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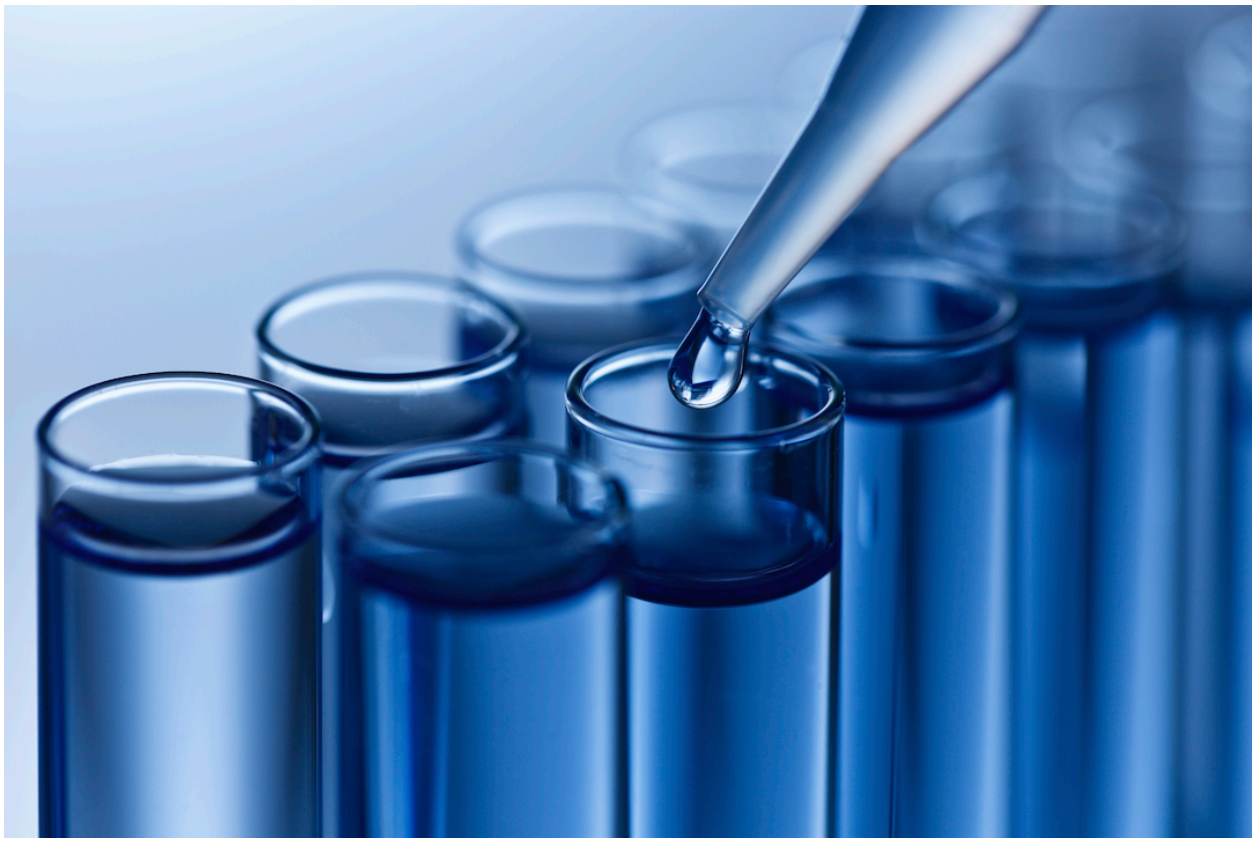
Meta-evaluation of VIB

Management Summary



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Meta-evaluation of VIB

Management Summary

technopolis |group| The Netherlands, June 2011

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Introduction

This report presents the results of the meta-evaluation of VIB (Flemish Institute for Biotechnology) that has been carried out by the Technopolis Group between December 2010 and May 2011 on behalf of the Flemish Department of Economy, Science and Innovation (EWI). The report covers the period from ten years before the start of VIB (1995) to present. In this way, the long-term development of VIB can be assessed, and reflections can be made on the policies to integrate VIB in the innovation landscape in Flanders and Europe to maximise VIB impact. A comparable meta-evaluation has also been performed for imec, the Flemish centre for micro-electronics. Both meta-evaluations are meant to give input to policymakers of the Flemish Government on the renewal of their innovation policy. The VIB evaluation is also providing information about biotechnology as strategic research domain in Flanders in general and the performance and impact of VIB specifically.

The evaluation is a consequence of the terms of engagement that the Flemish government has agreed with VIB: the VIB management agreement. The management agreement is renewed every five years and specifies the objectives, structure and governance of VIB, the funding mechanisms, the reporting requirements and the evaluation mechanisms. In addition, it provides the basic outlines for intellectual property policy and personnel policy. The management agreement states that (the performance of) VIB has to be evaluated at the end of the agreement, hence every five years. Based on this evaluation, and a strategic plan of VIB for the next five years, the Flemish government decides on the funding levels for the subsequent years. VIB so far has received substantial funding: approximately €460 million over the past 15 years.

Since 2000, the Flemish Government is increasingly using performance targets for government funded activities (in the area of science and innovation) and Key Performance Indicators to measure the performance. For VIB as well, clear and unambiguous indicators have been developed and targets have been set to reflect the multiple ambitions and strive for excellence of VIB.

VIB now

VIB is one of the (four) so called Strategic Research Centres and was established in 1995 by the Flemish government as an inter-university institute to support strategic basic research in biotechnology, to facilitate technology transfer, and to stimulate and communicate ideas and innovation (about biotechnology) to the public. VIB is a virtual research institute and works in close collaboration with the four Flemish universities of Ghent, Leuven, Antwerp and Brussels. Including the new initiative NERF[1], VIB's research is organised in 9 research departments. The departments are composed of research groups (64 in total in 2010). In addition to the departments there are 7 independent research groups (special projects) of which 4 have decided to structurally integrate within one of the VIB departments. The VIB groups have one group leader, and on average 4 postdocs, 5.5 predocs, and 3.5 technicians per group. In total VIB currently provides work for over 1,200 scientists and technologists. VIB is a management entity covering own personnel as well as employees of the universities: each research department has employees on VIB payroll and university-employees. Research strategy and research management are however determined by VIB.

VIB financial means are also partly administrated by VIB and partly by the universities. The income, as stated in VIB annual accounts, consists of a base grant from the Flemish government ('VIB-grant'), income from industry (contract research

[1] Neuro Electronics Research Flanders, a joint basic research initiative to unravel the neuronal circuitry of the human brain, set up by VIB, imec and KU Leuven

and royalties), income from international programmes and income from fiscal/social benefits incentives. Income from various bio-incubators is also administered by VIB. The largest part of VIB income is spent in the research departments on personnel and equipment. The remaining part is spent on central support services.

The income administrated by the universities consists of grants and (national or local) fellowships, and is spent in the research departments. 80% of the total income available for research supported by VIB is determined by government sources, either directly (VIB grant) or indirectly (university income and local fellowships). The financial situation of VIB is healthy: in the past years a positive financial result was obtained, but VIB is vulnerable to policy changes. This became more obvious in the past years: Profits diminished after 2008 when the government decreased the VIB grant because of the financial crisis. The increased income from third parties and reduced operational costs could not fully make up for this.

VIB's history and policy background

VIB is based on the industrial policy in Flanders dating from the 1980s when the Belgian State Reform gave the Belgian regions authority to develop policies in this domain. Education and scientific research (both fundamental and applied) were identified as crucial pillars of industrial reform and, as one of its actions, the Flemish Government established strategic research centers ('SOCs' in Flemish). A main mission for the SOCs is to maintain and create international research excellence in the respective scientific fields, while feeding industry with valuable knowledge that could be valorised, thus leading to flourishing industry.

The Flemish government made the choice for biotechnology as strategic research domain because of the presence of critical mass (a number of prominent and internationally recognised researchers and their groups) combined with the acknowledgment that the biotechnology field would be a very promising field for solving health and food-related global problems in the coming years. This choice resulted in continuous policy support for biotechnology in several policy plans and programmes, and the foundation of VIB in 1995.

It is VIB's mission to establish a good reputation based on high quality research, add economic and social value to Flanders, including training of PhDs and the contribution to medical progress and sustainability. Over the years, this mission remained constant and focused on conducting strategic basic *science* to develop top technology; *transferring science and technologies* to industrial applications; and stimulating the *societal dialogue* on biotechnology. Although the actual phrasing of the strategic objectives has not changed much, the policy context in which VIB operates has, and this resulted in a stronger focus on the valorisation of results. VIB has accordingly developed a 'performance based management system' as well as continuously improved and expanded its valorisation policy.

In the management system the targets for publication in high-ranking journals relate to the scientific excellence; the target for PhDs relates to the educational excellence; and the targets for patents, start-ups and industry income relate to the valorisation excellence. The Key Performance Indicators reflect the high expectations, as well as the available budget: the rise in performance targets between the second and third MA reflects the increase in budget with 20% between these periods.

The development of VIB is reflected in the performance on these KPIs, and past evaluations of VIB confirmed the institute's successes over the years.

The first VIB evaluation in 2000 was very positive. The scientific quality of VIB was excellent; its valorisation policy took off and led to licensing and start-ups, the societal assignment was carried out professionally. With regard to the latter, the evaluation concluded that VIB was not the required player to carry out the societal assignment of facilitating a public dialogue, as VIB was generally observed as a partial actor. Further recommendations addressed inter-university co-operation, IPR agreements, training

of researchers and the installation of a scientific advisory council. Moreover, competition between departments was abandoned, as it appeared to work counter-productive and prevented departments from co-operation. The positive evaluation led to a prolongation of the first management agreement to 2001 and of increased budgets for VIB during the period of the second management agreement (2002-2006).

In 2006, the second evaluation of VIB was carried out. Again, the evaluation was very positive, this led to a further increase of public investment in VIB with 20%. As a consequence the number of VIB employees increased as well.

In the current management period (2007-2011), VIB grew significantly. Again VIB performed on an excellent level and outperformed its targets with an average of 168% over the past 5 years. 7 out of the current total of 72 research groups were performing below target and will be terminated following the recent finalised individual department reviews VIB.

Scientific quality

VIB's science policy has three elements: frontline (not me too), world class, relevance and quality. This should lead to performance, which is defined as a good record of high impact publications and patent applications. VIB strongly selects on excellence. Critical mass and interchange are key success factors for VIB, and therefore it tries to provide its researchers with good access to advanced technologies, facilities and infrastructure. VIB's science policy is quality driven, not 'mission driven'. This is in general well received and applauded, although some label this policy as 'non-existent' or 'driven by university policies and competition'.

In the Management Agreement 2007-20011 between VIB and the Flemish government the following strategic objectives for science and education have been defined:

- To promote the international reputation of Flanders in the field of biotechnology.
- To develop an autonomous inter-university structure creating a stable and stimulating environment for high-quality basic research in the field of biotechnology in Flanders.
- To undertake and/or to have undertaken research activities in the field of biotechnology.
- To actively contribute to the education and training of researchers in the field of biotechnology.

These strategic objectives have been translated into a operational objectives related to the following Key Performance Indicators (KPIs):

- Science: 150 publications/year in high rank journals (impact factor > 5), of which 55 publications/year in top journals (impact factor > 10).
- Education: 40 PhDs/year.

VIB's scientific performance is above KPI target: the top publications reach 165%, high rank publications even 179%. In the period 1995-2009, VIB has published 4843 papers, with an annual growth of 7%, which is in line with the increase in funding and number of employees of VIB.

VIB has a stable share of almost 15% in the Flemish biotechnology research output. VIB papers are, on average, published in higher impact journals. The average subject-normalised citation frequency for VIB papers is high, 1.66 being the world average in the life sciences, and lies distinctly above the Flemish average.

In comparison with a number of other leading biotechnology research institutes in Europe VIB scores well: Karolinska has a high quantitative output, but is not superior in qualitative terms; EMBL has a lower quantitative output, but has a superior quality.

Since 1996 the VIB departments and groups have increasingly collaborated, as shown by the number of co-publications. In 1995 0.5% of the total peer reviewed publications were institutional co-publications, while in 2009 this was 7%. The number of international co-publications increased significantly over the years as well, to more than 60% of the total number of VIB publications.

In terms of educational targets VIB performed excellent as well: 284 researchers obtained a PhD degree (142%). Interviewees consider the quality of VIB PhDs as high.

Tech transfer and valorisation

In the Management Agreement three Strategic Objectives are defined focusing on technology transfer and valorisation:

- To develop a well-structured knowledge transfer policy for the research results obtained in Flanders with industrial application opportunities in the field of biotechnology.
- To promote cooperation with the biotech industry, among other things to ensure the transfer of technology and knowledge to the industry established in Flanders, to attract and execute industrial research projects, or to participate financially in related projects, associations or companies.
- To promote industrial activity in Flanders in the field of biotechnology.

In order to achieve the valorisation objectives VIB has set up a tech transfer policy, including from the start a Tech Transfer Office (TTO) and, since the last evaluation, a "tech watch" team.

The tech transfer policy focuses on:

- The translation of VIB's research results into products for the benefit of patients and consumers.
- The growth of the regional life sciences industry.
- The generation of revenues to research departments.

Since the last evaluation VIB supports non-VIB research groups as well.

A team of 16 people (15.4 fte), is responsible for the implementation of the tech transfer policy. It is located in VIB headquarters in Ghent, but works closely together with the VIB departments and with the tech transfer offices of the partner universities by means of a bilateral communication platform (with regular tech transfer-briefing meetings).

The tech transfer approach includes the following activities:

- The identification, analysis and patenting of novel inventions.
- The facilitation of access to and exchange of biological material, software, tools and data.
- The support of proof-of-concept research.
- The marketing of VIB's knowledge and negotiation of tailor made agreements.
- The development of technology/product platforms and the establishment of start-up companies.

The strategy resulted in a mindset of the researchers to keep their ears and eyes open to think about tech transfer opportunities in addition to their excellent scientific performance. This message was very well communicated, since the tech transfer approach is not considered to be influential on the fundamental character of the scientific research in terms of excellence. VIB has created a positive "culture" of valorisation and an acceptance among the entire VIB staff that top science can go hand

in hand with excellence in Technology Transfer[2]. This combination is considered a strength of VIB and unique in the world. Furthermore, the strategic choice of supporting potential new (platforms of) technologies during a longer-term incubation period (including the pre-seed grant, assisting in writing business plans and recruiting a suitable management) works quite well.

There are three annual targets for Tech Transfer in terms of Key Performance Indicators:

- 25 patent applications (of which 50% is to be granted)
- €6.0 million receipts from industrial collaboration
- 1 start-up company/year

In addition to these indicators, the Management Agreement comprises a number of indicators that should lead the assessment of economic impact of VIB in the period 2007-2011:

- The expansion of the bio-incubator facilities in Flanders up to at least 16.000 m².
- The exploitation of the VIB Seed Fund with at least 5 investments in biotechnology companies.
- The organisation of at least 100 meetings with foreign biotechnology companies in the context of starting business activities in Flanders and/or a Research and Development (R&D) or licence agreement with VIB.
- The attraction of 5 international investments (foreign biotechnology companies) to Flanders.

Furthermore VIB tries to increase its economic impact by means of the following additional activities as foreseen in the Management Agreement:

- Setting-up a structured information platform for the Flemish biotechnology industry.
- Maintaining mutual interaction with the Flemish industry (mainly, though not exclusively, the biotechnology industry).
- Transfer of knowledge and technology to the Flemish economy.

Over the last 10 years the number of inventions has been quite stable with around or slightly above 50 inventions reviewed per year. In the period 2006-2010 a total of 240 inventions by VIB research groups has been reviewed by the tech transfer office. Based on the analysis of the novelty and inventiveness of the inventions approximately 50% of the inventions is translated in patent applications. For the period 2006-2010 this resulted in 114 patent applications, which is just below the KPI target of 125. For non-VIB research groups 16 patent applications were filed.

In the period 2006-2010 a total of 457 patents have been granted which amounts to a total of 731 granted patents since the establishment of VIB. These 457 granted patents belong to 85 patent families, which implies that the patents are granted in multiple countries. The high number of granted patents in the last five years (in relation to the total number of granted patents) is caused by the average time lap between the date of filing a patent and the actual granting of a patent of 7.9 years.

At this moment the patent portfolio of VIB consists of 175 active patent families, of which 27 patents/patent applications are transferred to industry and another 77 are licensed to industry. Another 6 patent applications are kept in the portfolio for two new start-up companies. Overall, 63% of the patent portfolio is transferred or licensed to industry or kept in portfolio for strategic reasons.

[2] Quote from Report on the Evaluation of VIB – Panel Meeting Report (2011).

By its active marketing approach towards industry, VIB initiated 1,320 meetings with companies during the period 2006-2010. Almost 75% of the contacts (i.e. 979) is with international companies, almost double the economic impact indicator as formulated in the Management Agreement. Based on these contacts a total of 329 R&D and license agreements and 47 service agreements have been signed, almost equally distributed among Flemish and non-Flemish companies. Industrial revenues in the period 2006-2010 amounted to €61.8 million, more than double the KPI target.

VIB has a very intensive start-up approach consisting of in-house evaluation of technologies, development of associated IPR platforms and conceptualisation and composition of business plans. Based on business cases road shows are organised towards potential regional, European and US investors and an appropriate management team is recruited. With this approach VIB tries to facilitate the start-ups as much as possible and make sure the company is provided with critical mass and a global competitive perspective from the start. Over the entire lifetime of VIB this approach led to the creation of 8 start-up companies based on technology that is developed by the research departments, including 5 companies that are backed by Venture Capitalists. In addition, VIB founded three organisations that focus on catalysing the Flemish life sciences sector. The VIB start-ups currently employ around 715 persons, of which more than 90% employed by the first three start-ups (Devgen, CropDesign and Ablynx). The 4 technology-based start-ups that are established during the evaluation period 2006-2010 employ less than 30 people of which Actogenix is accountable for the majority of the employees. The total investment in the start-up companies amount to a little over €434 million, of which more than €331 million was invested in the evaluation period 2006-2010. Half of the investments come from international (foreign) investors. As with the number of employees, the first three start-ups are responsible for over 80% of the investments (in the period 2006-2010 as well as of total investments).

In comparison with the benchmark institutes the number of start-ups created by VIB is not very high, but the success rate and the quality of the start-ups (in terms of investments from Venture Capitalists and employment) stand out very well.

With respect to the non-KPI economic targets currently 24.000 m² of incubator facility is available, exceeding the target as defined in the Management Agreement. The internal seed fund of €2.5 million, established in 2005, was extended with €5.5 million in 2008, with the purpose of investing in new VIB start-ups and participating in follow-up rounds in already existing start-ups. In the period 2006-2010 this VIB Seed Fund made 6 investments in VIB start-ups with a total amount of €1.46 million and 1 investment in a non-VIB company[3]. With regard to the investments, almost 70% of the investments are allocated to already existing start-ups[4].

VIB furthermore contributed to the attraction of five international industrial biotechnology companies to Flanders: Regenesys (US), Oxyrane (UK), Apitope (UK), Argen-X (NL) and Biocartis (CH). With the recruitment of these companies VIB exactly meets the objective as formulated in the Management Agreement.

The estimated added value of VIB for the Flemish economy varies in the evaluation period between €5.3 million (2006) and €14.9 million (2008). The height of the added value in 2008 is the result of a significant higher income obtained from contract research. In addition, it can be assumed that without VIB less new biotechnology industry would have been attracted (or even: companies would have left): VIB created research excellence that was attractive for foreign companies.

VIB was founder of FlandersBio, which has played an important role in the involvement of the industry by mobilising companies to Flanders. VIB cooperated with

[3] Ablynx, Actogenix, Solucel, Biolign, Pronota and Multiplicon.

[4] Argen-X.

Flanders Investment and Trade (FIT) to recruit international companies to Flanders. VIB created trust with Venture Capitalists, which resulted in greater willingness to invest in Flemish biotech companies. Flanders is considered to be an interesting location for biotechnology activities nowadays, and VIB has been instrumental in achieving this position. VIB's achievements in developing the incubator facility and attracting foreign companies can therefore be applauded; they are a crucial element in the successes of VIB and Flanders in general in the biotech cluster.

Finally VIB has been putting the idea of economic valorisation of research results on the Flemish agenda. VIB (and others like Leuven R&D) have started a process of professionalising tech transfer, of which the effects can now be seen in many research domains at all Flemish universities.

VIB and society

In addition to the scientific, educational and economic focus two broader strategic objectives have been defined in the VIB Management Agreements:

- To take part in the societal debate on the scientific and technological aspects of biotechnology by actively engaging in objective communication on science, paying attention to informing the general public, regulation and risk assessment.
- To make a contribution to sustainable development

VIB has an elaborate communication strategy. As part of this strategy VIB starts with informing the public by announcing breakthrough research papers and national and international prizes for VIB scientists in press releases. Under the header 'communicating by doing' VIB uses scientific experiments (like field trials) as communication tool. Surveys and polls are conducted, for instance to assess the attitude of the Flemish population towards biotechnology. VIB also publishes opinion articles as part of its media strategy. The VIB website is highly visible (181,000 visits per year) and has a Dutch site focused on the public at large and an English site focused on scientists. In 2009 the communication strategy was renewed with a stronger focus on 'decision making units' such as politicians, policy makers and people from civil society.

Over the years of its existence, VIB demonstrated a 300% increase in references to VIB in the media. In the interviews we found that the role of VIB to explain GM food to the general public and policy makers was considered particularly valuable.

VIB's science education activities have been a success over the years (scientists@work, school kits, et cetera). In the past 5 years, VIB reached over 20,000 kids and teenagers with these programmes. VIB is however operating rather on its own, and synergies with the generic Flemish science communication policy should be better explored.

VIB's visibility to the general public in Flanders can be increased further, although many Flemish people do know that biotechnology is a key strength of the region, with thanks to VIB's active communication policy.

VIB's international scientific reputation seems very good. The number of students that apply for the international PhD programme increases every year and there is an increased interest of Belgian and international researchers living and working abroad to return to Flanders ('braingain') due to the reputation of VIB.

The international visibility of VIB is also easier to measure than a few years ago, due to a more standardised use of the affiliation in publications, communications, presentations, etc.

In the management agreement VIB also has the objective to contribute to sustainable development. The institute undertook various activities to promote 'responsible research' such as developing a procedure on handling scientific misconduct; lecturing on research ethics; through participation in the Belgian Bio safety Professionals Network and Bio safety Advisory Council. VIB did not refocus its research programme

around sustainable development, which might have been the intention of the Flemish government when they added 'sustainable development' as objective to the management agreement (however these intentions could not be traced within the scope of this evaluation). Although VIB's research does contribute to sustainability, VIB has not made sustainability a strategic issue and could further elaborate on how it will deal with the effect of its research results on sustainability issues in its future research strategy.

Organisational quality and governance

Overall, the VIB management and organisational quality is considered excellent. Important issues that have been dealt with in the past years are the institutional renewal and the strategy process, HRM, monitoring and KPIs, the relation with the participating universities and internationalisation.

Renewal, strategy

Although VIB has some mechanisms in place to rejuvenate, there is little room to shift to new promising areas that are not currently covered by the departments. This risk was already identified in the last evaluation in 2006 and it was recommended that *'VIB should consider starting the transition towards introducing a more centralized approach in R&D portfolio planning and management. The role of the IAB (Institutional Advisory Boards) should be further intensified (and utilized) in this process. The next contract period should be a transition period in this respect'*.

Currently, most science strategy development still occurs at the department level, which has led -with a few exceptions- to little change in research focus. In principle, the departments adjust their research programme only if it helps them to stay at the forefront of science (bottom-up approach). They have however a number of mechanisms at hand to change their research direction, including employing new people such as group leaders; implementing new technologies; and specific development of new knowledge. VIB further seeks to guarantee renewal at department level by the continuous evaluation by the Science Advisory Boards (SABs). At institutional level approaches are discussed with the Institutional Advisory Board (IAB) and in the Board of Directors.

A concrete result of this is the start of a new department in cooperation with imec and the KU Leuven: NERF, Neuro-Electronics Research Flanders. This has only recently been started, but the subject of NERF is really scientifically interesting and potentially of great societal value (highly supported by the peers involved in the meta-evaluation of VIB), there is a relation with knowledge strengths of both imec and VIB and so far, some really good researchers have been attracted. The strategic process around NERF however seems to have been rather opportunity driven and top down. The internal support within VIB for NERF does not seem to be 100%, and a more organised approach for such decisions is considered desirable. Integration of future NERF personnel within VIB (and within imec, but they will be physically based within imec) will be a challenge. Lately, renewal also occurred because VIB hired a new department director from outside VIB, and on this occasion VIB took the opportunity to redefine the research focus of the department in cooperation with this new Director.

A third mechanism for renewal is the project programme. In the project programme the VIB management selects independent groups through an open call. The selected group leaders then can execute their research under the VIB flag without being part of a department. This has led to 7 new groups. The peers demonstrated however their concerns over the current 'independent groups' scheme. They consider: "it is essential that any new independent appointee is embedded within a supportive VIB department that is at least highly interested in the research interests of the independent group leader". They have major concerns that "placing a young VIB group leader outside a VIB department isolates the younger scientist from the VIB environment and thus will

be ineffective in helping VIB (and Flanders) achieving its long-term goals. Only in exceptional circumstances should an appointment be outside a VIB department". This recommendation potentially has some consequences for the programme, since the idea is to ensure that the project leaders can act independently from the department and this way explore new fields of interest. Technopolis recommends VIB therefore to further evaluate the optimal balance of independency and attachment to a department to be as effective as possible. Finally the technology watch provides the groups with ways to acquire or develop new technologies and infrastructures.

Although VIB has some mechanisms in place to rejuvenate, there is still relatively little room to shift to new promising areas that are not currently covered by the departments. Main critique on the strategy process is that it is not explicit and not very transparent to different stakeholders within VIB.

HRM

VIB has an annual turnover rate of personnel between 15 and 19%. VIB has therefore been focusing increasingly on career development over the years. With the introduction of 'a more elaborate function level system in the 2009 HRM plan, career management has become more transparent and offers clearer career perspectives within VIB. Staff training supports this and received much attention in the past years.

Future challenges are however the development of clear exit strategies (for groups that have to leave VIB because of their performance) and further improvement of the gender balance: VIB overall counts 52% females and 48% males, but the presence of women at the level of PI and Dept. director dramatically drops to around 12%.

Introduction of a mentoring system in place can strengthen the HRM system further. Finally there is some need for media training.

Monitoring and KPIs

The current monitoring and evaluation system to assess VIB's performance is overall perceived by VIB as workable and there is no real need for change. The system addresses both quantitative and qualitative metrics and the balance used over the last 5-year period (60% on strategic basic research, 30% on valorisation and 10% on education) has worked well according to the stakeholders. The high performance targets however, especially when they are directly translated in targets for groups, create large pressure on individuals to perform and it might be considered to add some specific qualitative indicators that measure research quality (citations) or technology and tool development including computational methods.

Relation with (participating) universities

The relationship between the participating Flemish universities and VIB improved significantly over the years. For further improvement the heads of the research department proposed the introduction of a Science Director to the management team. This person would support the current management in their interaction and cooperation with the Ministry, other funders, the universities and external scientific institutions.

Important remaining issue in the relation with the universities is the position of group leaders. The complex relationship between VIB funded groups and their host university could lead to difficulties for group leaders to obtain a university position, a position, which would enable them to obtain external funding and act as the principle supervisor of a PhD students. VIB should therefore not consider hiring group leaders unless (at least a partial) appointment can be guaranteed at a university.

Internationalisation

Finally, VIB is an increasingly international institute. The non-Belgian share has increased from 15% to 30%, and is around 45% in the categories of PhD students and postdocs. With its international PhD programme, international recruitment and international collaborations, VIB offers various opportunities 'across borders'. The number of foreign Group Leaders has almost doubled from 14% to 24%. Participation in EU and other international programmes has increased, and international co-publication has increased as well. This internationalisation has had many positive effects: The pool from which researchers can be recruited has increased (and therefore the excellence of the recruits); the international visibility has increased because of international publications of vacant positions; the size and intensity of the international network has increased; participation in international programmes becomes easier, etcetera.

However, since many positions are only temporary there is always a potential of brain drain as well.

The future of VIB

VIB has been successful in continuously reflecting on its strengths and weaknesses and act upon them to improve its performance and organisation. A few challenges lie ahead of VIB however:

- It will be a challenge to focus on fewer key areas and define topics in close cooperation with the key stakeholders within and outside the organisation, bearing in mind that short-term political choices (either made by universities, politicians or other important stakeholders) should not stand in the way of the long-term perspectives.
- The huge amounts of data available pose a great challenge on VIB. It will need to strategically buy, develop or share technology, facilities, infrastructure, etcetera, to be able to cope with these data.
- Rejuvenation is a necessity for a healthy organisation. Rejuvenation should however not be an objective in itself, and should be always be driven by strengths and weaknesses that call for renewal in a certain domain.
- It will be a challenge to further increase VIB's visibility in European initiatives, since these are largely coordinated by the Flemish government organisations such as FWO and the ministry itself. VIB could be an important sparring partner in agenda setting activities and thereby increase its own visibility.
- A challenge will be to increase internal transparency and improve communication without losing speed and momentum and the ability to act when needed.
- Flexibility is needed to work with the differences in educational obligations in the departments. This is an important driver for success of the different departments and their Directors.
- It is an important challenge for VIB to support its researchers with obtaining a permanent university position, especially in the case of the independent Group Leaders.

Despite these challenges, VIB seems to be ready for the future, provided that the funding of biotechnology and life sciences research and innovation remains a priority for the Flemish government. Although results from the past are never a guarantee for successes in the future, VIB is expected to have a noteworthy impact on Flemish society and economy in the next few years as it had in the past, not only in terms of employment but also in terms of awareness, (international) reputation and innovation.

Conclusions

VIB has shown an impressive performance over the past years. The organisation grew significantly and the outcomes and impacts of each management period were evaluated very positively and led to renewal. In the current management period, again, VIB performed on an excellent level. Except for the number of patents, all targets were met. The targets for science were met with respectively 165% (publications in IF > 10 journals) and 179% (publications in IF > 5 journals). The targets for tech transfer were met with respectively 91% (patents), 206% (revenues from industrial cooperation) and 100% (start ups). However, the number of start-ups includes also other organisations than technology-driven companies, and it showed to be more difficult to reach this target during this management agreement. Additional targets set for tech transfer in the latest management agreement were also achieved. The target for PhD students exceeded expectations as well with a performance of 142%. Finally, revenues from industrial and international sources increased to 168% of the set targets.

Recommendations for the Flemish Government

1. We advise the Flemish government to grant VIB's request for additional means because we believe the current strategic objectives and plans of VIB are sound and require the requested increase, and past performance justifies current funding requests. The peers even suggest to grant and additional 3M€ to VIB to meet current challenges. Whether this is feasible for the Flemish government however, remains a political decision.
2. Although the KPI system is not a perfect system, it has worked well for VIB over the years, and that there is little need for further adaptations to this system. Metrics that measure the value of the contribution of technology and tool development, including computational methods and their developers; and increasing use of citation numbers as a measure of research quality at VIB may be useful.

Recommendations for VIB

Main issues

3. The science strategy process could be more transparent and clearly linked to external trends and challenges.
4. If the Flemish government decides to provide VIB with less funding than requested, VIB should focus on a few activities instead of doing it all with less means.
5. VIB should consider adding a science director to their management team, that is focusing on further improving relations with universities and improving the science strategy process.
6. It is furthermore crucial that VIB group leaders are provided at least a partial university appointment in order for them to apply for grants and supervise PhD students.
7. VIB should promote retention of well performing senior staff, and ensure that contingency and succession plans are in place for senior management.
8. Clear exit strategies should be developed for groups that need to leave VIB. Expectations could be managed from the start: turnover after a period within VIB is the expected norm, and having to move on from VIB must not be considered as a failure.
9. The VIB Seed Fund should be retained within VIB, as it is a critical factor accelerating the translation of technology into commercial impact in Flanders. The

tech transfer office of VIB has the right capabilities to manage such funds and it fits in the entire tech transfer policy.

10. VIB should seek further cooperation with initiatives such as CMI and Flanders Care.
11. Synergies with other science communication actors in Flanders should be explored and realised.

Other recommendations for VIB

12. VIB could further explore the possibilities to act as partner for the Flemish government towards European agenda setting and initiatives. This should be part of a continuing strategy to connect expert researchers to policy makers and assure that they have the most up to date and relevant material available to them.
13. Given that VIB's research results can have very broad and large effects on the environment and social well being, in its future research strategy VIB could further elaborate on how it will deal with sustainability issues.
14. VIB should further consider evolving its scientific priorities with sufficient flexibility; given that most senior staff has a permanent university position with the associated space.
15. VIB should develop guidelines and processes for formal and uniform mentoring of scientific leaders, post docs, students and staff, hereby bearing in mind that mentoring is different from evaluating performance of staff, and needs frequent attention.
16. VIB should keep in touch with former VIB employees, which may become important contacts (abroad). We recommend that VIB consider starting a VIB alumni Association using new media.
17. VIB should continue and expand the successful 'scientist@work', 'science4kids' and 'biotechnology school kits' programmes, as well as 'teaching the teachers' and the development of various folders. However, further investments can be made in successful activities aimed at the public at large and to reach more young people, The use of new 'social media' such as Facebook, YouTube, and LinkedIn in the outreach should be further intensified. VIB should further align with the Flemish science communication policy.
18. Organising an international conferences series under the VIB brand could further increase VIB's international visibility.
19. VIB should invest in professional systems for video conferencing to further facilitate the interaction between the research groups at different locations
20. Although cooperation between the departments increased significantly due to the international PhD programme and other initiatives, this could be further intensified, for instance by the use of shared facilities and seeking further synergies between departments and groups.

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