domestic (regional) product (GD(R)P). The result for 2005 was 2.09%, of which 0.61% was publicly funded and 1.48% privately. Compare these results with the targets set for 2010, when EU Member States - and Flanders as a region - agreed that R&D intensity should rise to 3%, 1% funded by the public sector and 2% by the private sector.

What (additional) R&D efforts are needed to ensure that Flanders hits both these targets in 2010? And given the latest results, is that even possible? If not, what can Flanders reasonably expect to achieve?

The calculations for 2010 are based not on scientific models but on logical assumptions. In this analysis, our aim is to keep the discussion alive among policymakers without getting too bogged down in figures. Finally, we will look into our crystal ball by projecting the current results forward to 2020 and 2025.

1. Analysis of required R&D efforts to 2010

We will base our estimate of the R&D efforts required in Flanders in order to meet the 2010 targets on a number of sources: for the privately funded share we can use the findings of the R&D survey[40], while for the publicly funded share we can look to both the R&D survey and the figures for R&D public funds in order to make projections.

A key factor in R&D intensity is GDP. Table 2 shows a projection of GDP through to 2010. For R&D intensity to rise, R&D expenditure must increase by a greater proportion than GDP.

a) The R&D survey

The latest figures available for Flanders (on R&D intensity, private financing, public financing, etc. for 2005[42]) are projected forward to 2010, enabling the annual increase in private and public funding needed to meet the 2010 target to be calculated.

This method of calculation (Figure 2) assumes that there is no link between a rise in public R&D efforts and the R&D intensity of companies. This is in contrast to a federal government study[43], which performed this exercise at national level. By neutralising this correlation, it can be objectively calculated what efforts the partners must make independently of one another in order to meet their goal.

To achieve the target of 1% public funding by 2010, all public sector players - the federal, Flemish and local governments as well as European and international organisations - will need to increase their R&D expenditure on Flemish Region institutions by €1,087 million between 2005 and 2010. Based on the estimated GDP figures for 2006-2010, this means a cumulative annual increase of €217 million over five years.

Table 2: Flemish gross domestic product (GDP) at current prices[41]

	2005	2006	2007	2008	2009	2010
Flemish GDP (€ million)	170.266,2	179.050,9	187.564,8	195.716,4	203.822,6	212.264,5
Real growth compared with previous year	3,2%	5,2%	4,8%	4,3%	4,1%	4,1%

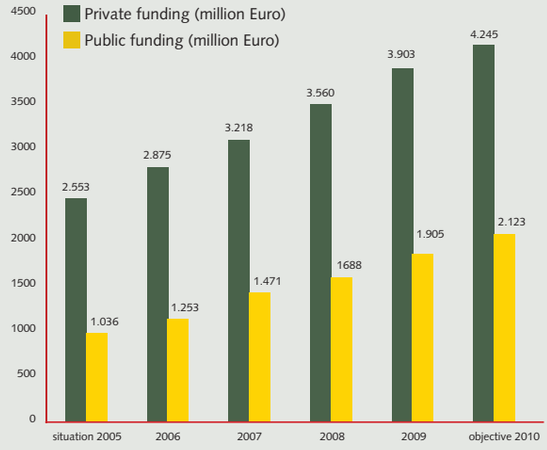


Figure 2: Growth path of R&D efforts between 2005 and 2010 in the light of the 2010 target

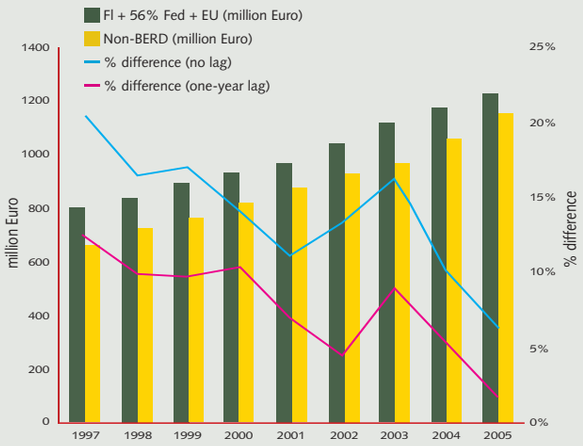


Figure 3: Comparison between public R&D funds (Flemish public funds + Flemish share (56%) of federal public funds + Flemish share of EU-FP) and community non-BERD

If the private sector is to meet the 2% target by 2010, R&D funding must undergo a cumulative annual increase of €342 million compared with 2005. There must be an overall private sector increase of €1.712 billion between 2005 and 2010, based on the predicted growth of Flemish GDP. The Flemish government - the biggest government player in the Flemish R&D landscape - has made significant efforts in recent years, but these are clearly inadequate compared with the levels required.

b) R&D public funds

The latest survey data on R&D expenditure relate to 2005. For subsequent years, an approximate method[44] can be used to calculate publicly funded R&D intensity.

In this calculation method, we will assume that all funds included in the budget are fully spent. This assumption is justified by analyses of the Horizontal Budget Programme for Science Policy, which show that expenditures ratios are high (Table 3).

We can make the calculation based on two scenarios.

Scenario 1 is based on the situation in 2007 and calculates the additional financial injections required for 2008, 2009 and 2010. According to the 2007 EWI Budget Browser, the three government components - Flemish public funds + Flemish share in federal public funds + Flemish return from EU-FP research programmes - are worth a total of €1.297 billion. This equates to an R&D share of 0.69% of Flemish GDP. 1% of estimated Flemish GDP for 2010 is €2.123 billion. To achieve the 1% target by 2010 will require an additional 0.31%. According to this rough estimate, therefore (Figure 4 – scenario 1), another €826 million is needed, equivalent to a cumulative annual increase of €275 million of public R&D funds.

Table 3: Expenditures ratios of science funds from the Horizontal Budget Programme for Science Policy for budget years 2001-2005

Budget year	2001	2002	2003	2004	2005
Expenditures ratio	98,5%	99,0%	99,4%	98,2%	99,9%

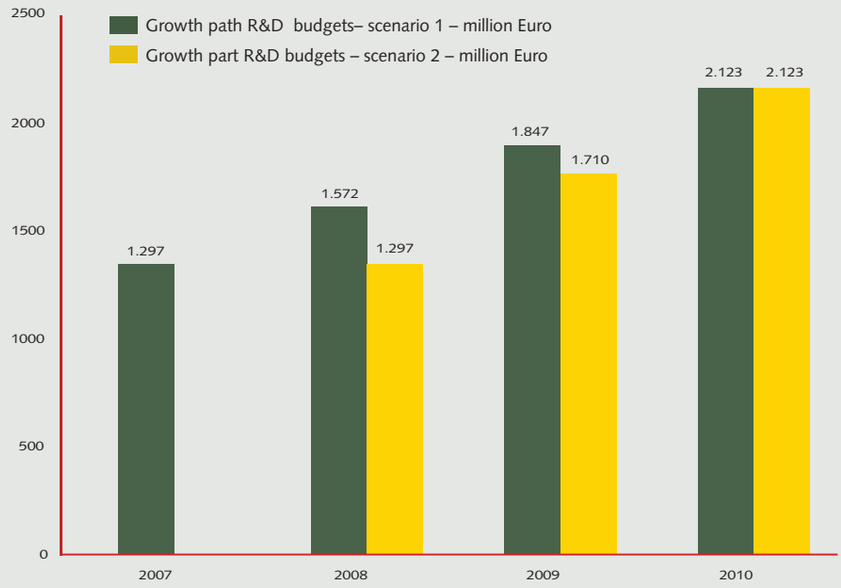


Figure 4: Government R&D efforts needed to meet the 1% objective by 2010 (scenario 1) and government R&D efforts taking into account a lag of one year between the availability and allocation of budgets (scenario 2)

The Flemish Science Policy Council (VRWB) has already made various calculations about the amount of additional public funds needed to meet the 1% target. In 2002 (advice 79), it calculated an additional cumulative annual requirement of €94 million. In 2005, the figure stood at between €122 million and €164 million (recommendation 24). In its recent budget opinion 113, the VRWB calculated an R&D shortfall of €603.50 million in 2007, and a cumulative annual figure of €201 million through to 2010. This factors in Flanders' return from the Seventh European Framework Programme for Research and assumes that Flemish GDP remains at its current level. Scenario 1, meanwhile, assumes a rise in Flemish GDP, as estimated by the Study Office of the Flemish Government (cf. Table 2).

Scenario 2 assumes that a period of time elapses between the budgets becoming available and their expenditure. This time difference should be taken into account, since R&D intensity is calculated on the basis of R&D expenditure as revealed by the survey. Since both the budgets and the survey data are available up to and including 2005, we can compare the two. The table below shows the non-BERD (community), as revealed by the survey, compared with public R&D funds (Figure 3). It reveals a relatively good correlation between the two sets of figures, particularly in recent years. It also indicates that the relative differences diminish where there is a one-year lag between the funds becoming available and their allocation. This approach results in an overestimation of the funds of barely 1.7% for 2005 (the most recent survey data available).

Assuming a one-year lag between the availability and expenditure of R&D funds (Figure 4 – scenario 2), there is even less room for manoeuvre, with only two years in which to achieve the objective. In this scenario, the 2007 budget (€1,297 million or 0.69% of GD(R)P) would only be spent in 2008. That means that to meet the 2010 objective an additional €413 million would need to be invested in R&D in both 2009 and 2010.

2. What level of R&D intensity can Flanders achieve by 2010?

Below, we calculate the results that Flanders could achieve by 2010 based on current results as derived from two data sources: R&D funds and R&D expenditure.

a) Taking R&D expenditure as a basis

An initial approach, based on R&D expenditure[45], retrospectively examines R&D expenditure for the profit sector (businesses: BERD) and non-profit sector (higher education, public research centres and private non-profit organisations: non-BERD). The drawback with this calculation method is that the latest figures available relate to 2005.

Table 4 gives an estimate, based on R&D expenditure for 2005, of R&D intensity and the ratio of private to public funding in 2010 for the Flemish Region. R&D expenditure by businesses in 2005 totalled €2.485 billion. Public sector R&D expenditure totalled approximately €1.084 billion. An analysis of BERD figures between 1993 and 2005 shows that R&D expenditure rose an average of 5% annually during that period. Non-BERD expenditure over the same period rose by 8% annually. We can use these figures to estimate the growth rate for BERD and non-BERD between 2006 and 2010. Although there is absolutely nothing to link historic and

future R&D expenditure, the timeframe is long enough to enable the former to be taken as a basis. When estimating R&D intensity, an important factor is Flanders' estimated GDP. Based on the projections made, R&D intensity will rise to 2.24% by 2010, due mainly to the rise in non-BERD R&D intensity: public sector intensity would rise from 0.64% to 0.75%.

While the 3% target is one part of the overall objective, another element is the ratio of private to public funding. In this context, the origins of R&D funding need to be examined. In 2005, 71% of research funding came from the private sector, while 29% originated in the public sector. According to the above projections, the non-BERD component would show a greater increase than the BERD. We can therefore assume that the share of publicly funded research will rise slightly further by 2010. This hypothesis is supported by evidence from the past: the share of publicly funded research rose from 23% in 2001 to 29% in 2005. This would mean a private R&D intensity of 1.54% in 2010, compared with a public R&D intensity of 0.70%. Although purely indicative, these figures do offer guidance for further policy actions at the Flemish level.

b) Taking the budget as a basis

Public funds are known for years up to and including 2007[46]. To estimate the situation in 2010, we can draw on various data sources. For 2008 and 2009, planned structural increases in R&D budgets within the multi-annual budget are taken into account: a €75 million increase on 2007 and a €25 million increase on 2008 (i.e. €100 million increase on 2007) respectively. For 2010 an average of these increases is taken: €50 million. An average annual indexation of 1.5 % is also applied (Table 5). Flanders' share of the federal government budget remains at 56% and the funds themselves are increased annually by 1.5% (indexation), assuming policy stays the same. For the Flemish return from European Framework Programmes for Research, we can base our estimate on an interim analysis of the Sixth Framework Programme (February 2007): €363 million over four years, making an average of €90.8 million per year. Gross Expenditure on Research & Development at community level (GERDcom) can be roughly calculated by adding the BERD to this (a rise of 5%, as in the calculation based on R&D expenditure). The regional GERD (GERDreg) can then be estimated by applying a simple, additional correction: according to the 3%-nota (3% memorandum), the GERDreg[47] is on average 2% lower than the GERDcom. Based on this calculation, the R&D intensity of the Flemish Region would be around 2.17% in 2010.

A first glimpse at the future post-2010

a) Taking R&D expenditure as a basis

As is clear above, the forecasts for R&D intensity in 2010 must be approached with a degree of caution. If we look still further ahead, the uncertainty increases accordingly. Nonetheless, based on the pattern for 2005-2010 calculated using the R&D survey (R&D expenditure), it is possible to estimate where Flanders will be post-

Table 4: Estimated R&D intensity and public/private division of funding based on R&D expenditure recorded in the 3%-nota (3% memorandum)

	2005	2006	2007	2008	2009	2010
BERD (€ million)	2.485	2.609	2.740	2.877	3.021	3.172
Non-BERD (€ million)	1.084	1.171	1.264	1.365	1.475	1.593
Total R&D intensity	2,10%	2,11%	2,13%	2,17%	2,21%	2,24%
R&D intensity - businesses	1,46%	1,46%	1,46%	1,47%	1,48%	1,49%
R&D intensity - public sector	0,64%	0,65%	0,67%	0,70%	0,72%	0,75%
Privately funded	71%	71%	70%	70%	69%	69%
Publicly funded	29%	29%	30%	30%	31%	31%
Private R&D intensity	1,49%	1,49%	1,50%	1,51%	1,53%	1,54%
Public R&D intensity	0,61%	0,62%	0,64%	0,66%	0,68%	0,70%

Table 5: Estimated R&D intensity based on public R&D funds (growth path as per the multi-annual budget)

	2007	2008	2009	2010
Funds (€ million)				
Flemish government	954	1.044	1.085	1.152
Flemish share of federal government budget	273	277	281	285
Flemish share of EU-FP	71	91	91	91
Total Flemish R&D funds	1.297	1.411	1.457	1.528
BERD	2.740	2.877	3.021	3.172
Total R&D funds + BERD	4.037	4.288	4.478	4.700
R&D intensity				
GERD(com) %GD(R)P	2,15%	2,19%	2,20%	2,21%
GERD(reg) %GD(R)P	2,11%	2,15%	2,15%	2,17%

2020. Assuming a 5% annual increase in BERD, an 8% increase in non-BERD and a GDP increase of 4.1%, the 3% objective will still not have been met by 2020. Only in 2026 will the target be achieved. Even then, all public sector players combined would have to invest an extra €250 million a year in R&D between 2020 and 2025. By the same reckoning, the public sector in 2021 would be contributing 1% of GDP to R&D activities.

b) Taking the budget as a basis

If the growth path specified in the multi-annual budget is adhered to (i.e. an extra €50 million in structural R&D funding per year + average indexation of 1.5%) and assuming that GD(R)P continues to rise by 4.1%, the 1% objective will never be met. The share will reach a ceiling of 0.73% some time around 2015 then fall gradually to 0.72% by 2020. By this reckoning, to achieve the 1% target by 2020 the Flemish government would have to increase R&D funds structurally by €125 million a year from 2010. This would mean an annual increase in public R&D funds of 0.05% of Flemish GDP.

Conclusion

The fact that both Flanders and Belgium will fail to meet the R&D intensity objective of 3% by 2010 has been increasingly apparent for some time. The same is true of most other European countries. The 3% target will have to be pushed back at European level to 2015 or 2020.

However, as the simulation for Flanders shows, even a target of 3% by 2020 will require major efforts from all partners concerned. This is particularly true for the Flemish government, which accounted for 75% of total public R&D funds for Flanders in 2007. The annual increase in R&D funds assigned to public sector institutions in Flanders would total €71 million in 2010, rising to over €153 million in 2020. This calculation does not include the public research funds (although these account for only a limited share) awarded to companies by the Flemish government. Moreover, rising GDP will make the effort needed to deliver a real increase in R&D intensity all the greater.

The above calculation is limited to R&D funds alone, whereas high-quality research depends on a whole range of framework conditions, most notably ongoing investment in top-quality education. If Flanders wants to establish itself as a knowledge region, investment in knowledge and research - combined with due care and attention for the framework conditions - must remain its top priority.

But rest assured, all you 3% fetishists out there, meeting the 3% target is actually extremely simple. If the government and private sector spent nothing, or virtually nothing, on R&D in 2009, then allocated the 2009 budget in 2010 in addition to the normal 2010 budget, the results would be spectacular: up to 4.5% or 5% of GDP, just like that! As for the (perhaps rather more spectacular) repercussions of such a scenario: alas, we really don't have the space to go into those…

Peter Viaene,
Office for Policy Research and Prospective Studies
Koen Waeyaert,
Statistics and Indicators Team

38 Source: 3%-nota for 2005, Steunpunt O&O-Indicatoren (Policy Research Centre for R&D Indicators)

39 GERD or total R&D expenditure is the sum of business expenditure on R&D (BERD) and that of other sectors (non-BERD). Non-BERD comprises higher education R&D (HERD), R&D expenditure by government research centres (GOVERD) and R&D expenditure by private non-profit organisations (PNP).

40 R&D efforts (staff and expenditure) in the private (businesses) and public sectors (higher education, government research centres and private non-profit organisations) are surveyed twice yearly.

41 Source: Research Centre of the Flemish Government (Studiedienst Vlaamse Regering, SVR), data from 21 May 2007, in which the 2005 figure was calculated by the Instituut voor Nationale Rekeningen/ Institut des Comptes Nationaux (INR-ICN) and the figures for 2006 to 2010 are SVR estimates.

42 For R&D expenditure, R&D intensity and public/private funding, the calculations used are those of the Policy Research Centre for R&D Indicators relating to the 2007 3%-nota (2005 data).

43 In their publication, Capron and Duelz state that the extra efforts made by the government to boost R&D intensity will also have an additional effect on BERD R&D intensity. If R&D funds were to rise by 10%, BERD would rise by 5% as a result (Henri Capron and Denis Duelz, Meer onderzoek in Europa. Doelstelling: 3% van het BBP, Een raming van de extra inspanning die België moet leveren om deze doelstelling te halen, O&O en innovatie in België, Study Series 03, Federal Science Policy, February 2004, p 52).

44 See also the calculation in the EWI Budget Browser 2007. The breakdown is as follows: Flemish public R&D funds include the Flemish share of federal public R&D funds (56%) together with the Flemish share of R&D funds from EU framework programmes. Dividing that figure by Flemish GDP gives an approximate calculation of the R&D intensity of the publicly funded part.

45 Source: 3%-nota, Policy Research Centre for R&D Indicators.

46 Unlike GERDreg, GERDcom includes all R&D expenditure by Flemish higher education institutions located in the Brussels Capital Region.

47 GERDcom - unlike GERDreg - takes into account all the R&D expenses of the Flemish institutions within higher education in the Brussels Capital Region.

Science and technological innovation in your living

This autumn, broadcasters VRT (één) and VMMa (JIM) are launching a new TV programme aimed at bringing science and technological innovation to Flemish viewers in an entertaining way. And it's all thanks to EWI...

As part of its Science Information and Innovation Action Plan (Actieplan wetenschapsinformatie en innovatie), EWI called on all Flemish TV companies to submit ideas for programmes promoting science, technology and technological innovation and informing people about these issues in an accessible way. This echoed a Eurobarometer[48] finding, according to which people in Belgium are interested in science and technology but require more information on the subject.

Flemish broadcasters submitted 10 programme proposals, which were assessed by a jury of media experts from the academic world. There were a number of conditions: for instance, the programme had to be aired in a prime-time slot, run for a full season and have episodes lasting at least 30 minutes. De Bedenkers and Solar Team II were deemed the best candidates and will be co-funded by EWI to the tune of €675,644 and €94,356 respectively.

De Bedenkers

De Bedenkers (The Creators) is an exciting new interactive game show in 12 episodes, which will air on Sunday evenings from September this year, on channel één. Presenters Bart Peeters and Sofie Van Moll, along with the rest of Flanders, will be searching for the region's best new invention. After all, the future is about creativity! If we want to retain our prosperity and keep our economy moving, we need to play every innovative card we've got...

Early this year, the programme makers appealed in the Flemish media for original inventions and/or services: anything that could make our daily lives easier or more comfortable. The TV ads included one with people in a restaurant drinking wine from their hands, in which Bart Peeters praised the inventor of the glass, and another spotlighting the inventor of the bra clip[49].

Over 2,000 entries flooded in. Provincial heats were held, allowing budding inventers to showcase their ideas in front of a jury. The jury members were leaders in their field: Omega Pharma boss Marc Coucke assessed whether the product had any chance on the market, designer Axel Enthoven judged whether the idea was technically feasible while advertising executive Els Raemdonck examined whether the idea fitted with a particular trend or fulfilled a specific need.
The jury whittled down the entries to the best 100, leaving viewers to decide which invention merits the title: "Best idea in Flanders". The winner will be given the money they need to turn their idea into reality.

Protect your idea!

Do you have an idea for which you want to claim official ownership? Then do something about it. There are several kinds of protection available, depending on the type of idea or invention. In other words, a number of different legal systems have been established in this area. You therefore need to check which system your idea comes under: whether patent, copyright, trade mark and design protection or i-depot.

Full details can be found on the website of the Belgian Office for Intellectual Property:
http://mineco.fgov.be/intellectual_property/home_en.htm

48 Eurobarometer No. 224-225 (2005) http://europa.eu.int/comm
49 You can view a trailer for De Bedenkers at http://www.youtube.com/watch?v=gLO00Prhi2M

Has this whetted your appetite for Flemish innovation and creativity? Then tune in!

Or for a little taster, visit:
http://www.een.be/televisie1_master/programmas/e_denk_programma/index.shtml
http://www.solarteam.be/Solarteam2

Solar Team II

Raising public awareness about renewable energy. Getting young people enthusiastic about science and technology. Promoting Flemish entrepreneurship around the world. And building a new solar car that finishes in the top five at the World Solar Challenge. The second Solar Team certainly doesn't lack ambition - or vision and drive, for that matter. Group-T's new solar car project got off to a flying start on 25 September 2006.

Solar Team II is the second JIM TV series on the World Solar Challenge (WSC), which this year will take place in Darwin, Australia, on 21-28 October. The WSC 2007 is an unofficial world championship, in which solar cars race through the Australian desert without burning a drop of fuel, creating any noise or air pollution or disturbing the ecosystem.

Over 10 episodes, the programme will follow the ups and downs of 14 students from Group-T university college in Leuven. Currently busy preparing for their 3,000 km desert tour, the students will have spent a year and a half working on their vehicle by the time of the race.

Though less futuristic-looking than previous entries, the latest solar car is nonetheless a model of high-tech ingenuity. It also had to satisfy more criteria than in the past. This year's cars must have scope for much wider use: for example, the driver must be able to get in and out of the car unaided, rather than being assisted by his team-mates as in the past. Ergonomics is also increasingly important, and safety is now a key concern (this year's cars must be fitted with a roll cage and lights). Meanwhile, solar panels must be smaller to make the vehicles look more like 'ordinary' cars.

These changes may give the race added appeal for ordinary Flemish drivers, while for their peers the 14 Group-T students make ideal ambassadors for science and technological innovation.

Liliane Moeremans,
Awareness Raising and Society Team
Emmelie Tindemans,
Communications Team

Animals galore and much much more

It's somewhere we're all familiar with. Somewhere we all went at least once as kids, with parents, grandparents or the school - and later on with our own children or grandchildren. Each year, over 2 million visitors pass through the gates: around 5,500 a day! The Royal Zoological Society of Antwerp (Koninklijke Maatschappij voor Dierkunde van Antwerpen, or KMDA), better known to locals as 'de zjolozjie' and to the rest of us as Antwerp Zoo, is part of Belgium's heritage. In this article, we take a look behind the scenes at the Zoo's scientific activities.

Past…

Antwerp Zoo opened in 1843, the brainchild of the city's forward-thinking mayor-to-be Jan Frans Loos, with the task of promoting the zoological and botanical sciences. Jacques Kets, a renowned Antwerp naturalist and taxidermist, was asked to become its first director. Back in 1828, Kets had opened his own museum in the Kloosterstraat, housing exotic animals and stuffed birds. However, the city council had other plans for his rented premises and Kets had to find alternative accommodation for his collection. The Zoo's offer came just at the right time, and Kets accepted on the proviso that he could house his collection there. With his exceptional knowledge of trees and plants, he created an extraordinary botanical garden at the Zoo. The epithet Koninklijk (Royal) was added to the Zoo's official name when the building was opened by King Leopold I in 1844. When originally built, the Zoo stood outside the city walls and covered a surface area of only 1 ha 59a. Gradually, as the zoological and botanical collections grew, the Zoo expanded to 10.5 ha.

… and present

In recent times, all buildings adjoining the Zoo – with one exception in the Ommeganckstraat and Ploegstraat – have been purchased. The owner of the remaining house is to be expropriated. Work has now begun to demolish the buildings, which will allow the Zoo to expand by a further 1.5 ha. The master plan aims to combine the world's best preserved 19th century zoo with a forward-looking vision of a model zoo of the future. The total cost of the project is €30 million, spread over 10 years. The final look of the expanded Zoo has yet to be unveiled. Ghent-based architecture firm Robbrecht and Daem (whose work includes the Bruges Concertgebouw) were appointed to design the master plan and implement the first phase of the project. During the works, the demolition areas will be screened off by a wall, though visitors will be able to see how the work - and life at the Zoo - is progressing through special peepholes.

From showcase…

Originally created as a showcase for exotic animals and other rarities, the Zoo's aims are now somewhat different: to promote nature preservation and conservation and inform the general public about plants and animals. The KMDA also plays an important role in historic preservation, culture and socially responsible tourism. As well as its zoo in Antwerp, the KMDA also runs Planckendael Animal Park and De Zegge nature reserve in the Kempen region of Belgium, as well as a number of research projects abroad (Brazil and Cameroon).

Right from the outset, research has been

a major part of the KMDA's work. In the past, this was mostly opportunistic research focusing on descriptive anatomy, natural history and veterinary medicine. In its early days, the Zoo offered a unique research environment for universities and other scientific institutions. In the early 1960s, this developed into an official partnership with the University of Antwerp, supported by low-level government subsidies. Around the same time, a number of research projects got under way at the Zoo itself, focusing mainly on animal behaviour and welfare.

From this point on, the research became more structured. New partners (Ghent University and the Institute of Tropical Medicine) joined the projects. At that time, the main research theme remained animal behaviour, particularly in the field of primatology. In the 1990s, its research gradually expanded to take in new scientific disciplines and other animal groups, developing a solid body of research expertise and garnering international recognition within both the zoo world and academia.

In 2002, this culminated in the creation of the Centre for Research and Conservation (CRC), thanks in part to a substantial boost in financial support from the Flemish government via the Science and Innovation Administration (AWI), now the Department of Economy, Science and Innovation (EWI). This supplemented funding from Flanders' then Tourism Minister and is intended solely to implement the KMDA's scientific mission via the CRC. The CRC's work now contributes significantly to the KMDA's nature conservation remit.

…to research lab

2005 saw the publication of the second World Zoo and Aquarium Conservation Strategy (WZACS), in which the international zoo community sets out general goals for itself. According to the Strategy, zoos and aquariums must become examples of integrated conservation, working on the principles of sustainability. As regards research, the Strategy states that zoos and aquariums must become serious, respected scientific institutions that make significant contributions to science, take sound scientific decisions for wildlife conservation worldwide and are fully integrated into the research community.

With support from EWI and the KMDA's Scientific Advisory Board and by collaborating with national and international universities and research centres, the KMDA is now one of the few zoos in Europe with its own research department that conforms largely to the vision outlined in the WZACS.

One good turn deserves another

The CRC funding agreement between the Flemish government and the KMDA terminated in 2006. EWI organised an in-depth evaluation of the last operating period, appointing two international experts in the domain of zoo research facilities. They examined the KMDA's research performance from an international perspective, looking at how the CRC organises research and assessing whether its strategic research plan for 2007-2011 is practicable and sufficiently innovative for the field. The experts returned a complimentary verdict and made a few recommendations for the future.

Based on this and the positive evaluation report, it was decided to conclude a new cooperation agreement for operation of the CRC in 2007-2011. The subsidy was increased by 20% to €815,000 a year, with 90% of the subsidy being paid annually. The remaining 10% is subject to a positive evaluation by EWI, based on the annual report. A number of performance criteria have to be met, in areas such as scientific publications, scientific training for students and PhD's, participation in international scientific meetings and establishing scientific excellence at international level. By setting ambitious targets, EWI aims to support and foster the creation of a centre of excellence.

More than just animals

The CRC's research focuses on four main areas.

Ethology is about studying animal behaviour in order to improve animal welfare and enable species-specific behaviour patterns in captivity. This is crucial to the success of some breeding programmes, as personality clashes (not just a human phenomenon) can interfere with sexual activity.

Conservation biology combines various scientific disciplines including population biology (population genetics and demography) and molecular genetic research. For both wild and captive populations, genetic and demographic parameters provide a kind of diagnosis of the current health of the population. The main emphasis is on population biology research programmes aimed at supporting the KMDA's own, as well as external, breeding programmes. Besides such factors as behaviour, age and origin, a healthy breeding programme has to take into account the degree of relatedness between the mating individu-

als. The genetic background of a pedigree's founders and the degree of relatedness between animals living in a group cannot be determined using pedigree data. Molecular genetic research offers a solution. Thanks to the CRC's enlarged laboratory infrastructure, much of this DNA research can be performed in-house.
The genetic parameters of an animal population can be measured by means of DNA analysis or estimated using pedigree analysis. The CRC has built up considerable expertise in the latest theories and software packages for pedigree analysis.

The KMDA also runs a number of field projects that are contributing to conservation biology. Its intensive management of the De Zegge nature reserve[50] since 1952 has preserved the area's biodiversity in the face of many negative environmental factors. With water (both quantity and quality) being critical to De Zegge's biodiversity, the KMDA has joined forces with the University of Antwerp in a cooperative research project to study the area's hydrological dynamics.
The Projet Grands Singes (Great Apes Project) in Cameroon is being undertaken in partnership with the country's Ministry of Environment and Forests and Ministry of Tropical Resources. It is an integrated conservation and development project aimed at developing a sustainable management plan for the community forests bordering the Dja Faunal Reserve. The project is studying the socio-ecology of apes in non-protected areas and investigating the effects of different forms of management on chimpanzee and gorilla populations.
The BioBrasil project in Brazil's Atlantic coastal rainforest aims to study the ecology and behaviour of golden-headed lion tamarins in fragmented and disturbed habitats. Fragmentation and destruction of the forest are the biggest threat for the remaining wild tamarin populations. The project is working closely with two local research institutes (Instituto dos Estudos Socio-Ambientais do Sul da Bahia and Universidade Estadual de Santa Cruz).

The aim of the veterinary medicine research unit is to improve animals' physical and psychological well-being. Most of its projects relate to pathology, microbiology, parasitology, reproduction and nutrition. Key elements are the early diagnosis of infections in living animals, epidemiological research and safeguarding the animal collection for and by means of in-situ exchange programmes. It also works closely with the Antwerp Institute of Tropical Medicine and Ghent University on parasitological studies.

The fourth main research area is functional morphology. One of the most important aspects of this is the study of movement. The Zoo's unique animal collection is an important source of experimental data for determining the evolutionary origin of bipedal locomotion in early man. It may be a surprise to many 'informed laymen' (as we term our target readership), but the lever function of limbs in movement continues to fascinate and inspire scientists. Though perhaps not immediately relevant to the Zoo, such research is useful in the design of robotic arms and prostheses.
Locomotion problems are another area where functional morphology is important. One of the discoveries made is that substrate (i.e. floor) type influences the movement of, and gait and claw problems in, okapis. The findings of this research and the research methods developed have important implications for the way hoofed animals in general are housed. These projects bring together a number of advanced disciplines in an attempt to construct an integrated data set comprising movement analyses and data on muscle properties and morphology. Biomechanical modelling can help to elucidate the underlying locomotion mechanism itself.

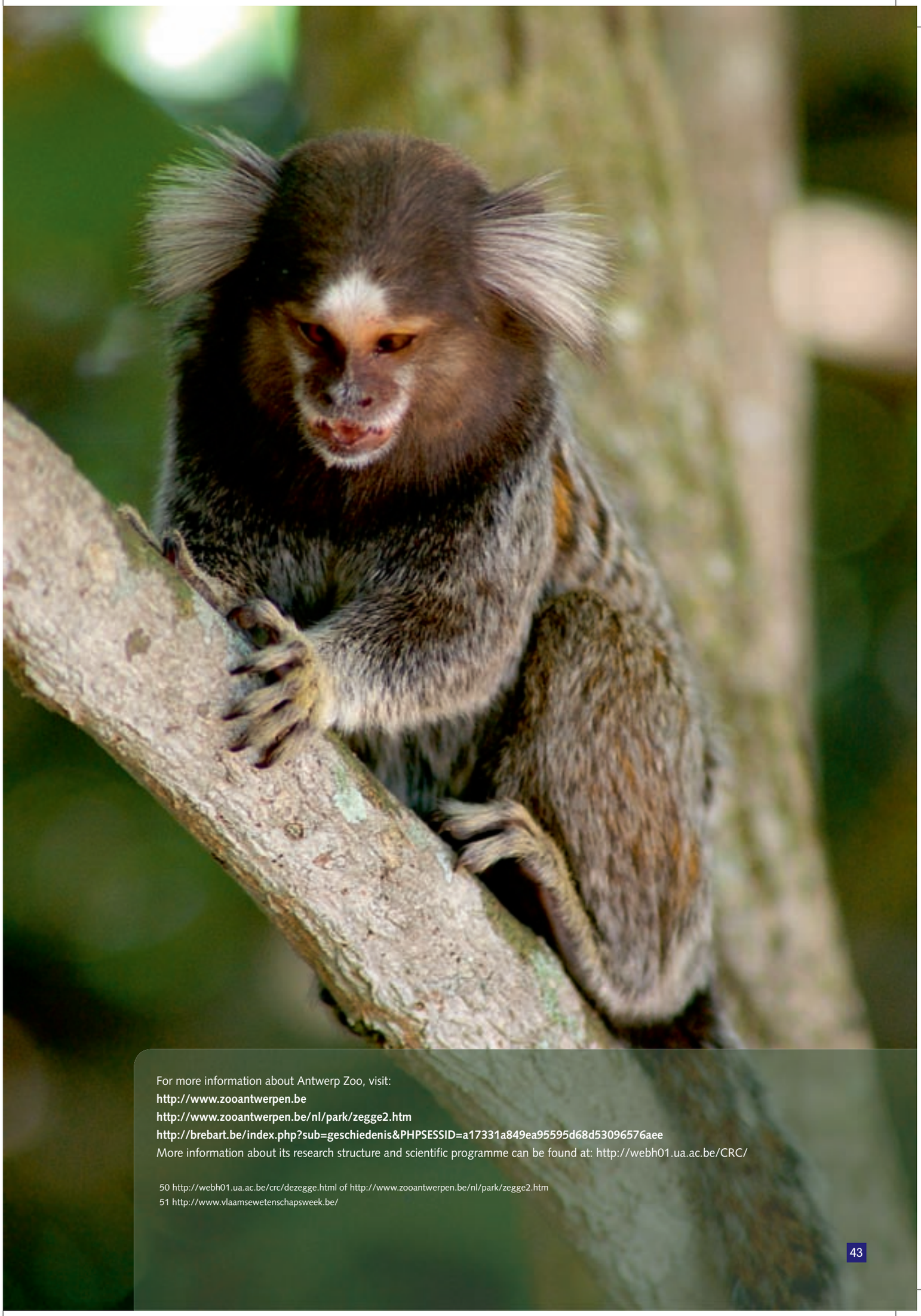
The general public

Finally, the KMDA also has the vital task of informing the general public. Its researchers regularly address the public on different aspects of scientific research. Twice a year, on Flanders Day (Vlaanderendag) and during Flanders Science Week[51], they present their work to the general public at Antwerp Zoo and Planckendael Animal Park. Antwerp Zoo's laboratory facilities have also been included in a new "Behind the Scenes" visit. In 2005, a series of conservation and research principles from the BioBrasil Project were incorporated into the South America Project at Planckendael, making the information accessible to ordinary visitors. The KMDA's scientific work also features regularly in the media, press and on radio and TV discussion programmes, not forgetting the public broadcasting company Eén's flagship TV series Het leven zoals het is, in which both the Zoo and Planckendael Animal Park feature prominently.

The KMDA has come a long way since its creation. As for its future as a scientific body, EWI is keen to see it develop into a European and international centre of excellence in its field. We are also looking to further upgrade and expand the zoo itself. Plenty of reasons, in other words, to visit again in the near future: you won't find the same mix of modern aspirations and a hint of nostalgia anywhere else.

We would like to thank the KMDA for its assistance and for allowing us to use photos from the Antwerp Zoo image bank (Beeldbank Zoo Antwerpen).

Kathleen D'Hondt,
Policy Support and Academic Policy Team



For more information about Antwerp Zoo, visit:
http://www.zooantwerpen.be
http://www.zooantwerpen.be/nl/park/zegge2.htm
http://brebart.be/index.php?sub=geschiedenis&PHPSESSID=a17331a849ea95595d68d53096576aee
More information about its research structure and scientific programme can be found at: http://webh01.ua.ac.be/CRC/

50 http://webh01.ua.ac.be/crc/dezegge.html of http://www.zooantwerpen.be/nl/park/zegge2.htm
51 http://www.vlaamsewetenschapsweek.be/

Flanders supports the 'S' in UNESCO

In 1998, Flanders signed a general cooperation agreement with the United Nations Educational, Scientific and Cultural Organisation (UNESCO). It was the first instance of a regional government within the multilateral organisation entering into a formal contract of this kind.
A year later, EWI's predecessor, the former Science and Innovation Administration (AWI), implemented the agreement by setting up the Flanders UNESCO Science Trust Fund (FUST) for the support of UNESCO's activities in the field of science. With the creation of FUST, Flanders became a structural partner in the development of networking and research activities in UNESCO's priority areas of 'Water' and 'Ocean Sciences'. FUST promotes the creation of a worldwide ocean data and information network.

Humans have been attracted to and by seas and oceans from time immemorial. More and more people are moving to coastal areas and trying to make a living there. Almost 65% of the world's population now live on or near the coast, and people in developing countries in particular are heavily dependent on the sea for their food. Meanwhile, the exponential increase in human activity is placing mounting pressure on natural resources in coastal areas and the deeper seas adjoining them (Figure 5).

Fig. 5. Around the world, pressure on coastal areas is increasing enormously due to human activity.
In the space of 25 years, a number of small coastal villages has expanded into an urban agglomeration in Cartagena Bay, Colombia. ©Rudy Herman

A sensible approach to the sea

Whereas land-based food production can be stepped up, seafood resources are more complicated. We therefore need to think carefully about how we exploit these food sources, preferably within a structured framework based on cross-border agreements. Several multilateral organisations play a key coordinating role in ensuring a sustainable future for our oceans natural resources.

UNESCO's Intergovernmental Oceanographic Commission (IOC) is the main mechanism responsible for coordinating the study of seas and oceans. Its remit complements those of other multilateral organisations. UNEP (United Nations Environment Programme) focuses mainly on the land, including coastal areas, while the Food and Agriculture Organisation (FAO) oversees the management of natural resources (including fisheries).

One of the IOC's priorities is to encourage and help implement integrated coastal zone management in developing countries. An important element of this is developing an efficient data and information network in consultation with local and regional stakeholders. This is the cornerstone of one of the IOC's major programmes: International Oceanographic Data and Information Exchange (IODE). IODE contributes significantly to the spread of global knowledge about the seas and oceans. It also works – in close collaboration with the World Meteorological Organisation (WMO) – to develop international standards and protocols, and safeguards free and open access to ocean data and information. Finally, it provides instruments that support data management for regional and large international programmes, enabling member states to access a global network of databases.

Flanders supports IODE

Flanders decided to support the IODE programme through FUST (2003-2007 phase, US$ 4.15 million, then equivalent to around €3.32 million), focusing particularly on the Ocean Data and Information Network (ODIN). This package of activities promotes close cooperation between two major IOC programmes: Integrated Coastal Area Management and the operational Global Ocean Observing System.

When launching the Ocean Data and Information Networks, the UNESCO/IOC Secretariat secured the necessary commit-

ment from all the member states involved with regard to data centre infrastructure and staff. At the same time, the IOC undertook the required capacity building in member states by organising on-the-job training. Flanders' input in this respect was crucial, not least because the UNESCO/IOC Project Office for IODE began operating in Ostend in April 2005. Since this UNESCO expertise centre was set up, 800 experts from 97 IOC member states have received specialist training. Uniformly trained experts are vital for developing data networks according to international standards. This on-the-job training resulted in the accelerated development and launch of new ODINS around the world, based on the successful pilot network ODINAFRICA and its successor ODINCARSA. In total, six ODIN networks have been developed and are now up and running (Figure 6).

Fig. 6 The ODIN networks cover virtually all IOC member states. The European SeaDataNet is not included.

The European SeaDataNet (including the IODE Project Office as a partner), which comprises 49 data centres in 36 countries, works closely with the ODINs.

One of IODE's key tasks is to supply targeted information and products to other IOC programmes. These information and data flows are also streamlined with the activities of other IOC programmes and harmonised with data flows from other organisations such as the WMO and UNEP, resulting in joint activities and products. This can best be illustrated with a few examples.

Obvious benefits

Thanks to structural support from FUST, the IOC was able to develop its first uniform Ocean Data and Information Network at continental level: ODINAFRICA. Within this process, a major priority was establishing and strengthening regional centres for information and data management to support integrated coastal zone management. As a pilot network, ODINAFRICA fulfilled a number of needs and priorities reported to UNESCO by the African member states.

Until 1999, there were only four African operational measuring stations supplying data to the Global Sea-Level Observing System (GLOSS). Today, GLOSS has around 300 stations that monitor changes in sea level at both regional and global level (Figure 7). Thanks to ODINAFRICA, Africa now figures prominently on GLOSS's world map. A Pan-African coastal observing system has also been developed, based on a network of 30 or so tide gauges. During the tsunami of 26 December 2004, the Seychelles data centre sent an immediate warning to the ODINAFRICA data centres on Africa's east coast, allowing Kenya's Environment Minister to warn of the impending danger on television. An hour later, all the beaches had been evacuated and the small fishing boats stowed in comparative safety. No tsunami victims were recorded in Kenya or Tanzania, whereas in Eritrea the death toll was high.

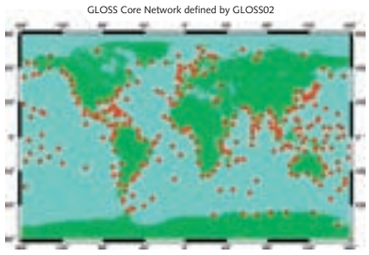


Figure 7. The global GLOSS network includes over 300 measuring stations which monitor sea level changes around the clock.

Much information from the global network can be used at local and regional level, generating a variety of products and services. By combining extensive on-the-job training with up-to-date equipment and proper operational support, ODINAFRICA has succeeded in creating a Pan-African network. The Flanders Marine Institute (VLIZ[52]), which has an EWI representative on its Board of Directors, played an important ancillary role in this process. EWI has earmarked €1.075 million in subsidies for the VLIZ in 2007, most of which will go on developing database technology and software for channelling and monitoring these vast flows of data.

One example is this is the African Marine Atlas (AMA), an interactive web application allowing several data layers to be viewed in superposition. AMA can provide such layered data at both local and continental level. For example, it shows the location of all measuring points for the Marine Species Database for Eastern Africa (Figure 8): MASDEA was set up with the assistance of the VLIZ and is now a fully-fledged ODINAFRICA activity[53].

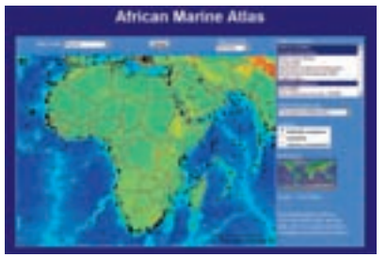


Fig.8. Overview of locations where data are recorded for inclusion in the MASDEA database.

Through this integrated approach, ODINAFRICA is helping to underpin sustainable protection of Africa's coastal regions and marine environment. It also fulfils some of the ambitions set out in the marine and coastal resources section of the NEPAD (New Partnership for Africa's Development) Environment Initiative. Inclusion in NEPAD ensures that all stakeholders have a real say on the marine environment, including the private sector, policymakers and the education sector. With FUST being part of the EWI Science Sharing Programme, Flanders - in collaboration with UNESCO - is making a significant contribution (€1.437 million in 2007) to the development of a sustainable policy for Africa's coastal regions.

Rudy Herman
Policy Support and Academic Policy Team

52 http://www.vliz.be – see also p. 49 of this issue.
53 http://www.vliz.be/vmdcdata/Masdea

Entrepreneurship and International Entrepreneurship

The Department of Economy, Science and Innovation (EWI) is responsible for the 14 new policy research centres created under the Policy Research Centre Programme[54], and runs two of them itself: R&D Indicators (Steunpunt O&O-Indicatoren) and Entrepreneurship and International Entrepreneurship (Steunpunt Ondernemen en Internationaal Ondernemen). In this article, we take a look at the second of these: Steunpunt OIO.

Steunpunt OIO, a consortium comprising Ghent University, Katholieke Universiteit Leuven and Vlerick Leuven Gent Management School, aims to develop into Flanders' leading knowledge centre for entrepreneurship and international entrepreneurship. By building up knowledge on entrepreneurship and the relationship between entrepreneurship and sustainable economic growth, it seeks to aid the Flemish government in policy development. To maximise knowledge transfer, close working ties have been established between its researchers and the Department. Steunpunt OIO also works on short-term projects relating to specific policy issues, in which the Department acts as a catalyst. To optimise its work in these two areas, Steunpunt OIO carries out basic policy research on three themes: start-up, growth and takeover/transfer.

Flanders: low level of entrepreneurial activity

The Global Entrepreneurship Monitor shows that the level of entrepreneurial activity in Flanders is well below the EU average: 3.05% as against 5.01%. Belgium (2.73%) scores the lowest out of all 40 participating countries[55]. More research is needed into the obstacles involved in starting a business. *Which aspects determine success? Which hinder growth? How important are international partners? And which factors make for international success?*

Gazelles in Flanders

According to recent research, a very high percentage of growth is being achieved by a small group of fast growers, with 1% of gazelles[56] generating 50% of economic growth. Given the vital importance of growth companies for the Flemish economy, we need to find out more about these businesses, and more specifically the importance of funding, cooperation and alliances.

Transfers: data needed

Due to various demographic and social factors, the number of business transfers is set to rise over the coming years. Based on research data, it is estimated that ownership of around one third of businesses in Europe (between 25% and 40%, depending on the Member State) will be transferred over the next 10 years. This equates to at least 610,000 small and medium-sized enterprises each year, 300,000 of which employ a combined total of 2.1 million staff. The statistics for Belgium and Flanders are incomplete because virtually no studies have been conducted on the subject. This highlights the importance of basic policy research into the takeover and transfer of businesses

Showcasing research

Each research theme is showcased in a yearbook. Besides research, the yearbook also focuses on issues such as innovation, international entrepreneurship, spatial economic policy, funding, cooperation and networks, concluding with an extended chapter of concrete recommendations. An advisory group, in which the Department plays a prominent role, helps ensure that the research findings in the yearbook are as policy-relevant as possible.

An example of a policy recommendation can be found, for instance, in Je bent ondernemend en je start wat, a yearbook published by one of the first generation of policy research centres called Steunpunt Ondernemerschap, Ondernemingen en Innovatie (Entrepreneurship, Enterprises and Innovation). It assessed the training and consultancy cheque (opleiding- en adviescheque) scheme, and found that the main benefits were its transparency and unbureaucratic nature. However, the researchers also advocated alternatives such as the 'entrepreneurship portfolio', whereby start-up companies are offered a range of different cheque options depending on their needs and phase of existence. The Budget voor Economisch Advies (Budget for Economic Advice, or BEA) was subsequently developed, based on the policy recommendations outlined in the yearbook.

The research findings are disseminated not only within the Flemish government but also among academics, businesses and any other interested parties. The most important medium in this respect is the website, though findings are also published in academic journals and working papers. Seminars and discussions are held, as well as an annual Entrepreneurship Day at which Steunpunt OIO presents its yearbook and puts it through its paces with talks, expert discussions and critical questions from the audience.

Sophie Callewaert,
Research Valorisation and Industrial Policy Team

Steunpunt beleidsrelevant onderzoek 2007-2011

ondernemen en internationaal ondernemen

Name: Steunpunt Ondernemen en Internationaal Ondernemen (Policy Research Centre for Entrepreneurship and International Entrepreneurship)
Promotor-coordinator: Prof. Sophie Manigart
Consortium members: - K.U. Leuven,
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Tel.: +32 (0)16 24 88 84
Fax: +32 (0)16 24 88 00
Website: http://www.ondernemerschap.be
Responsible minister: Flemish Minister for Economy, Enterprise, Science, Innovation, and Foreign Trade
Budget for 2007: €787,500

54 See also EWI Review 1 (1): pp. 29-30

55 See also EWI Review 1 (1): p. 9

56 Gazelles are businesses that achieve turnover growth of 100% four years in succession.

Miraculously multiplying fish ?

Sustainable management of natural resources has been central to recent developments in European Maritime Policy. Innovative approaches in boosting natural fish stocks using ecosystem-based aquaculture have also been in the spotlight.

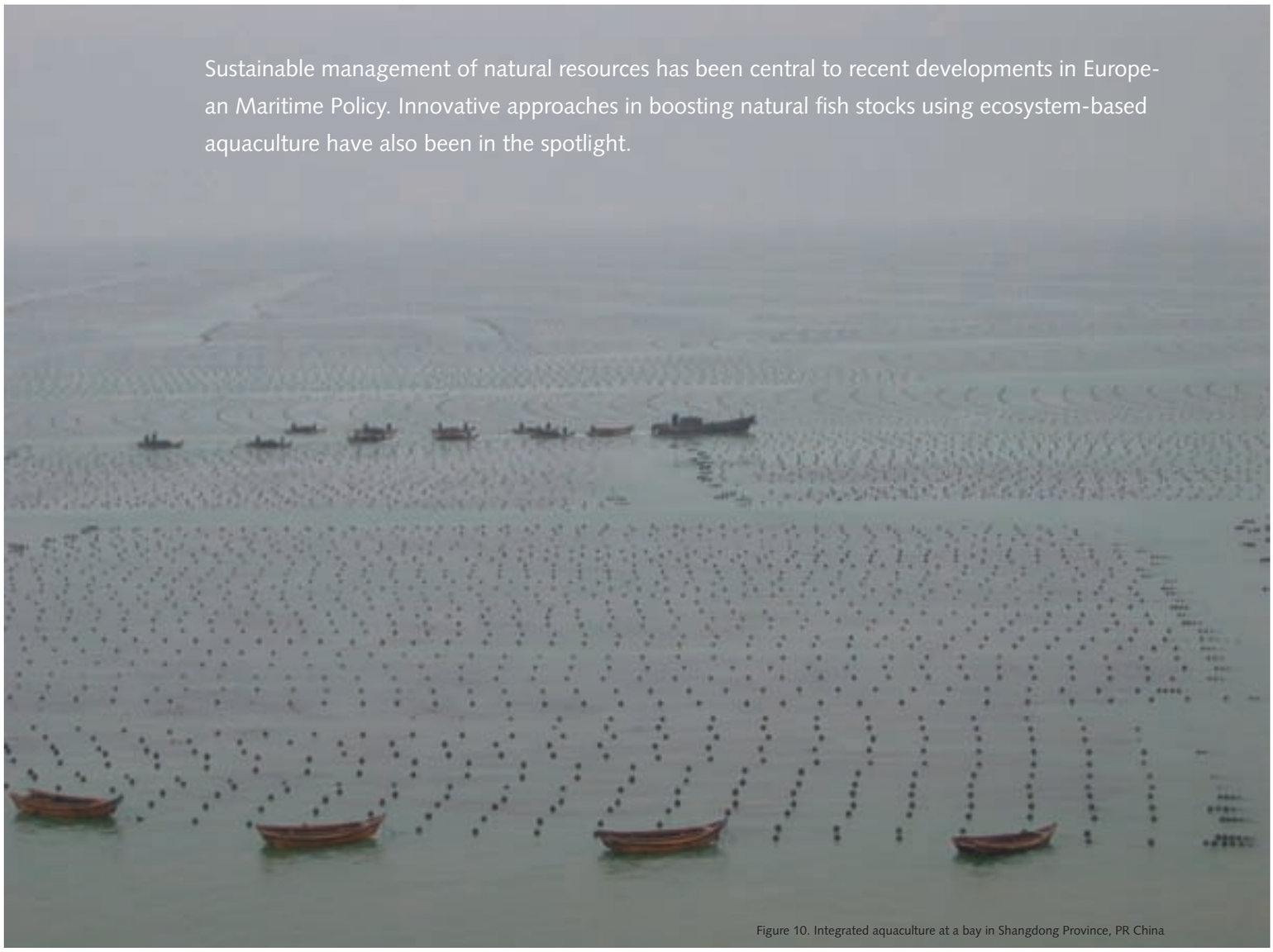

Figure 10. Integrated aquaculture at a bay in Shangdong Province, PR China

Over recent decades, Flanders has built up an impressive store of expertise on aquaculture. In this research field, EWI also supports the international ASEM (ASian European Meeting) platform. The international workshop on European Ecosystem-based Fisheries Enhancement held in Bruges on 7-8 May 2007 sought to define a number of research priorities for ecosystem-based aquaculture, to be included in future work programmes on the thematic priorities of "Food, Agriculture and Fisheries, Biotechnology" and "Environment" (including Climate Change) in the European Commission's Seventh Framework Programme.

Ensuring adequate fish stocks

Fishing yields have been declining since the 1980s. Particularly worrying are the species intended for human consumption, some of which (cod, herring, turbot, etc.) have reached their critical population density. There are not enough older fish left to keep schools at the required size with the right distribution across age groups. Measures to safeguard these commercial fish stocks are urgently needed. This could involve designating protected areas where no fishing is allowed to take place whilst also ensuring strict compliance with fishing quotas. However, restocking programmes are also needed, like those now being successfully implemented in Asia. These programmes exploit the latest developments in land- and sea-based aquaculture practices. For economically important species, young fish are bred in captivity and then added to the natural populations in carefully chosen locations.

Landing and production of fish, shellfish and other marine protein products (such as crustaceans and seaweeds) now totals approximately 150 million tonnes a year (Food and Agriculture Organisation, 2006; see Figure 9). Of this, around 50% comes from aquaculture. By 2030, protein production through aquaculture is expected to increase by 40 million tonnes in order to meet mounting global needs. The importance of aquaculture is therefore set to increase exponentially. These developments should preferably take place on the basis of new research findings that take into account the importance of marine ecosystems and natural populations (of fish, etc.). Over the last decade, various innovative new methods have been applied - with apparent success - to a number of marine fish species. Expertise in this area is located mainly in Japan, China (see Fig. 10) and the countries of northern Europe.

Currently importing 50% of its aquaculture products, Europe has every interest in capitalising on its aquaculture expertise. Recently, progress has been made in genetic characterisation and selection techniques, in improved breeding techniques for hatchlings and new marking technologies for fry. This has enabled scientists to develop new strategies for making restocking programmes more effective. Given the critical situation facing Europe' fisheries, scientists and fishermen alike need to examine the potential of restocking with renewed focus, preferably working together at a pan-European level.

Pooling knowledge for the future

The European Ecosystem-based Fisheries Enhancement Workshop, which was co-organised by EWI (with financial support of €12,000), the VLIZ[58], the ASEM platform[59] and the ILVO[60], brought together some 30 top experts on fishing, marine biology and aquaculture from Europe and beyond, in Bruges. The active participation of policy staff from the European Directorate-General for Fisheries and Maritime Affairs ensured that some of its recommendations will be incorporated into EU fisheries policy.

The research underlying sustainable restocking programmes must be multi-disciplinary, ecosystem-based and involve consultation with the many stakeholders

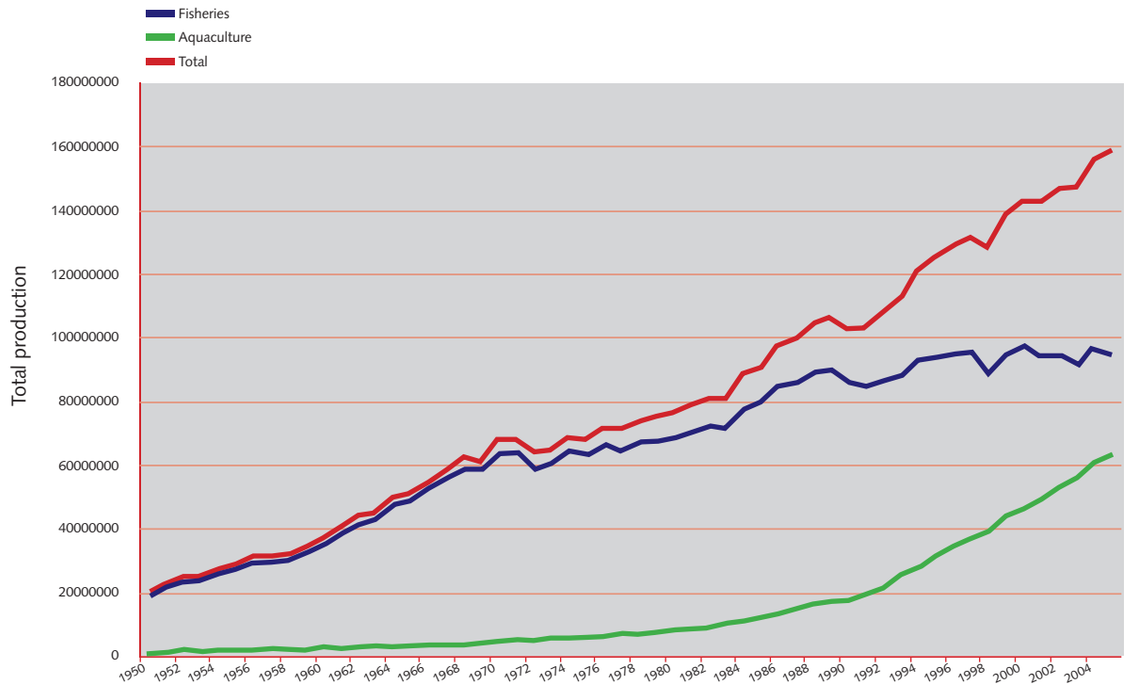

Figure 9. Evolution of global fisheries and aquaculture production over the last 56 years.

from all sectors. Future research must be geared towards:

- improving knowledge about Europe's marine and coastal environment to gain a better understanding of population structure and the dynamics of commercial and non-commercial species;
- integrating stocking practices with an ecosystem-based management, supported by socio-economic research and anchored in a participative approach;
- developing concepts, tools and methods to assess the suitability of restocking and stock enhancement of key commercial species;
- improving aquaculture technologies and methodologies to meet the demands for stocking programmes with minimal adverse impact on the environment.

Europe's great diversity of marine and coastal habitats will also call for region-specific approaches. The solutions to these challenges should ultimately help shape an updated fisheries policy. With the in-house expertise that Flanders has, including the world-renowned Artemia Reference Centre[61], the Ghent Aquaculture Research Consortium, the ASEM platform and its experience with small-scale restocking trials, Flemish researchers are well placed to make a major contribution in this field.

Rudy Herman,
Policy Support and Academic Policy Team

58 Flanders Marine Institute (http://www.vliz.be), also supported by EWI.
59 http://www.asemaquaculture.org/
60 Institute for Agricultural and Fisheries Research
61 http://www.aquaculture.ugent.be

Kafka

K., the anonymous hero of Franz Kafka's (1883-1924) novel The Castle, is embroiled in a heroic battle against bureaucracy. The bureaucrats work in a castle above the village in which the novel is set; rarely seen, they remain out of reach and hide behind impenetrable procedures, vague powers and shifting hierarchies. In such a bureaucracy, a man's identity is reduced to a single initial.

The Castle is a search for rationality and justice in the labyrinth in which K. gets caught up: a prophetic book which Kafka never completed and which was never published during his lifetime but which today remains as recognisable and relevant as ever. Little wonder, then, that some politicians have picked up on the point-scoring potential of concepts like 'simplification', 'transparency' and 'customer-friendliness' - albeit, in many cases, with results that fall well short of what could be achieved.

Let us turn now to science policy. You would imagine science policy, by its nature, to be a paragon of transparency and rationality - traits we have come to associate with scientific thinking ever since the Enlightenment. In no other policy area are there so many learned ladies and gentlemen at work, whether in advisory bodies, the Department, the ministerial office or university departments. But that is precisely where the labyrinth begins.

Within the Flemish government, the most important funding bodies for basic scientific research are the Education Department and EWI, each with its own administration, ministerial office, minister and advisory body. Now this is not necessarily a problem in itself, provided everybody knows who is doing what and people are not all doing the same thing. In theory, the Education Department pays the structural operating costs of universities, while EWI pays for project research costs through separate funding channels such as the Fund for Scientific Research (Fonds voor Wetenschappelijk Onderzoek, or FWO).

So much for the theory. In practice, there are countless areas of overlap. Some of the university operating funds are intended for research. This used to be 25% but under the new funding model has risen to 45%. Meanwhile, the Education Department manages the Special Research Fund (Bijzonder Onderzoeksfonds, or BOF) which, like the FWO, is intended to finance basic research. Both funds finance research posts, projects and equipment. The major difference is that the BOF is an instrument of university research policy: it is administered by the individual universities and involves intra-university selection, i.e. research proposals are selected within a single university. The FWO, on the other hand, involves interuniversity competition.

One drawback of this system is that it does not allow for a single centralised system of policy control. This has implications not only for the relationship between the BOF and the FWO, but also for other funding instruments. If a political decision is taken imposing an exact balance between basic and applied research, the funds from the budgets of both policy areas will need to be brought into line with that decision.

Moreover, the Education Department and EWI have different views on research funding. The Education Department often uses distribution keys with various parameters. For instance, the BOF comprises a budget of around €110 million which is divided up between Flemish universities based on factors such as the number of second-cycle degrees, doctorates, publications and citations. The disadvantage of such a distribution-key budget is that it does not reward performance. If one university publishes 15% more over a given period and other universities 10% more, funding for the latter will decrease assuming the overall budget remains the same. Rather than encouraging cooperation, this breeds resentment between universities. However, the advantage of this method is that it offers great consistency and stability

over time. Universities know where they stand and can plan and budget more effectively.

By contrast, EWI's funding instruments are variable and flexible. The FWO distributes approximately €150 million and for its selection process uses over 30 committees of scientific experts, who are increasingly not linked to Flemish universities. This peer review system ensures a high level of objectivity: an important consideration since competition is greater than for the BOF. The number of posts and projects distributed at each university through the FWO has not been fully ascertained.

Meanwhile, the BOF key is being ap-

62 Budget line for encouraging top (Flemish) researchers to return to Flanders from abroad.
63 Budget line for long-term funding to top researchers in Flanders.
64 Zelfstandig academisch personeel, i.e. independent academic staff (permanent researchers, mainly professors)
65 See also p. 30 of this issue.
66 Industrial Research Fund (Industrieel Onderzoeksfonds): fund for applied research at each individual university.

plied to an array of new EWI initiatives: the distribution of Odysseus funding[62] (through the FWO), Methusalem funding[63] (through the BOF) and extra ZAP places[64] to universities, the distribution of Hercules funding[65] for research infrastructure (which uses a weighted average of the BOF and IOF[66] keys!), and so on. Science policy is being 'BOFinised': even funds distributed through the FWO are using the BOF key, so that the differences between the FWO and BOF are being blurred. As a result, the new initiatives fall into no distinct category. Why have they not been amalgamated with the BOF? Because each initiative now has to be calculated separately, by either the Education Department or EWI. And why is Flanders the only region in Europe to suffer from 'key syndrome'? As with the ministerial office culture: once it's taken hold, it's a devil of a thing to shift…

Additional research funds tend to be distributed through EWI rather than the Education Department. The BOF decree has recently been amended to include new parameters relating to the number of female and foreign researchers. These parameters have very little weight in the BOF key, yet the Education Department is now having to recalculate its figures, which means universities having to supply the necessary data. A lot of work with minimal effect on policy and every likelihood of delays and errors in payments. Needless to say, ministerial offices in their enthusiasm for new initiatives take no account of such considerations.

Of course, the Flemish government is not solely responsible for science policy. The federal Interuniversity Attraction Poles (IUAP) programme, for example, is the only programme funding scientific cooperation between the Dutch- and French-speaking parts of Belgium. The resources are distributed according to a ratio of 56% for Flanders and 44% for Wallonia. The BOF is then applied for the distribution among Flemish universities, meaning that competition on the basis of scientific quality is limited. Moreover, most networks are funded over a long period, so there are few opportunities to establish new ones.

The Better Administrative Policy scheme (Beter Bestuurlijk Beleid) has thus failed to deliver a homogenous policy area for science. Maybe there has been too much focus on structures and not enough on concrete issues. Maybe the human factor has been overlooked: reforms take time to digest and cooperation is about more than drawing up organisational charts. Whatever the case, the next Flemish government has a pleasant task awaiting it.

Peter Bakema,
Policy Support and Academic Policy Team

> Notes

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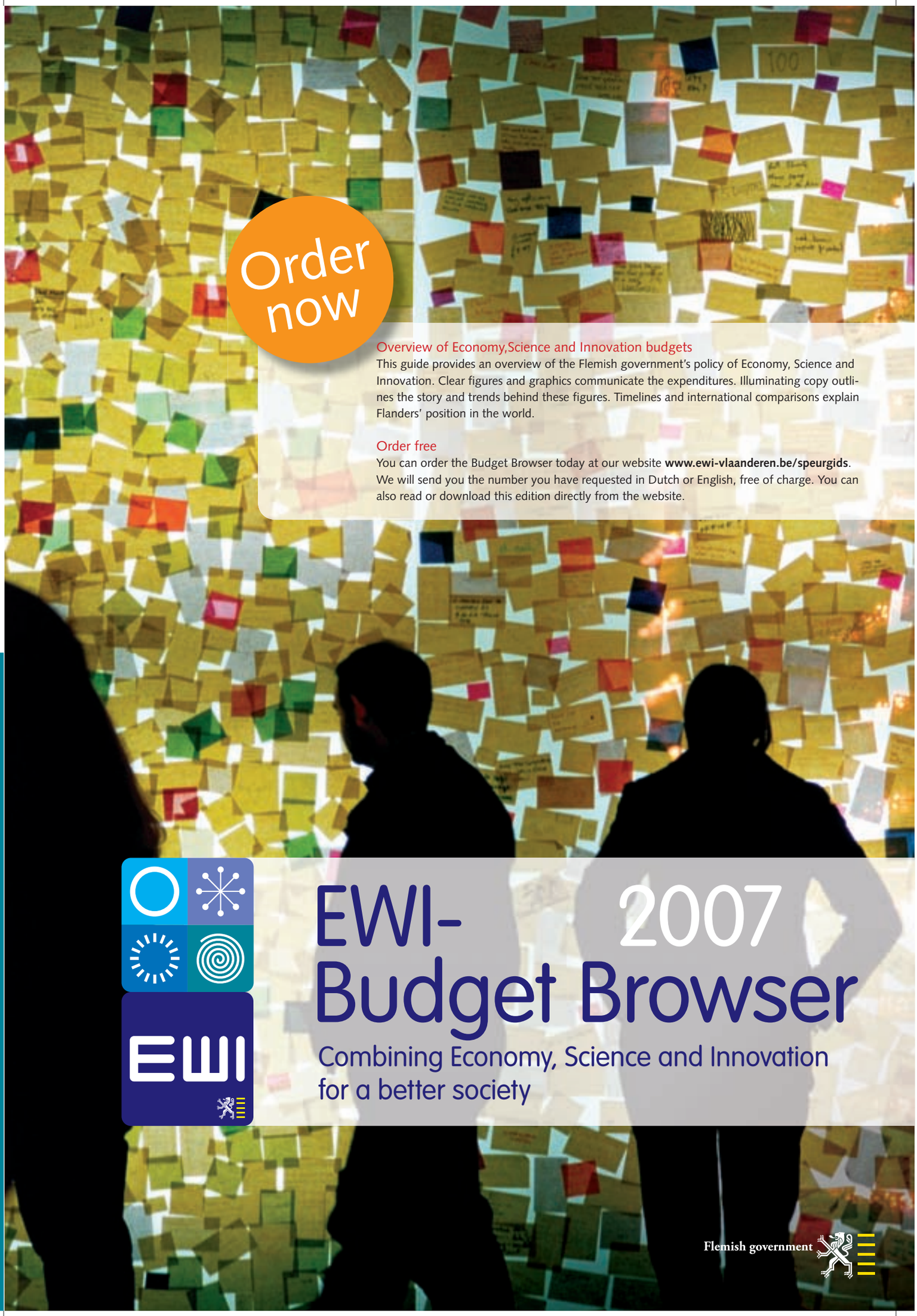

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