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(Meta-)evaluation of VITO

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Management summary

This summary outlines the main findings of the (meta-)evaluation of VITO (Flemish Institute for Technological Research) assigned by the department of Economy, Science and Innovation (EWI)¹ in early February 2012 and carried out by Technopolis Group in the period February-June 2012. The evaluation focuses on the period 2008-2012. This is the period of the current Management Agreement (MA), the agreement that governs the relation between VITO (as a strategic research centre) and the Flemish government and provides the base funding. However, the evaluation also has attention for historical pathways and is in that sense a meta-evaluation.

Inputs for the evaluation were a (ex-post) self-evaluation by VITO, VITO's draft strategic plan 2013-2018, a bibliometric and technometric analysis of VITO's performance by ECOOM, a client satisfaction survey performed by Dialogic as well as numerous policy documents and other information on VITO. As part of the evaluation Technopolis synthesised the information available, held an additional survey (among Flemish laboratories) and interviews with more than 50 relevant stakeholders inside and outside VITO. A benchmark with other international research institutes was made. A peer review panel (consisting of international experts in the VITO domains) visited VITO in May 2012 and made a thorough assessment.

General introduction to VITO

VITO was spun out of the federal nuclear research institute SCK in 1991 and then became the second Strategic Research Centre of the Flemish government, for the domains of energy, environment and materials. Over the years the mission shifted slightly. In the current MA the mission of VITO is formulated) as follows:

“As an independent and customer-oriented research organisation, VITO provides innovative technological solutions as well as scientifically based advice and support in order to stimulate sustainable development and reinforce the economic and social fabric of Flanders”.

In the evaluation period VITO received a base funding of on average €30-35m/y, an annual (continuous) assignment of government tasks in the field of environment and energy (the so-called 'reference tasks') of on average €10m/y and an increasing own generated income of €39-64mln/y. Of the total VITO income some 80% comes from public sources and 20% from private sources. The research of VITO is performed in three domains (Quality of the Environment, Energy and Industrial Innovation). Within these domains there are in total eight research units.

Science

The scientific productivity and quality that in the 2005 evaluation was described as one of the weak points of VITO has improved. VITO's scientific production increased from 60 to 100 annual SCI-publications. In this way VITO met the corresponding target as stated in the Management Agreement. The relative citation rate increased considerably (in the period after 2000), and showed a continued but marginal increase in recent years. Whereas the 'Quality of the Environment' theme is considered strong (with a real excellent group in remote sensing) other research areas in the themes 'Energy' and 'Industrial Innovation' are considered scientifically less

¹ The assignment for the (meta-)evaluation of VITO was awarded to Technopolis Group by way of a public procurement procedure (“(META-)EVALUATIE VAN HET STRATEGISCH ONDERZOEKSCENTRUM VLAAMSE INSTELLING VOOR TECHNOLOGISCH ONDERZOEK VITO EN HAAR ONDERZOEKSDOMEINEN” – bestek met nummer EWI-2011-13).

strong (except separation technology and smart grids (developing now)). On the international level, VITO performs very well with its remote sensing activities, but as an institute VITO is not well known internationally and possibilities for improvement are there. VITO's income from participation in European framework programmes did however double since 2006 to €4.5m in 2010 and even rose to €5.6m in 2011.

At national level however, VITO is well known and in contrast to five years ago, relations with Flemish universities are intense and good. VITO now also has an important role in education by offering PhD positions. VITO has clearly established itself as an important player in the scientific research environment in Flanders. VITO has enabled a concentration of expertise that would not have been possible for Flanders to achieve without the establishment of a strategic research centre.

Economic and societal impacts

VITO has increased its number of EPO patent applications from five per annum in the period 1991-1999 to about nine per annum in the period 2004-2009. VITO also has an active policy towards Flemish SMEs. The number of SMEs with whom cooperation agreements are signed, has shown an annual increase of about 23% during the management agreement period. VITO furthermore realised six spin-offs in five years. Two of them are based in China; their contribution to the overall goals set in the management agreement (the spin-offs should serve Flemish economy and society) seems questionable. With these outputs VITO has met its economic targets stated as a Key Performance Indicator (KPI) in the Management Agreement.

At the more operational level, clients are not satisfied with VITO's ability to understand economic realities, they complain about its lack of openness and dynamic attitude and its quality when compared to its competitors. VITO's research subjects do not align well with Flemish companies' needs.

VITO claims that it has actively internally stimulated the accessibility of its outputs to wider audiences in Flanders (science communication). Most of our non-VITO interviewees shared this opinion.

Reference tasks

Within 15 reference tasks, with budgets varying from €84k to €2.2m per year (figures for 2011), VITO performs specific services for the Flemish department LNE and the governmental agencies OVAM, VEA, VLM and VMM². These customers are generally (except one) very satisfied with VITO's expertise and knowledge in their specific domains and highly praise the quality of deliverables. Communication between government parties and VITO is generally good, and VITO's staff is considered dedicated and flexible. Reporting quality in terms of timing and textual details could be improved for many reference tasks by using better quality control procedures.

Laboratories participating in VITO's ring tests and audits (three of the reference tasks) are generally also satisfied: they consider VITO of consistently high quality, with knowledgeable and friendly people, but see room for improvement with regards to processes. All parties do believe that VITO is relatively expensive, an issue which is likely to amplify in the future with new costing structures.

² LNE= Flemish department of Environment, Nature and Energy; OVAM= Public Waste Agency of Flanders; VEA=Flemish Energy Agency; VLM= Flemish Land Company; VMM=Flemish Environment Company.

Further analysis

Income and investment in the units

In three of the eight units income (base funding plus income from contract research and European and other public projects) has increased over the period 2008-2011. In 2011 the income stagnated in the domains Quality of the Environment and Industrial Innovation, but still increased in the Energy domain. This is explained by the emergence of Energyville, the cooperation between VITO and the Catholic University of Leuven in the field of energy research in 2011. In terms of income, the domain Quality of the Environment is by far the largest (ca €20 mln) and Remote Sensing is the largest unit within this domain (almost €12 mln in 2011)

The base funding (for strategic research that is aimed at building knowledge platforms) increased in the period 2008-2010, flattening out in 2011. The largest investments in strategic research through the base funds were allocated to the “Remote Sensing” unit. The second largest investments were in the “Energy Technology” unit and the “Separation and Conversion Technology” unit. The income from contract research and European and other public funded projects increased in almost all units over the period 2008-2011.

The ratio between generated income and expenses is in all units below 100%: this means that VITO invests in all of its units. There are however large differences between the units. Remote Sensing has a ratio of over 85%, and Environmental Modelling and Energy and Environmental Transition have ratios over 70%. These units are typically heavily relying on income generated by public research funding and through public research customers. In 2011 the ratio in the Material Technology unit is the lowest (just over 50%, meaning that almost half of the income comes from the base subsidy of the Flemish government). Investments in strategic basic research in the units Remote Sensing and Energy Technology are accompanied with significant growth in income from contract research and European and other public funded projects. The Energy Technology unit is a rising star that doubled the ratio between generated income and expenses from 30% to 60% in the period 2008-2011, even when the base funding investments increased.

Research focus

A recommendation of the last external evaluation of VITO in 2005 was that VITO should create a more focused research portfolio. In this regard, it was suggested to phase out the material research and put more emphasis on the other research domains. At this moment however, material research is still one of the three research domains of VITO. Recently however, VITO has started with focusing its research with investments and growth of personnel in the area of Energy Technology and Remote Sensing. Material Technology is decreasing in personnel and gets a lower share of investments (although in absolute terms the investment in 2011 is more or less at the same level as in 2008). Outcomes are shown in the level of contract research with a strong growth in the ‘investment areas’ Remote Sensing and Energy and Environment Transition, and limited or no growth in other units as well as in the publication trend.

Although there is some evidence of recent focusing, the effects are small and the portfolio is still rather broad. The research portfolio is still too fragmented, and research groups are often subcritical, except in ‘Quality of the Environment’. In ‘Energy’ the new focus on smart grids is an encouraging sign, also the sustainable chemistry initiative might offer more focus orientation. The organisation would benefit from an effective, transparent and more on-going process to review and modify the research focus, connecting to a consultation process with stakeholders and to changes in the surrounding world. The aim should be to realise the recommendation of the 2005 review to identify and pursue a small number of topics to internationally competitive levels.

Internationalisation

One of the goals for VITO in the MA is related to this: “To become or remain an internationally renowned research organisation in the domains of environment (including earth observation), energy and materials and to be in the top 10 of the European Union in these fields and as such stimulate the visibility of Flanders internationally”. Internationalisation of VITO is therefore important, but the 2008 strategy of VITO does not elaborate upon internationalisation strategies. Nevertheless, a number of international dimensions are integrated in VITO’s strategies and activities: initiatives to attract foreign researchers to come to conduct research at VITO (increase from 6-10% of labour force), contracts with international partners, and coordination activities to internationalise Flemish cleantech companies (Flanders Cleantech Association).

With respect to foreign funding EU participation doubled, and VITO increasingly generated income from foreign industrial partners. The increased international business has also led to a strong increase in international co-publications, especially with (neighbouring) EU countries and the US.

VITO also started activities in China, India, Puerto Rico and Vietnam. Overall these international activities were profitable thanks to a very large and profitable mapping project in Puerto Rico. Activities in the other countries are loss making (accumulated losses outside Puerto Rico approx. €1m), however VITO sees added value in networking and experience (e.g. transition management in India) as well as in access to development aid budgets (projects of more than €5 m are in the pipeline). On the cost side, VITO intends to invest €2m in a geothermal demonstration plant in China.

The (draft) ‘VITO ex-ante Strategy 2013-2018’ states that VITO aims to reinforce the international activities. VITO’s internationalisation strategy seems however not very well underpinned, and rather driven by opportunity and personal preference. The relation between the mission of VITO (esp. the part related to contributing to the Flemish competitive position) and the international activities is not always clear. Furthermore the EU market, an important market for VITO will be changing in the future, which is not explicitly addressed in the VITO draft strategy. A soundly based and realistic internationalisation strategy is therefore still required.

Market distortion

VITO’s various roles and positions require careful positioning in order to avoid market distortions and player/referee dualities. Unfair price competition seems not to be a large issue. VITO calculates full rates including overheads, does not use base funding for contract research and is expensive because of its high labour costs. Also the distortional effect of VITO carrying out the reference tasks seems limited. Over the years, VITO has in general developed such an expertise within these tasks that there are no feasible private alternatives available. It is recommended though to properly discuss alternatives for future (sub)tasks. Thirdly, VITO’s position enables it to use its developed expertise and capital in market situations when it provides services to Flemish companies. This is actually one of VITO’s core strengths and is essential for valorisation of its knowledge, but the situation becomes more problematic when VITO is providing market services that are also available through private alternatives. Flemish companies active in the environmental technology sector find that VITO does at times compete too much by providing relatively standard environmental consultancy. Though the scope of market distortion is likely to be relatively small, a more damaging side effect is an attitude of distrust and competitive behaviour, which could inhibit cooperation in knowledge valorisation. Fourthly, VITO has a dual role as reference laboratory and market participant, which threatens the required impartiality of such a reference laboratory and could provide opportunities for abuse by VITO. Although most stakeholders indicate that VITO is combining these roles in a professional manner, there have been specific complaints about situations when this issue did become problematic. Finally, VITO has a dual position within MIP (the

Flemish Environmental & Energy Technology Innovation Platform) where it is closely involved in the organisation and approval of subsidy applications, but is also one of the main service providers - and hence beneficiary - to the subsidy applicants. As the MIP programme is in transition, there is an opportunity to address this issue.

VITO's governance and organisation

Governance

VITO is primarily governed by EWI (as provider of base funding), but the annual budget of VITO is submitted to the department of Finance and Budget by VITO directly (because of VITO's legal status as formal part of the government organisation). VITO has received much freedom in the MA to determine its own strategies, and has, historically become so independent that, even though VITO is operating at the centre of Flemish innovation policies there is limited structural dialogue on the role of VITO in these policies and there are no formal opportunities for the Flemish government to influence VITO's research portfolio outside the five year evaluation. This offers room for improvement and increased impact on Flanders, especially because VITO operates in fields that are considered strategic for Flanders' future. The government as a key stakeholder should participate in and approve the results of the planning and control cycle at the highest level of VITO. For clarity, this does not mean involvement in operational management, but is to ensure that strategic targets and purposes are correctly aligned with public policy objectives. The VITO Board of Directors, which has been appointed by the Flemish government to govern VITO might be more instrumental in that than at present.

In the internal governance the role of the Management Board of VITO, and especially of the Managing Director is very strong. The Strategic Advisory Council, that was set up by VITO's Board of Directors, has improved the strategic function in VITO to some extent, but it seems that the implementation of a new strategy by the Management Board is slower than is expected by the Board of Directors, and it is unclear what role the Board of Directors plays in holding management to account for this. Overall the governance structure, lines of accountability, and internal management processes of VITO are unclear, and lead to uncertainty over operating priorities, decision making which is not transparent, and difficulties in combining and deploying the scientific resources available to the level of international good practice.

Organisational processes

VITO's strategy formulation and implementation process is yet far from optimal. The draft strategic plan of VITO suggests a system of programming at unit level, but this seems not to be central for VITO. In consequence there appear to be no effective means by which the different scientific disciplines can be combined and deployed to satisfy real market and stakeholder needs and aspirations. Equally, there is apparently no clear process for management of the research portfolio. This should be addressed and various corrective actions by the Board have, according to the Board, not been fully successful. The VITO Board and VITO management should ensure that an integrated planning and control cycle is in place throughout the organisation, with associated lines of accountability, and that the process and structure is transparent to all staff. This planning and control cycle should facilitate the integration of elements of its scientific base to undertake multidisciplinary studies to deliver outputs that are both quality-assured and timely. This would realise a unique potential of VITO and support it in reaching out to new markets and clients in Flanders and elsewhere. A system to engage regularly with current and potential clients and other stakeholders should be introduced, to inform the development of strategy, support the planning process, and to provide a clear two-way communication route between VITO and all interested parties.

In its primary processes VITO has had much attention for acquisition in the past period. This was successful because external income of VITO has increased. Successful

business models are the reference tasks, co-financed projects, contract research and consultancy. In order to be able to achieve further growth new business models have been tried recently such as the Business Affiliate Programme and the Platforms for SMEs. Closer cooperation with universities (like the Energyville example) is also a business model that might generate more income while also increasing the strategic component of the research.

Of the support processes, administration and finance are well organised and transparent, though not always easy to understand.

As for all knowledge organisations the HRM function is very important for VITO since the people are VITO's main capital. Because of its history as a nuclear research centre, the remuneration of VITO's researchers as well as the labour security for VITO employees are excellent. Flip side of this is that labour costs for VITO are high and workforce mobility is low. Almost all employees are in permanent work contracts and possibilities for rejuvenation/strategic reorientation of workforce are limited.

However two trends in human resources are visible during VITO's past years: a rejuvenation of VITO's workforce and a shift towards an R&D-oriented work force. Determining both trends is the rapidly growing share of PhD candidates in VITO's workforce. In this way the above-mentioned problems are circumvented. This is considered a very sensible approach for VITO.

For the future increased mobility and flexibility are important issues of HRM. The current service conditions of VITO staff are inconsistent with operating practice of research institutions elsewhere in Europe and the wider world. This may present problems in establishing the more agile operations sought within VITO, and effective collaborations with leading research institutes internationally who increasingly choose partners able to integrate working practices to deliver outputs against competitive cost and time targets. Because of the sensitivity of this issue it is important that on short notice VITO and the labour unions (supported when useful by the government) start discussions and reach consensus on the opportunities to make VITO more competitive in a European context.

Main conclusions

1. While VITO has made good scientific progress in a number of areas since the previous evaluation (2005), it has not yet achieved its ambition to be in the top ten of European research institutions in its research fields.
2. Positive results in the past five years were the following:
 - Overall: a serious increase in research volume and staff.
 - VITO has met all the targets with respect to the Key Performance Indicators that were agreed in the Management Agreement.
 - Science: a serious increase in number of peer reviewed publications; a stable, above world average citation rate for these papers; a doubled participation in the EU FP programmes; a (very) good scientific reputation in some areas and a much improved relation with Flemish universities leading to a more central position in the Flemish science and innovation landscape.
 - Economic and societal value: an increase in (contract) income from both industry and public sector; an increasing number of patents; 6 spin-offs and an increased visibility in Flanders.
 - Reference tasks: an important role as advisor for the government (in reference tasks and with contract research), with satisfied public customers and positive feedback from the relevant economic field.
 - A stable financial position and an improved HRM system with additional focus on behavioural skills and training apart from the focus on content.

3. However, there is a lot of improvement needed before VITO is really fulfilling its mission: “As an independent and customer-oriented research organisation, VITO provides innovative technological solutions as well as scientifically based advice and support in order to stimulate sustainable development and reinforce the economic and social fabric of Flanders.”

Main points for improvement are:

- The external governance and internal governance of VITO: The governance structure, lines of accountability, and internal management processes of VITO are unclear, and lead to uncertainty over operating priorities, decision-making which is not transparent, and difficulties in combining and deploying the scientific resources available to the level of international good practice.
 - The governance of VITO does not work well, and the government has had only limited practical means to steer VITO’s research into directions that are considered important for the Flemish society outside the MA that is concluded only once every five years.
 - The strategy process that has insufficient interaction with stakeholders in society (government, civil society and business), and is insufficiently implemented with a systematic planning and control cycle.
 - The lack of research focus that has led to a too scattered research portfolio.
 - The alignment of VITO’s research subjects with the needs of Flemish industry is suboptimal.
 - The quality and timing in terms of reporting (persistent problems with some reference tasks show the need of an improved QA system).
4. Possible serious market distortion as perceived by others is found in these cases where VITO is involved in executing (government) programmes in which it is a potential beneficiary as well. Market distortion (because of dual role as reference laboratory and market participant and of providing market services that are also available through private alternatives) seems only minor and/or incidental. However, although the effects might be small the perceived opinion may seriously effect VITO’s reputation as an independent and reliable research partner.
 5. Current KPIs do not really reflect the government’s goals for VITO and are also not effective in guiding VITO towards its ambition of being in the top 10 leading institutes in Europe. They should be changed.
 6. The draft strategic plan 2013-2018 is not sufficient to realise the opportunities and counter the threats over the next five years: it provides some direction and includes useful ideas, but the strategy is too broad, does not seem to link very well with the needs and future needs of external stakeholders, does not take sufficient account of the potential over several years for changes in external circumstances beyond the control of VITO and does not give enough guidance and empowerment to internal stakeholders. It should be improved.

Recommendations for the Flemish government

1. VITO has had increased impact on Flanders in the past five years. The potential added value of VITO is even bigger. The Flemish government should therefore continue to provide base funding for VITO as well as continue to use VITO for policy advice.
2. The government (led by EWI) as a key stakeholder should participate in and approve the results of the planning and control cycle at the highest level of VITO. This means that an approved strategic plan 2013-2018 for VITO should be part of the Management Agreement with VITO, as well as at least annual involvement of the government in the planning and control cycle of VITO. For clarity this does not

mean involvement in operational management, but is to ensure that strategic targets and purposes are correctly aligned with public policy objectives.

3. New KPIs should be developed which are both qualitative and quantitative, to cover both minimum acceptable standards (expected to be achieved) and aspirational targets representing international class operations. Rate of progress towards the latter should be judged annually.

Recommendations for VITO

1. The governance and management structure of VITO should be reviewed to ensure clarity of responsibility, accountability, and process related to strategic decisions.
2. Both the VITO Board of Directors and the VITO Management Board should ensure that an integrated planning and control cycle is in place throughout the organisation, with associated lines of accountability, and that the process and structure is transparent to all staff.
3. The current draft strategic plan should be improved in more elaborate strategy process that encompasses internal and external stakeholders and a better market analysis. Some effort to consider additional scenarios should be included in the process, to increase the robustness and resilience of the planning approach. This must lead, before the end of this year to a final strategic plan with more focus, explicit enthusiasm within the VITO organisation and a better fit with customer needs. As stated above, this strategic plan should be part of the new Management Agreement.
4. The present range of activities is, like has been concluded in all previous VITO-evaluations, too broad to be able to build critical mass in all areas. VITO should focus its research efforts to a more limited number of focus areas.
5. In these focus areas VITO should be aiming more at building knowledge platforms of international quality level instead of maximising contract research from the start.
6. In choosing its focus VITO should build on present strengths with potential and not try to build completely new ones. Although markets for policy advice are largely national, knowledge platforms in areas of public policy should also be (further) developed, in co-operation with policy stakeholders (also outside Flanders, in order to take care that the platforms are internationally competitive) with the present reference tasks as a foundation.
7. Other knowledge platforms should be for a large extent focused on the (future) needs of Flemish companies and be defined in terms of needs for strategic knowledge instead of in end products.
8. All different markets that VITO operates in require their own valorisation strategy. The IPR strategy of VITO should also be adapted to fit the model of working with knowledge platforms for industry and government.
9. The strategy to co-finance SSR to build platforms with subsidy (or other external) income should continue. All possible sources should be explored: EU, SBO, etc. In the new Horizon2020 VITO will effectively experience more intense competition, therefore VITO must immediately start to position itself (with increased research excellence) in the relevant networks.
10. A serious internationalisation strategy should also be part of the overall strategy. In this strategy the proposed investment of €2m in China (in a geothermal energy demonstration project) should be reconsidered from the perspective of its contribution to the Flemish economy.
11. VITO should take care of its image as an independent research organisation. This requires a code of conduct, transparency and better communication. It also

requires opening up MIP for other service suppliers (than VITO), a full retreat of VITO from the decision-making process and a serious reconsideration of the role of VITO in executing/co-ordinating a programme where it also is a potential beneficiary.

12. VITO should consider its pricing strategy and focus more on the value of the results for the customer instead of on the cost price to produce the results.
13. VITO should start discussing its personnel statute with the unions. When short-term changes are not possible, a process should be started to enable long-term changes.
14. Investments in new buildings are important, because working conditions have a great impact on employees' well-being, creativity and productivity. The proposed investments of tens of millions of euros in buildings in Mol and at Energyville Genk seem however to be rather high and may lead to excessive financial obligations (in terms of rent or lease) in the long term.
15. Although many of the above points are internal and very important, and should be solved VITO should not become too internally focused, but would benefit from demonstrating and institutionalizing more clearly a culture of appreciation of the position and the needs of its clients, stakeholders, collaborators and competitors.

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