Interuniversity attraction poles (IAP)

Conclusions and recommendations of the expert panel

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CONTENTS

BOXES

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They are grateful to all the participants of the IAP Programme who answered to the questionnaire and/or which accepted to be interviewed, and to the community policy-makers and to the rectors who proposed us through different channels their views about the programme and its future.

It goes without saying that the usual disclaimer applies and that we take full responsibility of the opinions expressed and of the interpretation done in this report.

PART 1 – SETTING THE SCENE OF THE EVALUATION

THE IAP PROGRAMME IN SHORT

The Interuniversity Attraction Poles programme (IAP) "aims to reinforce the high scientific potential of the country's universities" by promoting "collaborative research". It targets the development of "lasting networks transcending scientific institutions and linguistic communities", requiring the presence of teams from "at least three different institutions and one team in each of the country's linguistic communities". It mainly addresses "teams that have already gained international scientific recognition", but it also wishes "young teams to take advantage of the environment of excellence created". These lasting networks should promote the building of "complementarity between leading teams", the accumulation of a "critical mass of material and intellectual means" and "the increasing use of interdisciplinary approaches"[1].

Created in 1987, the programme is presently in its fourth phase. The first phase (1987-1991) supported 14 networks. These were extended under the third phase (1992-1996), this phase also supporting two other networks. Meanwhile the second phase (1990-1995) had been engaged, supporting 23 other networks. The fourth phase, started in 1997, will last until the end of 2001, and supports 35 networks and 154 teams belonging to Belgian universities[2].

Over 6 Thousand Million BEF were allocated to the IAP Programme between 1987 and 1996. 4.5 Thousand Million BEF are earmarked for the present phase, making of this programme the largest one at the Federal level dedicated to "basic research".

Such expenditure has of course caught the attention of policy-makers and the IAP Programme has witnessed successive and complementary evaluation efforts, both ex post, and for the fourth phase, ex ante.

- The panel was told of an ex post scientific evaluation of the networks from phase I and phase II.
- In 1995 and 1997, two scientometric studies were undertaken for characterising the production profile of participating teams. Whatever limitations such studies may have, both concluded that "a large majority of the teams … had a high impact compared to the world average during the time period 1987-1995" (p.V, study 2). At the same time, both studies were cautious about effective co-publications which were "unevenly distributed" and, by and large, "moderate" (the authors mention a figure of 3.4% of all international publications published by participating teams, pVI). They also offer a first estimate of the central role of the programme in the Belgian landscape: when aggregating both studies, the teams included in the 39 networks produced (in 1994) around a third of the total Belgian articles listed in the ISI databases (SCI and SSCI).
- Finally, an internal review by the OSTC (Federal Office for Scientific, Technical and Cultural affairs) conducted in 1995 was instrumental in shaping the new phase. Most of its seventeen recommendations were taken up and shape the present functioning of the programme.

[1] All citations from this paragraph come from the English official presentation of the IAP Programme, June 1999.

[2] This number also comprises some teams from Federal Scientific Institutions.

The present evaluation is part of the global decision about the monitoring and evaluation of the fourth phase requiring an intermediary evaluation to take place before the final scientific one at the end of the programme. This document presents the results of the intermediary evaluation.

THE QUESTIONS POSED TO THE EVALUATION PANEL

What follows is clearly what is labelled in science policy a "programme evaluation". It does not evaluate the quality of individual activities and their scientific content, it focuses on "global" effects, considering the diversity of individual "networks" as an intrinsic feature of any structured policy, and tries to capture the benefits and pitfalls of the present organisational setting. Traditionally such evaluations address three complementary issues:

(i) The appropriateness of the action: how appropriate are the objectives selected compared to the overall political aims, since, often and especially in technology programmes, the objectives followed have been oversold to policy-makers as compared to what can be expected at best.
(ii) The effectiveness of the implementation setting: how effective are the solutions that have been devised to achieve the targeted objectives.
(iii) The performance of the activity: how relevant are the mechanisms adopted and how efficient is the management of the programme. It is generally under this third heading that come the usual problems of "red tape" or "bureaucracy" and the usual issues about the selection, monitoring and evaluation of individual actions, projects or networks supported.

The readers will recognise these three issues in the five broad questions, which were addressed to us by the Secretary General of OSTC.

(i) What are the effects on the IAP Programme?
(ii) What is the added value of the IAP Programme in the Belgian scientific landscape?
(iii) Is it relevant to start a new phase characterised by structural and financial support to interuniversity and intercommunity basic research networks?
(iv) What should its objectives be (e.g. support to decision making in the long-term)? and
(v) What should be the modalities of intervention in the new phase: network structure, funding modalities, role of the universities, thematic and discipline orientations, differentiation of the modalities of intervention, etc.?

THE SETTING OF THE PRESENT EVALUATION

The three authors of this report have been selected by the OSTC to act as a joint panel overseeing the work of a consultants team – made up of Professor D. Vinck and Ir G. den Ouden – which was selected separately.

The consultants were in charge of five main activities:

(i) conducting a systematic study on programme information and network documents at OSTC;
(ii) conducting systematic interviews of present networks co-ordinators;
(iii) conducting interviews of relevant policy-makers both at federal, community and university level;
(iv) undertaking a mail survey of all participants;
(v) undertaking a specific survey on career paths of persons employed by the teams supported. This has given rise to a main document "Characterisation and effects of the

Interuniversity Attraction Poles" presented in a separate report, and a set of internal documents, which are listed in Box 1.

Box 1 - The documentation gathered and elaborated by the consultants' team

A specific file for each IAP network. It remains confidential and only for the use of the panel and of the analysts. It gathers: (i) A synthetic presentation of the network built, based upon the analysis of documents produced by the networks (proposals, contract, reports) and information gathered by OSTC managers (formal such as evaluations, or informal via interviews). (ii) The minutes of the interview with the co-ordinator and, sometimes, with a promoter or a researcher (altogether 39 interviews of an average of three hours per interview). (iii) A synthetic presentation of the relevant results extracted from the postal enquiry. (iv) A data file on employment produced from OSTC and promoter's data, and (v) in some cases, correspondence received from promoters.

A quantitative report on team involvement and point of view. It is built from the postal questionnaire. Some 170 answers were received (out of 200 sent out, including all "co-promoters"), implying a 85% response rate, a quite unique return in recent evaluations undertaken. It gives the basic characteristics on participating teams and on networks, as well as team point of view of the programme.

A quantitative report of networks set up. It is also built from the postal questionnaire. But the analysis is at IAP network level.

A qualitative report on co-ordinator point of view. It is a thematic analysis of the interviews with co-ordinators.

A qualitative report on institutional witnesses' point of view. It is a transversal analysis of the interviews made with institutional actors or witnesses of the Belgian landscape of research institutions (20 interviews).

A quantitative report on IAP related employment. This report is built upon the OSTC contract database and on the 120 answers received to the specific questionnaire sent to teams on employment.

One role of the panel was thus to interact with consultants about the framing of issues and questions. This led to numerous and positive interactions that the panel wishes to underline.
The authors met three times (in January, February and June). They interacted otherwise via bilateral encounters and through e-mail. The chairman did a few more visits and interviews, and called for open letters of opinion to all rectors and all participating teams. Some 20 answers were received.
All this builds the material, which this report draws upon.

THE APPROACH ADOPTED TO TACKLE ISSUES RAISED

The aims of the programme have been translated by the consultants into five main goals, which are clearly visible in the various detailed presentations of the programme. They are also, and this is an important result per se, commonly shared by the policy-makers[3], at federal level and from both communities, we have met. These are:
1- stimulating intercommunity interactions and cohesion
2- rewarding scientific excellence
3- helping young satellite teams to expand and gain recognition
4- enlarging the competence base
5- anchoring collaborations and building new research infrastructure

[3] We mean the actors and agents involved in the design of policies, in the process of decision making and in the management of science and technology policies and their programmes.

The consultants have gathered evidence about the extent to which each of these goals has been achieved. In their report they have adopted the same presentation for each of these goals

a) the first section describes which achievements are looked for (and translate the above mentioned goals and objectives) and which indicators / descriptors are being used to "measure" the achievements.
b) The central section is dedicated to structuring the relevant information gathered helping to identify, describe and position the achievements arrived at.
c) The final section is the consultants' elaboration about why such achievements have been arrived at and how. One important aspect is to identify all what co-evolves with the IAP action, and thus contributes in explaining the results achieved[4].

In doing so, they provide a characterisation of the programme activities and their effects.

THE WIDER CONTEXT

National research systems, while evolving all the time, appear to be transforming rapidly over the last decade. One example is the increasing importance of interaction among the main actors in a research system: universities, industry, the health sector and other public-sector research, government, and NGOs. Another example is the institutionalisation of (civilian) relevance in science policy and the use of research (and innovation) stimulation programmes starting from the 1970s. Such programmes are now an accepted part of the research landscape. Research Centres, specially established and sponsored (but the latter only for a limited period of time, often ten years with possibly a further extension of five years), appeared from the 1980s onward. Such is for example the case of the Engineering Research Centres Programme and of the Collaborative Research Centres Programme in USA and Australia, respectively, as a further instrument to introduce strategic action into the research system.

At the level of research performance, strategic research, that is, basic research[5] with long-term societal relevance, became a recognised category – even while policy attention was often too exclusively focused on economic aspects ("wealth creation", as UK science policy documents call it). Interestingly, in recent science policy documents, one sees the continued emphasis on relevance as a goal as well as a "return of excellence".[6] Also, interaction between science and scientists and the public domain more generally plays an increasing role.[7]

It is against this backdrop that one must position the recognition, in all developed and some less-developed countries, that university research is a key component of the research system. Whatever the institutional arrangements for university overseeing, most OECD countries have

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[4] This is important because it helps to address the issue of causality: what relations are there between the result we describe and the cause we put forward, which is only one among many other elements that have shaped the present action.

[5] Traditionnaly basic research is defined as only curiosity driven, aiming at producing new knowledge which seems unrelated to any economic or social goal, and is judged and assessed from the sole point of view of the scientific community (i.e. by peers, and on criteria of excellence and originality). It is also qualified as "fundamental" or "pure" research. However the reader should remind the works of the sociology of science (especially Latour's Science in action) that question this supposedly big divide between science and society.

[6] Heide Hackmann, Arie Rip, *Priorities and quality incentives for university research. A brief international survey*, The Hague: Sdu Servicecentrum, March 2000. A publication of the Ministry of Education, Culture and Sciences.

[7] From the wide variety of documents attesting to this, we mention only the report *Science and Society* of the UK House of Lords Select Committee on Science and Technology, 23 February 2000.

developed national funding and/or co-ordinating procedures to ensure both quality (and accountability) and the capabilities necessary to compete in the global environment of knowledge production.

A critical issue faced in numerous countries is linked to the dispersion of capabilities and the perceived need to concentrate them in a limited number of "centres of excellence (and relevance)". This is not specific to smaller countries, such as Sweden, Finland or The Netherlands, but is a challenge faced in Germany as well (Meyer-Krahmer, 2000). One can see that this policy goal will face a strong limitation: how to maintain coherence between the education and research finalities within universities, the former requiring more and more proximity and a large spread of competence while the latter asks for concentration on a limited number of sites. Universities themselves show ambivalent responses to this "need of the time". On the one hand, they are keen to help creating special research centres (especially if this is coupled to financial and symbolic rewards). On the other hand, they want to maintain a certain breadth, and have room for the emergence of new research themes.

If one looks at what has been happening over the years, one sees "virtual" centres or laboratories "without walls" as one possibility of clustering geographically dispersed entities. Their limited number, after more than 20 years of such attempts, highlights the difficulty of such enterprises. By now, temporary and more focused collaborations are progressively privileged. Not because these are easier to develop – fruitful collaboration most often derives from long and difficult learning processes – but because it is easier to make actors' interests converge for a limited time and on a given topic or problem. The vast majority of these network collaborations have been focused on "applied" problems linked to university-industry relations (as witnessed in the collaborations sponsored by European programmes).

The IAP Programme represents one of the very few attempts to push collaborative networks for "basic research". In fact, it constitutes an original answer to a lasting problem shared by most national research systems. With its nearly 15 years of existence, an assessment of IAP as a policy instrument, as well as a feature of a national research system, is broader interest than the immediate question of the OSTC.[8]

THE MAIN MESSAGES OF THE PANEL'S REPORT

The consultants' report clearly demonstrates that the programme has done reasonably well in at least four of the five goals aimed at, i.e. stimulating intercommunity interactions and cohesion, rewarding scientific excellence, enlarging the competence base, and anchoring collaborations and building new research infrastructure. Such an achievement is not that common and requires to be highlighted.

We shall do so in focusing on three main issues: long-term capability building; academic research (and often more than just academic research), and interuniversity structuration (which includes intercommunity interactions). We thus go further than answering the specific evaluation questions. We consider the programme as an integral (and perhaps integrating) component of the Belgian research system, and we must do so in order to address the questions about appropriateness of continuation and the way to go about it (the "modalities of intervention").

It is clear for the panel that the specific historical context of, and traditions in, the Belgian research system played a large part in how the IAP Programme was established and how it evolved. However, the IAP Programme has become a science policy activity with very

[8] The reader can thus understand why three science policy analysts could be easily enrolled as panel members: an opportunity to analyse its development and effects!

interesting achievements, which deserves to be continued, and further improved (in relation to changing national and international contexts).
The success of the activities is linked to five design features (i.e. rules governing action). These are: the existence of interuniversity keys, the focus on excellence, the promotion of thematic networks gathering at least three universities from the two linguistic communities, the establishment of minimal amounts for participation, and the focus on human resources. These principles should be kept.
However the programme requires, in the opinion of the panel, some rearrangements to take hold of past trajectories and lessons learnt. Among them, evaluation of present networks, selection procedures for the next phase, anticipation capabilities and the development of strategic research, some "staging" of calls over the life of the programme, issues about the renewal of the public research fabric and the support to young teams, rethinking the "differentiations" made by the programme between types of participants, scientific fields and types of networks, and strategic management – These are the key items for our discussion of a productive evolution.

PART 2 – THE PROGRAMME'S MAIN ACHIEVEMENTS

In this second part, we enter into the analysis of the effects of the programme, trying to answer the simple following question: what does the programme actually do? The bulk of the activity of the consultants' team has been devoted to the identification of the activities supported and to the characterisation of their effects. We endorse their results as these are presented in the consultants' report (see its executive summary). We have chosen, in this synthesis report, to focus our presentation on what we consider the three main achievements of the programme.

Firstly, we consider that the programme does **far more** that simply promoting bottom-up co-ordination between teams from both communities, which is its Federal "raison d'être". We shall try to demonstrate that it promotes de facto "strategic" interuniversity structuration.

Secondly, we consider that it has significant effects on **long-term capability building**, both at the human and structural levels, even though certain limitations, especially in promoting young, not yet established teams, can be identified.

Finally, we consider that the overwhelming outcome lies in basic, academically oriented research, but that in a significant number of cases, there is also research oriented to societal issues (broadly speaking), corresponding to what is commonly labelled in Anglo-Saxon countries, **strategic research**.[9]

2.1- INTERUNIVERSITY STRUCTURATION

Belgium, as opposed to most EU countries, is characterised by the absence of centralised research organisations dealing with basic research such as CNRS in France, CSIC in Spain or the Max Planck Gesellschaft in Germany. With the de-doubling of FNRS/FWO, it also no longer has one research council like in the UK or in the Netherlands that can promote basic collaborative research at the "national" level, a growing feature of all the above mentioned institutions. One of the key features of the programme, and its Federal raison d'être, is, thus to fill this gap and to promote intercommunity research. The latter is inscribed in the functioning of the programme and is visible in the achievements put forward in the consultants' report.

Convergent indicators about the intercommunity effects of the programme

Let us briefly recapitulate the convergent set of indicators proposed by the consultants' report about the intercommunity effects of the programme.

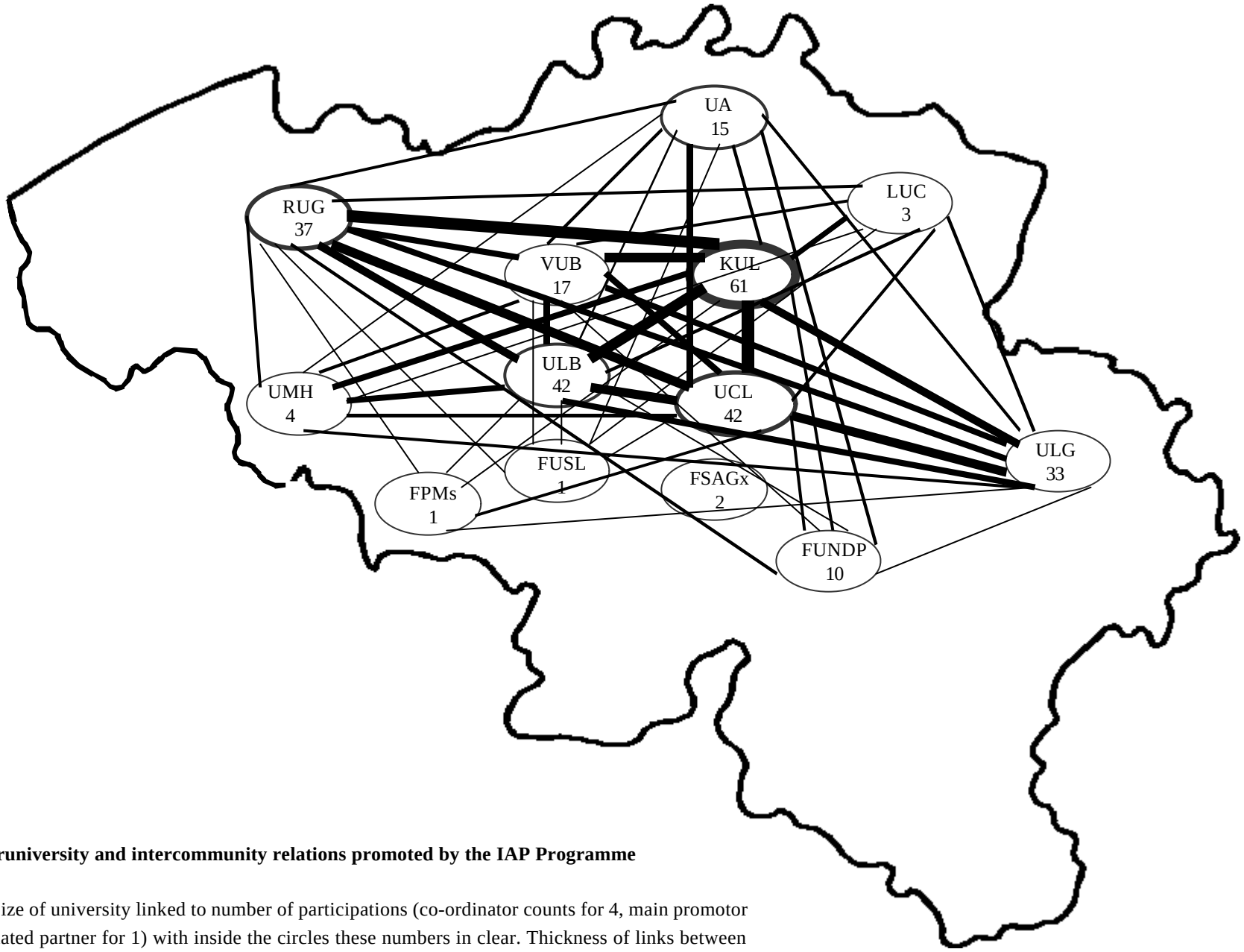
- The map positioning participating actors (box 2) highlights the extent of intercommunity links that do exist now.
- More detailed analysis at network level, shows that half of them are fully balanced between both communities, while the other half only include limited presence of the other community. However these "unbalanced" networks are equally shared between both communities, thus reinforcing the global intercommunity balance of the programme as a whole.

[9] "Strategic research: Basic research carried out with the expectation that it will produce a broad base of knowledge likely to form the background to the solution of recognized current or future practical problems." (Irvine, John and Martin, Ben R. (1984) *Foresight in Science. Picking the Winners*. London: Frances Pinter; at p. 4).

- An emerging fact raised from the evaluation exercise concerns the limited interactions between teams found within some networks. This has led to the issue of artificiality, an occasional phenomenon, which may require rearrangement of such networks for more substantive collaborations to develop. Bibliometric analyses also indicated cases of limited collaboration – although one should not take these at face value because there are good reasons for effective collaborations not to translate into numerous co-authored articles. Clearly this artificiality was the major reason for discontinuation or reshuffling of previous networks[10]. Even though continuation predominates in the fourth phase, witnessing only seven completely new networks out of 35 (see Box 4, further), quite a few networks were qualified by their co-ordinators as "weak", even "artificial" at the start, this to emphasise even more the difference with today's situation. (Cf. the consultants' report for such cases).
- Even more striking is the return rate from the mail questionnaire. Out of some 200 questionnaires sent (to teams and recognised sub-teams), more than 170 were filled in and returned without having to call back. This is without a doubt one of the best return rates ever seen in recent programme evaluations, an indication of the interest participants have in the programme. It is revealing to note that the answer providing the greatest convergence is the position vis-à-vis the positioning of the programme in the Belgian research landscape: **95%** disagree with a potential transfer to the communities (normally in charge both of universities and fundamental research[11]). Similarly, IAP networks share with other types of networks the same "interests" (such as enforcing existing contacts or enabling access to new financial resources). But they also acknowledge a very specific feature, the fostering of transcommunity collaboration: this fact is mentioned as an achievement of the programme by 60% of the teams, and within these 60% consider that the IAP Programme is the sole incitement for such intercommunity collaboration.

[10] Quite a few ex post scientific evaluations we have had access to for previous networks have highlighted this point.

[11] Unless explicitely stated, all data used in this report come from the mail survey and the consultants report.



Box 2: Interuniversity and intercommunity relations promoted by the IAP Programme

Principles: size of university linked to number of participations (co-ordinator counts for 4, main promotor for 2, associated partner for 1) with inside the circles these numbers in clear. Thickness of links between two universities correspond to the number of relations. Thickness of circles of KUL, RUG, UA, UCL, and ULB vary from others since they have also official partners within the university.

Interuniversity structuration

These above-mentioned results already satisfy the pre-requisite for appropriate Federal intervention that is to promote research activities between linguistic communities. But an addition to this positive picture as such, we think that stimulation of intercommunity collaboration through the IAP Programme is larger. In descriptions of the programme, the focus is often on two sets of actors: "bottom-up" researchers who propose research themes and networks, and "top-down" central government which selects those corresponding best to its criteria, basically scientific excellence, and network composition. This hides the role of a third and key set of actors: university boards and rectors.

It took sometime for the non-Belgians making up the evaluation panel to grasp the unique character of the functioning of this programme. We wish to present our understanding of it, since we consider it central to its global performance and to a major, but hidden, achievement which is the promotion of **a de facto interuniversity research strategy**.

Let us explain what we mean by this assertion. Three components interplay in the selection of the effective networks constituting the programme.

- The Federal government through the allocation of a global sum to the programme, the definition of selection criteria and the ex ante evaluation process,
- The teams through their bottom-up proposal power of themes and partnerships,
- and the universities. Thanks to the "interuniversity key" (see box 3), university rectors know ex ante how much their university will gain from the IAP Programme. But they have to select the candidates, which they authorise to enter into the competition and negotiate the final composition, once the external peer reviewing has taken place.

Box 3 - Elements about the interuniversity key

Source: OSTC.

Since the start of the IAP Programme the intercommunity key has been a central instrument. For Phase II, the intercommunity key was slightly revised by the Council of Ministers in 1990, and the sharing between Dutch speaking- and French speaking-communities was fixed at 56% - 44%. It has remained stable since.

The interuniversity key was also defined by the same decision, being officially called intra-community key. Three criteria were taken into account: the total number of students from 'second cycle' (third and fourth year of university) and 'third cycle' (for getting a Ph.D.), the same number but only for Belgian students with a degree from the second and third cycle, and the full time equivalent teaching and research staff. They respectively accounted for 37.5%, 12.5% and 50% and were calculated on a three year average.

For phase IV, the same intra-community key applies for universities of the French community, while the Flemish community has devised another key based on second cycles, number of Ph.D. students and core funding. This gave the following split (expressed per community and in percentages).

	Phase IV	Phase II		Phase IV	Phase II
KUL	47,18	45,3	UCL	35,89	36,6
RUG	27,63	26,2	ULB	26,00	26,5
VUB	12,41	13,9	ULG	21,65	20,9
UA	11,35	13,0	FUNDP	5,16	5,5
LUC	1,17	1,1	UMH	3,91	3,4
UFSAL		0,5	FPMs	2,40	2,1
KUB	0,26		FUCAM	2,35	1,8
			FSAGx	1,82	2,4
			FUSL	0,82	0,8
	100,0	100,0		100,0	100,0

For universities, the selection of research teams can be quite complex. For the fourth phase, each university had first to identify candidates for participation in the IAP Programme. It had then to do its own reviewing (both of the status of the university team and of the proposed network). Finally it had to establish its own equilibrium between "steering" teams (receiving a minimum of 60 Million BEF over 5 years for life, natural and engineering sciences – or 30 Million for social sciences and humanities), and "satellite" or "associated" teams (getting a minimum of 12,5 Million BEF over 5 years).

In doing this, they had to take into account the following elements:

- Teams had to be of international standard, this being reviewed by external experts.
- Teams had to work on themes, which had to be part of the international agenda of the discipline or domain (again because of the reviewing by external experts).
- Teams had to propose networks with at least teams from two other universities, of which one of the other linguistic community.
- Selection had to take into account the existence of previous networks with both their official and unofficial evaluations (about co-operative activities and scientific production), a de facto central criterion if one considers the origins of the 35 networks selected (Box 4).

Box 4 (1) - The continuity between IAP4 networks and previous IAP networks

Source: individual files established on each IAP phase IV network. And synthetic trajectories as calculated by consultants (see annexes to consultants' report).

Out of the 35 ongoing networks, 7 are new (4 come from existing networks previously funded by other Belgian research funds). 7 networks out of the 39 from phases I to III were no longer supported. These two groups of networks share the same characteristics: being quite small (with an average of respectively 5 and 4 teams).

All other 28 networks presently supported derive from pre-existing networks, including 5 mergers and 2 networks which split. Out of them 13 are in full continuity with preceding networks: 5 remain like they were; 8 have kept their previous members and also enlarged partnership (out of them 4 follow the merger of 2 – and in one case even 3 – preceding networks). 10 witness partial continuity, having around half the previous members kept and the other half renewed. Replacement is the key feature of such networks, which have undergone limited enlargement. Finally 5 networks were fully reshuffled, basically around a co-ordinator that remained but changed the whole partnership.

Type of network Situation	number of networks	number of promoters	number of co-promoters	average participation	% of continuity	% of enlargement
New	7	26	9	5		
Stopped	7	21	7	4		
Continuity	13	97	28	10	82	169
- like wise	5	23	-	5	86	105
- with enlargement	4	21	10	8	85	238
- with merger	4	47	18	16	79	167
Partial Continuity	10	49	11	6	47	113
- with limited enlarge.	5	24	11	7	52	140
- with merger	1	5		5	36	46
- with splitting	4	20		5	47	118
Reshuffled	5	27		5	25	135

Note: % of continuity = (number of remaining partners/ total number of partners in phase II/III)x100
% of enlargement = (number of participants in phase 4/ number of participants in phase II/III)x100

Box 4 (2) - The continuity between IAP4 networks and previous IAP networks

Type of Network per domain

Note: because both of the number of networks and of their specific characteristics, we have chosen to identify specifically "life sciences", while engineering sciences have been included into "exact sciences".

per domain	total	"exact sciences"	life sciences	social sciences & humanities
Continuity	13	6	3	4
Partial continuity	10	3	3	4
Reshuffled	5	3	1	1
New actions	7	1	4	2
	35	13	11	11

Even though not all universities chose the same road for undertaking this preparatory work, it will be clear that it is not an easy job to select the some 150 teams to be the happy few allowed to share near to five Thousand Million BEF over five years. Especially when, on average, IAP funding represents about 30% of the budget of the teams selected (excluding permanent staff and Ph.D. grants) and thus constitutes a major input.

Such a situation leaves rectors and their scientific board with a strong responsibility. This does not only apply within the remit of their own university (interviews are full of accounts about power games rectors have to decide upon). But it also, and maybe even more, deals with the relative positioning of the university's capabilities within the Belgian landscape. Simple issues have had and will have, no doubt, lasting effects on the Belgian university landscape. Examples of these are: the selection of disciplines or fields that will be supported and thus which will benefit from the IAP quality label (another clear attribute of the programme shared by 96% of participants), the positioning of teams within networks (those which the university supports for "steering" as opposed to those where they accept to only be "satellites"). This conclusion has important consequences in the changes we will suggest for the future programme.

2.2- LONG-TERM CAPABILITY BUILDING

Maintaining, improving and enlarging the competence base is a recurrent element in the goals and activities of the IAP Programme. The consultants' report shows the achievements in this respect, but there are also indications of emerging results, which we can build on to discuss further evolutions.

There are two important and lasting effects of the IAP Programme on Belgian research capability: human capability building and the promotion of new research infrastructures.

Human capability building

The first effect highlighted by the consultants' report is that the IAP Programme fosters the development of trained human resources, which is more and more considered as a critical issue in so called "knowledge based economies". It does so through three main channels:

(i) helping laboratories and teams to better develop their activities and to build a critical mass;

(ii) playing a "buffer" role for managing the career of young scientists, and finally
(iii) more widely, through its more global effects in the society and the economy linked to scientists trajectories.

We shall here only mention the major features concerning these three aspects.

Simple indicators from the mail survey already pinpoint to the importance of the IAP Programme in shaping team potential. Teams consider that on average half of their staff participates in activities generated by the IAP network. "Enabling teams to grow" and "stabilising the team" are two effects respectively mentioned by 78% and 68% of the responding teams. Even more striking are some comments from IAP co-ordinators: "the IAP created a critical mass inside the lab"; "the IAP allowed to structurally ground research teams and to stabilise researchers"; "it is a big structural support". And we could add many more.

The second dimension lies in the impact on individual careers. At the time of the survey, 2.4 persons per team were being paid for on IAP funds. This represents approximately 400 persons, a figure which amount to 25% of the total mandates allocated by FNRS/FWO.

This comparison is however not fully relevant, since IAP funds, and this is their major quality put forward by co-ordinators, are flexible. They offer "switching possibilities", enabling to "smooth the irregularities due to the different (funding) sources" (citations from co-ordinators). They act, according to the consultants, as "a buffer for career management".

One can find a clear indicator of this in the following result. OSTC management was quite concerned by short-term contracts, as witnessed from their contract database. However mail answers give a radically different picture, insisting upon longer-term employment (more than 3 years for 38%, and between 2 and 3 years for another 34%). Continuity is also stressed by the employment survey[12]: a fourth of all those employed during phase IV, were already employed (often in different status) in previous phases.

Interviews have enabled the consultants to explain this. IAP recruitment must not be looked in isolation, but in the wider framework of recruitment possibilities in Belgium for those who want to become professional researchers or university professors. IAP has two main roles, (i) It helps in the transition between doctoral and post-doctoral activities[13]. This role should not be understated since the employment survey shows that some 44% of the different recruitment made were for Ph.D. students. (ii) It enables post-doctoral students and young researchers to build up their curriculum for achieving tenured positions: either in Belgium through permanent mandates and professorship positions (consultants were told of a number of such cases) or even abroad. This last aspect is worth mentioning since one third of recruitment made by IAP promoters come from outside Belgium. Numerous studies have highlighted that the future of foreign trainees is either to enlarge the national potential (people staying in the country), or to help in building lasting bilateral links associated to the tenured positions obtained when returning back home.

Thus, thanks to this "avuncularism" at network level,[14] the IAP Programme at large is active in preparing candidates for opening academic positions, even if there might not be enough classical university positions to take hold of this potential.

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[12] The employment survey was a complementary one to the mail survey and was answered by 120 persons, which is again a unique result for such type of complicated survey.

[13] It is a recognised fact in most EU countries that grants duration does not correspond to effective duration of the Ph.D. thesis.

[14] The term "avuncularism" refers to the protection a senior person in a position of some authority can give to young researchers and/or new developments. We coined this term inspired by the colloquial reference as "uncle" to people higher up in an organisation (often, an industrial firm) who protect the early work on an innovation. This is different from the "paternalism" involved in a patron-client relationship.

Box 5 - Main achievements of the IAP Programme dealing with human capabilities

The average IAP team is made of 21 persons: 3 professors and/or senior lecturers (half of teams have 1 or 2), 1 permanent researcher (half of the teams have none), 8 doctoral students, 5 temporary researchers, and 4 technical or administrative staff. It should be noted that, if 60% of teams have between 10 and 30 persons, 23% count less than 10 persons and 18% have over 30 staff members.

With 9.5 persons on average involved in IAP activities, this is nearly half the average team which is, one way or another, mobilised by the IAP network. For 16% of teams, this involvement is less than 20% while, on the contrary, it exceeds the 50% mark for 40% of teams.

Teams participating to the IAP Programme have, on average, recruited 2.4 persons per team. The distribution is limited since over 80% of teams have recruited between 1 and 4 persons, while only 12% have recruited more. This represents on average 14% of their total staff, but here the distribution is far wider: it is under 5% for 12% of teams and over 20% for 1 team in 5.
For what purposes are they recruited? Clearly the two dominant reasons are to get a critical mass (62%) and/or to acquire new competences (49%). Whatever purpose, co-ordinators insist upon the role if the IAP in recruiting motivated, experienced and qualified post-docs. They also welcome the opportunity to invite visitors.
Which types of recruitment? The employment structure is shown in the table below. It is derived from the employment survey made dealing with 1200 persons for all IAP phases and nearly 600 for phase IV only (these figures deal with the total number of different persons recruited and not the stock at one given moment, which is around 400).

Structure	Ph.D. students	Post-docs	Senior, visiting & other researchers	technicians	others	total
All IAPs employment		39	17	23	15	6	100
IAP 4 only		44	21	17	14	4	100
out of which							
Belgian (%)		72	49	62	96	58	68
Out of which in							
SS&H	23	42	7	38	11	2	100
L	23	42	29	5	19	5	100
N+E	54	45	22	16	13	4	100
	100						

Where do they come from? First from their own language community and then from outside Belgium. Half of the teams looking for critical mass get researchers from other countries, and then the two main origins are Eastern and Southern countries. Three fourth of teams looking for new competencies get researchers from outside, and then mainly from other EU countries.

The progressive building of a new research infrastructure

These effects of the programme result in a wider outcome as well. They progressively shape at the national level a new research infrastructure. Let us explain first what we mean by these terms, before presenting briefly the mains results arrived at by the consultants' enquiry.
When we say "infrastructure", this is a broader concept than just the update of laboratory equipment and facilities, however important that is (cf. the recent UK Joint Infrastructure

Fund). This issue has been raised for the IAP Programme, but in a limited number of cases, often dealing with new features of emerging fields (like cells or genome banks). Research infrastructure has also less tangible components, and particularly so when collaboration is at issue. Active collaborations require long and difficult efforts to be productive. This is a highly intangible investment the importance of which has often been underestimated. Such investment produces a research infrastructure, at three complementary levels: (i) at the local level of actively collaborating teams, (ii) at the meso level of research "areas" by the web of collaborations that have been established and the "latent" networking possibilities it offers, and (iii) at the macro level by widely developing a collaborative competence, i.e. an ability to enter into new collaborations thanks to previous experiences and to the corresponding knowledge acquired.
The seemingly innocent word 'new' must not solely be understood as referring to the addition to the public research fabric of further bricks. It also includes transformation through new and lasting relations, which are created. However, and this is the major limitation of the programme: The IAP-sponsored networks have not have a significant impact upon fostering "start-up" teams - while this is a growing preoccupation in science policy of other countries (cf. France and Japan[15]).

A first point is that there is a converging set of indicators, indicating that there has been a productive collaborative learning. In a small country like Belgium, and in one's own discipline or interests, it is normal to find only 2% of teams not knowing at all other network participants ex ante. But it was a surprise to us, and after two rounds, to see that half of the teams had only a "partial knowledge" of their partners when starting phase IV. This has certainly to do with the conditions under which phase IV was built (see box 4 for the evolution of networks) and the pro-active role of rectors.
The productive side of the collaboration that developed, is further shown in the expected future collaborations: 88% want to go on collaborating with those they presently collaborate with within the IAP networks. Learning also entails selection (20% want to see some partners expelled from networks) and the will to further enlarge the collaboration (an issue mentioned by 68% of the respondents). Using the converging explanations given by co-ordinators, the consultants draw out a very important point: participants "learn to distinguish between good and bad co-operations and to identify some reasons for that: the importance of the subject for the partner, their relative priorities, their involvement in the network, changes in teams regarding the project, the importance of the IAP support".

A second point is about the nature of the collaborative networks. The consultants distinguished three typical configurations (see Box 6). For our purpose, we combine them into two opposite approaches of what networks are about: networks centred around research outputs, and networks centred around forum interactions.
The former are product-oriented, and emphasise a set of research results to be obtained mostly through bilateral collaborations which tend to be lasting and enlarge the individual capabilities of collaborating labs. Following the work by Pereira on Portuguese international collaborations, the consultants suggest that these networks foster the mutual extension of each of the directly collaborating labs, and thus promote "extended laboratories".[16] The outcome, at

[15] The Erato programme in Japan is an exterme case of this movement, selecting researchers with high potential and giving them free funds to establish a team. In France a competition was established recently with the aim of selecting young researchers with original projects and giving them the means to establish their own team.

[16] Tiago Tavares Santos Pereira, *Changing Places? The Extension of Research Groups Through European Research Collaborations.* Ph.D. Thesis, SPRU, University of Sussex, January 2000.

the end of the action, will then be small actively interacting sub-networks. Thus, it is not surprising to see that most "reshuffled" or "new" networks (as identified in box 4: 9 out of 12), build on the learning how to be productive in interaction. We note that organising active and multiple collaboration, requires a specific investment, the building of an intangible infrastructure.

Box 6 - Typical configurations of IAP networks
Source: consultants' report

Networks of extended labs. They gather teams being more or less complementary and working on a voluntary and ad-how basis in the framework of a general topic. They are focused on bilateral collaborations. In these, partners exchange ideas, data, methods and samples. They visit each other, sometimes to learn a new technique or to perform a joint experiment. Through such collaborations, researchers learn to know what other are really doing, what they are able to do and if it is really possible to work with them. So they learn to work together as if the capabilities of the partner were integrated in their own lab. It is a kind of extension of lab.

Pools of complementary competencies. The idea is to gather the research teams in a domain to benefit from the critical mass and of the complementary approaches and techniques of the partners. A general framework is defined in terms of research object, new questions and required specialties. The hope is to have numerous bilateral collaborations and general discussions on the results.

Networks structuring the domain. They gather most of the teams, organising a forum and encouraging bilateral collaborations. They also try to structure the post-graduate training in the domain, the research activities and the international representation. Some are typical **forums** based upon classical scientific ideas: colloquium, workshops and mutual visits. Others add to this, the development of a graduate school, international symposia, specific working groups, etc. In these networks, the co-ordination consists mainly in organising the debate, i.e. in managing a collective learning process and the emergence of a scientific community sharing some common research interests. It is a place where a collective problematic is structured and on which bilateral collaborations can be further grounded. In many cases, the IAP actions correspond to ways of structuring the speciality or the research field in Belgium. They allow for setting priorities for research in Belgium.

Type of network	extended Labs	pools of competencies	structuring the domain	total
Social sciences and Humanities	4	2	5	11
Exact and Engineering sciences	5	1	7	13
Life sciences	8	3	-	14
Total	17	6	12	35
Network dynamics				
Continuity	4	3	6	13
Partial continuity	4	2	4	10
Reshuffled networks	4	-	1	5
New actions	5	1	1	7
	17	6	12	35

This comment shows that there is a continuum with the other main type of collaborative network, where forum interactions are the main activity. The consultants, relating to previous work done on networks, characterise "forum" as a (virtual) place, which fosters and organises collective debate on relevant issues, approaches and where a collective view about priorities is progressively grounded. They actually identify two such types: networks which gather, for a certain theme or issue, all the necessary, complementary competencies to address this, and networks which gather the Belgian competencies in a given speciality or research area. 9 of the 13 networks, which were in full continuity with previous phases, correspond to this

second approach, especially those which witnessed mergers or significant enlargement. The ratio is 6 out of 10 of the networks with partial continuity[17].
There are 17 "output-geared" and 18 "interaction-geared" networks. The latter correspond to an implicit mandate for organising a space for a research area or managing a speciality. It might be an issue to reconsider this implicit mandate to transform it into an "implied" one for which the teams can be held accountable (cf. the concept of "implied warrant" in product liability). We shall further consider this in our recommendations.
These elements explain why we consider that the programme has a structuring national role, and that it develops "new research infrastructure".

A critical note is that this development remains largely limited to existing well established teams, and does not foster, as was hoped, the growing of new teams to achieve international-level performance. While there are officially over 70% of teams qualified as "satellites", the total number of teams that consider themselves as recently created is under 25%, and within these three quarters consider themselves as "centres of excellence". This was known from the start of the fourth phase, since only 14% of candidate teams had been considered by evaluators as having "moderate" or no reputation! This, no doubt, requires correcting action in the next phase, and we shall propose some directions to better address the issue of the renewal of the public research fabric.

2.3 – ACADEMIC AND "STRATEGIC" RESEARCH

Built-in excellence

Excellence is built into the design of the IAP Programme. We have mentioned the results of the ex ante evaluation, which considered 86% of candidate teams as having already gained international recognition in their field.
It is also embedded in the way teams qualify themselves and in their production profile. It should be noted that 96% of the teams consider having achieved international recognition in their field and that 87% consider themselves as "centres of excellence".
Academic outputs outnumber any other outputs, especially when adding "certified" and "embodied" knowledge i.e. the articles and international conferences on the one hand, Ph.D. theses on the other. 95% of teams mention international publications, 77% international conferences and 69% Ph.D. theses. Citations highlighting the impact of the programme on fundamental research are numerous: "everybody has become stronger and internationally better known", "thanks to the IAP we were able to take some importance at the international level", "my team has been able to develop itself on theoretical models", "we are now operating in a big international network where IAP represents 50%", "the output of the joint research is many articles in international peer-reviewed journals with a good impact factor".
Thus, a global analysis of teams' answers is already sufficient to bring to the fore this massive result. We are clearly facing a programme dedicated to basic research in an academic setting.
Following the 1995 and 1997 bibliometric studies undertaken, which showed limited increase in co-authorship, there was a debate about the significance of co-publications, and this is also visible in the comments made by co-ordinators. While co-publications are mentioned by 85%

[17] 3 out of the 4 other networks related to "splitting" dynamics and reorganisation mainly around bilateral collaborations.

of teams as important, and while they occur in significant number (on average 6 per team), there are also limitations in the bibliometric data. There are co-publications, which do not appear in journals analysed by ISI (especially in social sciences and humanities), and there are co-publications between different teams of the same university, a situation not taken into account by analyses performed. On the other hand, quite a few co-ordinators insist about the limited interest of counting co-publications. While the network may stimulate interdisciplinary activities, specific publications often go to specialist journals, and only those from the relevant discipline will have an interest to sign up as authors. Other data might be more relevant such as looking at "acknowledgement" to the IAP Programme in articles published, or the existence within a given network of one co-authored paper in a very high-impact journal presenting joint original results.
While the analysis may be improved, the massive contribution of teams participating in the IAP Programme to the whole of Belgian "internationally recognised literature" is striking, and shows the key role of the IAP Programme in recognising and, through its support, maintaining excellence.

More than academic research in a number of cases

In a number of cases, we see more than research oriented toward academic excellence. This is already clear from the outputs deriving from IAP activities. Methods are mentioned by 42% of the teams. These are present in 27 networks but are dominant in only 7. Similarly new instruments for research are mentioned as an output by one team out of five. These are present in 17 networks but are the focus of only 3 networks. This is a clear indication of "sub" specialisation within networks. More directly socio-economic relevant results are also mentioned: advice by 8% of the teams and patents by 12%. Support decision-making processes or the development of new products and processes are a shared objective in 7 networks (i.e. one out of five).
The global positioning of participating teams offers a further indication. Half of the teams also have contracts with industry, and two thirds mention involvement in European Union projects. Overall, only one team out of four does not have one or the other, while 40% have both. Another indication of such multiple orientations lies in the type of recognition looked for. Industry counts for 45% of the teams (already obtained by 39%) and the public spheres are important for 30% of teams (and recognition already granted for 25%).
We suggest that these findings should not be interpreted as indicating a typology, where some IAP networks are "more applied oriented" than others. There is a general trend towards strategic science, which combines excellence and relevance, as witnessed by citations from co-ordinators: "The IAP helps us to have a good scientific base for developing industrial applications", "Thanks to the IAP it is possible to quickly use applications of fundamental research in applied research". In other words, it is not a matter of identity (fundamental versus applied), but of the extent to which strategic and applied activities are taken up, a continuum rather than a dichotomy.
Our understanding is that long-term research (which answers all quality criteria of academic research) is increasingly done with the objective of addressing critical issues for society. Anticipations of researchers are then not solely driven by science dynamics, but equally by society issues. This definition is clearly in line with the Anglo-Saxon definition of **strategic research** (cf. notes 5 and 9), but accommodates a wider variety of issues than economic ones, in which science policy-makers often seem to be primarily interested in. In the UK, the earlier focus on 'wealth creation' was extended (in the Waldemar White Paper and later documents) to include 'quality of life' and we would argue that it is important to include 'societal

learning' as well. This phrase encompasses the whole range of cultural values of science, education, and early warning and other forms of articulation of new issues.

2.4- ROUNDING UP THE MAIN ACHIEVEMENTS OF THE IAP PROGRAMME

Firstly, there is a convergent set of indicators demonstrating the important intercommunity effects of the IAP Programme. But we consider even more important the lasting effects on the Belgian university landscape. We have used the term of interuniversity structuration of research activities to characterise the de facto role the programme gives to rectors and their research boards to mobilise the programme for shaping both the location of university capabilities and their articulation.

Secondly, the programme has, within Belgium, a major role in long-term capability building. This effect is both "human" and "structural". We have highlighted its very specific role in human capability building, based upon its flexibility and the corresponding "bridging" role, which gives the programme even far more importance that the already important position it occupies as a source of employment (a fourth of FNRS/FWO). We have further shown how it is active in developing "new research infrastructures", i.e. collective answers to the internationally perceived need of "critical mass" and "disciplinary complementarity". We especially consider those networks we have qualified as "interaction-geared" as an important intangible asset to put Belgian research in a good position for facing international competition.

Thirdly, "academic research" is at the heart of the programme, and must remain so whatever evolution is to be proposed. But this does not preclude teams and networks to already inscribe their activity in the new paradigm of "strategic research". Accordingly, there could be a more pro-active stand in the future phase of the IAP Programme, in line with world-wide changes in modes of producing scientific knowledge in combination with actual and envisaged uptake.

Part 3 takes hold of these results and achievements to propose continuation of the programme with significant evolutions of some of its features.

PART 3 – TOWARDS A REDEFINED PROGRAMME

It is appropriate to continue with the IAP Programme, provided the programme is recognised for what it actually does, which implies also that opportunities to do better are taken up. Doing better must, in the end, be specified in terms of concrete objectives and activities. We can only give some indications, but we want to emphasise that doing better, in the present national and international rapidly changing context, requires being more pro-active. Pro-activity at the policy-level and programme-level, basically works in two directions: creating spaces (for strategic research and new societal issues, for staging) and structuring the Belgian research system (speciality or research-area management, collaborative competencies, renewal of public research fabric).

Keeping the five main principles of the IAP Programme

The fourth phase of the IAP Programme has been based upon five design features (or governing rules for action), i.e. (i) keeping the interuniversity keys for global budget allocation, (ii) putting the emphasis on excellence, (iii) requiring networks gathering at least 3 universities from the two linguistic communities, (iv) establishing minimal amounts for participation, and (v) focusing support on human resources.

The analysis of interuniversity structuration highlights the role of interuniversity keys in the opening of strategic capabilities for university rectors and research boards. They do not have to fight for funds, but for having eligible teams, answering quality requirements and ready to enter into lasting partnerships with other Belgian university teams from both linguistic communities.
By keeping strict rules on minimal funding and use of funds allocated, the impact of IAP on participating teams is important. It represents on average 28% of their budget (excluding permanent positions and Ph.D. grants) and 14% of the staff (i.e. nearly half the temporary researchers employed) depend upon IAP funds. A third figure – teams declare that on average nearly half of all their staff works on the IAP projects – is even more revealing.
Thus we consider that the main design features of the programme continue to be appropriate.

How should implementation then evolve? In which directions and to what extent update the structures, processes and mechanisms used for the implementation of previous phases, in order to capture the experience accumulated and the lessons learnt? Such are the questions the third part addresses.
We have organised the third part of this report around common sense questions, raised in almost all interviews made. These are the following:

- What to do with existing networks – or *the issue of scientific evaluation*.
- What *selection criteria and procedures* to be applied for the next competition round.
- Should there be an evolution in the fully bottom-up approach to priorities addressed, or, said otherwise, should the portfolio of specialities and issues selected only be defined by proposers themselves – or *the issue of anticipation capabilities.*
- What about flexibility? Five years is a long period of time, even for basic research, what openings should be left for emerging issues, which are those which more often require a network approach to build up critical mass and assemble complementary competences – or *the issue of "staging"*.

- What *differentiations* to make: *between domains* (the a priori distinction between natural and life sciences and the social sciences and humanities), *between positions* in networks (is the very large difference in support between steering and satellite teams to be maintained as such?) and *between types of actions/networks* (should all types of networks be supported in a similar fashion, whatever their activities)?
- How to promote new teams to the international level – or *the issue of the renewal of the public research fabric.*
- And finally what about programme management, both at the strategic level and on the operational level, especially what about the nature and effects of on going monitoring?

To transform the answers to these questions into practicable policy, a "road-map" should be drawn up, or better, a number of road-maps for different scenarios. This is what we will discuss (even if not conclusively) in the concluding section.

Evaluation of present networks

It is a shared opinion by co-ordinators interviewed that the next phase should take into account the achievements of present networks. The final scientific evaluation which is planned is thus of central importance, especially since 29 of the 35 networks can be considered as having had, at least for part of them, a decade of life and activity.

The panel is of the opinion that, in the present situation, accountability is not a major issue, and that evaluation should clearly be focused on "excellence" achieved by participating teams and on "joint competence building". The evaluation should address the question of whether or not the networks have achieved leading world positions.

Box 7 - An estimate of the financial dependance of IAP Networks
Source: mail survey and consultants report.

The average share of IAP in team budgets (excluding permanent staff and Ph.D. grants) is 28%. It is less than 10% for 15% of the teams, but it is over 30% for exactly a third of the teams. It is interesting to note that this financial dependence is the highest both for co-ordinators (which average size is far larger than others, since 40% have 30 people or more and another 30% more than 20 persons) on the one hand, small teams (i.e. less than 10 persons, which represent 23% of all participating teams) on the other.

The stakes for such an evaluation are important. A programme is not aimed at indefinitely supporting the same networks. One of its ambitions is to see successful networks be progressively embedded in the usual institutional support of corresponding institutions. This has however not been prepared or even openly discussed until the time of this evaluation while financial dependency can be quite high (see box 7). The panel is thus of the opinion that there cannot be any clearcut positions taken for the next phase. It does suggest that those networks which will have been rated of "world level" should get special treatment similar to the approach developed in the UK for the third round of funding of an ESRC centre[18]: a

[18] Our use of the term "world level" is grounded into evaluation practices, such as those of the RAE exercise in the UK. It points to a leading role in the international scientific community in their fields of expertise (both in term of production and agenda setting), and translates into high recognition at international level (awards, membership in committees, editorial boards, etc.

"world level" network can get a final round of funding provided that there is a "business plan" preparing its transition to continued productive existence without IAP funding[19].

Will there be a risk that the next programme will be completely closed to newcomers because all existing networks are renewed? We have asked this question to a number of the persons interviewed. We have also looked carefully in the material gathered. And we are confident that a scientific evaluation, provided it is credible and conducted *before the start of the next competition*, would open far more room for "newcomers" which was the case in the previous phase.

For this option to be feasible, the scientific evaluation must be **credible** from the bottom-up point of view of participating teams. For credibility, it is important that not only past achievements of the network are assessed but also its future scientific plans.
The panel favours an evaluation, which is taylored to each network and based on site visits by a small ad-hoc panel. To maintain the equilibrium between IAP partners, one possible solution would be to have a three members panel, one being selected from a list presented by the participating teams, one being proposed jointly by university rectors, and one being chosen at the Federal level by OSTC.

This might look as a "heavy" solution, but, first there has been a lot of preparatory work done by the consultants' team which the panels can use (project file, interview of co-ordinator and network treatment of mail questionnaires). Second, it would anticipate on the future selection (since future plans will also have been assessed). Third, the size of the investment done and to come[20], i.e. nearly 10 Thousand Million BEF, simply justifies the expenditure in the order of 300 000 EURO (i.e. approximately the support that was given to a satellite team in the present phase!).

Summary of proposals on the final evaluation of present IAP networks
- *give foremost importance to scientific evaluation of ongoing networks*
- *officially recognise that networks having achieved "world recognition" will be funded for a last round depending upon the existence and feasibility of their transition to continued productive existence without IAPfunding*
- *evaluation should consider scientific achievements and future plans*
- *allocate enough resources for building a credible evaluation process built on ad-hoc peer panels and site visits*

Selection procedures

We derived three main lessons from what happened in the fourth phase.
Firstly, university councils anticipated criteria for selection in their own approach to the pre-selection of teams and proposals. As is now the rule in most major programmes, the set of criteria should be stated ex ante, in such a way that actors clearly know the relative weighing

[19] We are conscious that most of the time, this successful continuation will be at least partly linked to a "structural" embedment at university level, and through recognition of their lasting existence by Community university core funders.

[20] especially if we witness a similar rate of continuity as in the fourth phase.

of criteria. Defining criteria however difficult it is, is not enough, the way these criteria are mixed and their relative importance is a central issue not only in clarifying conditions of selection but also in the compromises made by proposers.[21] Both teams and university research boards can then adequately anticipate.

Secondly, in the present system based on interuniversity keys, external peer review does not act as a selecting mechanism but as an external check of the fact that projects rightly satisfy criteria retained[22]. Such peer reviewing is not for making funding decisions, but as a service to teams and universities.
Thirdly, all actors interviewed insisted upon the very important but informal negotiations between rectors, both before the external peer review took place for sending proposals, and afterwards for negotiating effective network selection and even composition.
The panel considers that these characteristics should be recognised as valuable and articulated as such in the next phase.

Summary of proposals on selection procedures

- *clear selection criteria should be established and their weighing made known ex ante (see further elaboration),*
- *the external peer review should be taken as a service and a guarantor rather than a direct selecting mechanism,*
- *the role of rectors in the decision making process should be recognised and be structurally linked to the strategic management of the programme (see below).*

Thematic and strategic research – and the issue of anticipation capabilities

One of the achievements highlighted in part 2 concerns what science policy analysts label as "strategic research". Let us recall what we mean, i.e. long-term research (which answers all quality criteria of academic research) with the objective of contributing to addressing a critical issue for society. Its anticipations are thus not solely driven by science dynamics, but equally by society issues.
The fact that some IAP networks have positioned themselves along this trajectory is important, since it witnesses the openness of the IAP Programme, and, in our eyes, its relevance in addressing important shifts presently witnessed in science and science policies. But at the same time, it raises new questions.

From the perspective of the national research system, the IAP Programme is a "portfolio of themes/issues addressed", their selection and money allocated to them turning them clearly into national priorities, all of them having been decided "bottom-up" by teams. Is this

[21] An instructive example is the shift, from EU Framework Programme 4 to FP5, in the approach to aggregating assessments of proposals. Rather than having high scores on one dimension compensate for low scores on another dimension, there are now thresholds (criteria) on each of the dimensions which must be met before eligibility will be assessed comparatively. (An informal exercise in the Health Telematics Programme suggests that about two-thirds of the proposals will be graded differently when the separate-threshold approach would be introduced.

[22] Experts can only say whether the proposal corresponds or not to the standards set, and if not, which aspects are defaulting.

adequate? Should researchers be the sole actors to anticipate on future societal issues? Even when dealing with those future issues requiring research efforts?
When looking back to emerging new fields (examples in life sciences are clear, but the dynamics are everywhere), one is driven to recognise the balance between "science push" (the initiative of researchers) and "societal pull" (the importance of societal actors). National government are often poorly equipped to address emerging issues, other than by delegating it to procedures, the role of which is to foster their bottom-up generation. The reason is that, for a new theme to emerge and become rooted, "mutual translations" are always necessary. This has often been the role of "third parties" (neither government, nor scientists) to foster progressive adjustment, as did the Rockefeller Foundation in its time (with its important role in the emergence of molecular biology as a striking example), and as is exemplified by the role of AFM, the patient association for neuromuscular distrophy, in the realisation of the first genome map and in the development of gene therapy research in France.

Clearly, intermediary actors and "go-between" processes are important. But there are further issues (which overlap) about more public relations between academic research and long-term societal issues. These questions link with the numerous ongoing debates in most OECD countries about the "democratisation of science". It is an open question whether (and how) the IAP Programme should engage in this set of issues, perhaps turning into one "facilitator" for those societal issues which Belgium anticipates as turning critical within a decade or more.

A positive answer to this open question requires to clarify what is meant by such prioritisation processes. Their role is not to decide upon scientific actions or priorities as such, it focuses on identifying those issues and problems which could turn important in the future and which require priority research efforts. Should such an approach be adopted, that it would require to address two complementary issues:

- How to organise a process of identification of "priority" problems and issues.
- What should be the equilibrium between fully bottom-up driven actions, and bottom-up answers to pro-active suggestions of priority issues.

These are not easy questions. And readers should understand that the panel is not in a position to answer such questions. It can only suggest directions and processes and warn about pitfalls.

What can we say in more general terms about anticipation processes?

- The IAP Programme being the sole Federal source supporting basic research in partnership, it should keep a clear majority of fully bottom-up actions.
- A clear distinction should be established between foresight processes aiming at technological and innovation capabilities and the above mentioned anticipation process focused on societal issues.
- The aim of such an "anticipation process" is not to reproduce existing "national priorities" (already handled through national programmes or agencies). It is to open the door to "emerging" issues, not yet stabilised and thus requiring initial exploration (if only to learn whether there is a need or not for establishing a specific "programme").
- The above-mentioned example of the role of the French AFM (and the time it took for national government to internalise this priority) is also there to recall a simple fact, often difficult to hear by policy-makers. There should not be too fast assimilation between "pro-active" identification and "top-down" definition of priorities. One possible approach to this problem may then be to introduce a new element in the shaping of proposals for the new networks. That is to propose those networks which aim at exploring a new societal issue to further elaborate it, and, if successful in convincing of the potential importance of the issue raised, to enter into a priority part of the programme.

Summary of proposals on anticipation capabilities and strategic research

- *It should be considered to focus a part of the programme on "priority" problems.*
- *This can only be done by adopting a pro-active approach for the identification of priority problems. Two options can be envisaged: (i) a "bottom-up" one linked to the capability of researchers to define, and to convince about the importance of new societal issues (this would require a specific selection process), (ii) a top-down one linked to the development of an anticipation process (still to imagin but not to be identified with technology foresight). Both options can be combined.*
- *This part of the programme, which would thus be dedicated to "strategic research, should remain secondary with respect to the total funds allocated to the programme.*

Introducing some staging

In the 1980s, EU programmes were known to engage most of their money, once every four years at the beginning of each framework programme. Those missing the deadline for submission of research proposals had basically to wait for another four years, a situation which was said to favour clientelism (those well aware of the administrative dynamics), and to limit the programmes' capability to adjust to evolving environments, in a time of ever faster changes (even in the most fundamental knowledge). Member countries were unanimous in requiring "staging", as it is nowadays called in EU circles, and the introduction of regular (at least annual) calls (even if these were thematically different).

We must consider this issue as it works out for the IAP Programme too. Blocking the whole of the budget for five years, once for all at the beginning of each phase, does not favour flexibility and openness to emerging research issues. The panel can understand that, in the very unstable process in which Federal funds are plunged, the scientific community and the policy-makers prefer to focus on "one-off" large actions which engage for long enough a time for research processes to develop. But one can also understand that science dynamics do not adapt to the Belgian administrative agenda. Could there not be any possibility for firm political engagement about the next phase, its duration and total amount, and then introduce some staging in the implementation of this decision?

Such staging should at least take into account three aspects:

(i) Leave some money available for "emerging" issues (may they be "bottom-up" or coming from "pro-active" decisions, which take time and will never be operational for 2001, when the calls for the next phase will be launched),

(ii) Reinforce the role of strategic monitoring of networks (since it could open the road for further allocations – the positive side – but would also enable the committee to be more active, since reallocations would be possible – the negative side!), and

(iii) Provide extra funds for those networks especially engaged in promoting the emergence of new teams (see below).

The panel thus suggests the following approach. The first call – which would take into account the continuation of "world level" networks and the "bottom-up" call (including bottom-up proposals of societal priorities) could use around 80% of the funds, with a full application of the interuniversity keys. This would leave the remaining 20% to be used for

specific calls (it would be meaningful to have at least two such calls over a three-year period, leaving the last two years just for adjustment to existing networks)[23].

Summary of proposals on "staging"
- *Introduce limited "staging" in the programme allocation, such as 80% on the first call (including continued networks) and 20% for specific calls and actions.*
- *Specific calls and actions could help in promoting a more active involvement of the programme in the emergence of new teams and a more active monitoring of ongoing actions (see below).*

The renewal of the fabric of public research

After nearly two decades of policy focus on innovation, policy-makers have slowly (re)discovered the central role of public research, if only because of the increasing number of "crises" (linked to environment, health and food safety) and public debates on the effects of technologies (such as nuclear waste). In most countries, universities have witnessed a dramatic increase of students and simultaneous budget restrictions. These have had lasting effects on the ageing of scientists and of research structures. Since the mid 90s, more and more countries have progressively started to cope with this problem, by selectively increasing the university research budget (e.g. Japan, Italy), by renewing their facilities (UK), by promoting "centres of excellence" (most Nordic countries) and/or by developing young scientist programmes (Japan, France).

The consultants' report and Part 2 of this report have highlighted the role of the IAP networks in training and nurturing young promising researchers. Promoters have been very imaginative and active in using the flexibility of IAP funds to bridge the "holes" of other systems in this difficult transition period from post-doctoral to first permanent position. It is thus not difficult to understand why there is a very different view of what the programme does between the OSTC administration (which follows effective employment contracts and complain about the existence of many very short-term contracts) and promoters who consider individuals and their career, whatever source of funding is mobilised. The panel is impressed by the effects of such a procedure – i.e. requiring that the majority of funds is used on human capital without any further requirement about how to use this – and considers it to be a definite priority to maintain as such.

If the renewal of the human potential appears strongly enhanced by the IAP Programme, such has not been the case however for structures. It is striking to see that less than one team in four participating to the programme considers itself as "recently created", that 75% describe themselves as "centres of excellence" and that over 95% expected and have obtained international recognition in their discipline. We could multiply the indicators showing the fact that the programme "rewards" excellence but that it has had limited impulse in pushing young teams to the international level.
This situation is all the more unsatisfactory as most young scientists programmes we know of, are de facto designed to help these young scientists to built and develop new teams. Can the

[23] More flexibility could be introduced in money allocations (e.g. using only the intercommunity key), provided the decisions are shared by the proposed strategic committee (see further).

IAP Programme continue without integrating more clearly this objective in its process? The panel doubts it and suggests two complementary alleys. The first one is to introduce this aspect as a complementary criterion for selection: each network should have its "start-up" teams that it nurturs and wishes to push in the wider world. The second one is for the programme to remain open for such opportunities when they appear, for instance, in the periodic monitoring of networks. This could be a specific role of the "strategic management" to monitor this aspect, and it could also help in pushing universities to think more actively about the careers of promising researchers (identified through this monitoring process).

Summary of proposals on the renewal of the public research fabric

- *Keep the focus on employment in IAP budgets, and keep present rules.*
- *Make a selection criterion of the support by networks to the creation of new teams.*
- *Reserve part of the funds to be receptive to networks requirements for the creation of new teams while on going.*

Promoting differentiation

The programme has established a set of distinctions, categories etc (which we call "differentiation" as a general term) between teams and between research fields. We think that some evaluation and consideration of their further evolution is required. No difference, however, has been made between types of networks, while part 2 has highlighted their variety.

Differences in the status of participating teams

Until the fourth phase, a network could only have one steering team, but this has been relaxed in the fourth phase, an option which was taken by some networks (see box 8).

Other participating teams can be either "associated" or "satellite" teams. These denominations do not only translate the relative positioning of teams in the network; they also have important financial consequences, satellite teams receiving five times less support than steering teams (12,5 vs. 60 Million BEF over five years) in natural and life sciences. Furthermore, most networks do not count more than one promoter per university. Again, this has had negative consequences, driving, in quite a few cases, universities to accept or even promote the artificial construction of entities for the sole purpose of candidate teams to be eligible to the IAP Programme. The consultants have underlined the existence of "co-promoters", these being most often responsible of other university teams, grouped into one official team for satisfying the rules of the IAP Programme (see Box 8 for an estimation of the relative importance of this situation).

This situation is not considered as healthy on the long-term by the panel, which suggests the following further evolution.

If the long-term objective of the IAP Programme is to build internationally visible networks and teams, starting with artificial constructions does not help! The panel does not understand why there should be only one team per university as long as global criteria are satisfied, especially when university participation entails teams from different disciplines or different affiliations (different research institutes or different departments). The panel thus strongly suggests relaxing this de facto administrative rule while keeping the rule about minimum allocations, to avoid atomisation of support (what is called in French "saupoudrage").

Similarly having one team with five times as much support as the others can more easily promote "subcontracting" than collaboration. By "subcontracting" we mean the participation in one specific aspect of the project without a global view of, and interest in its dynamics. Only "smaller" teams (both in term of size and status) tend to accept it. And the collaborative part of the IAP project can have a limited impact on the research agenda of "satellite" teams, even though IAP support is often central to their budget. This issue was already de facto raised by the scientific ex post evaluations made, and is present in a number of the comments we have gathered. The panel is thus of the opinion of relaxing this rule, and at least, of limiting the number of "star" networks made of one steering team surrounded by satellites.

In this direction, the panel welcomes the possibility introduced in the fourth phase of more teams having the "steering" status. The consultants' report has shown that a significant number of networks had developed into what has been termed as "extended laboratories". In this configuration, collaboration and involvement are often made on a similar footing, and rarely justifies one team having far more resources than the other ones. In small networks (3 or 4 partners at most) where partners have similar positions, the minimal amount for steering partners could also be relaxed (while in any case remaining higher than the present minimum for social sciences and humanities).

Institutional and geographical differences

Two other aspects of "authorised" participation in IAP networks concern non-university and non-Belgian participants. It is understandable that quite a few networks cannot find all the complementary competencies within Belgian universities. These can be found, as is the case in a few networks, in Belgian public research institutions, though the programme has been poorly tailored to incorporate these Belgian public but non-university participants. Such an involvement appears strongly linked to the government funding practices of these institutions, and it could be thought of making, within their budget allocation, a provision for involvement into IAP networks. Witnessing the very strong movement seeking in France, Italy or Spain, to articulate research institutions to universities, the panel strongly suggests the OSTC and other relevant government departments to seriously consider a move in this direction.

This however will not solve the problems faced by quite a few networks, a situation, which was recognised from the start of the IA programme, which accepted to support networks made with non-Belgian participants. The internal evaluation was very critical of these networks, and this possibility has been de facto abandoned in the fourth phase. The panel considers it should be reopened, provided it comes as a complement (and not in replacement) of general rules for eligibility (i.e. three universities from the two linguistic communities)[24]. Furthermore this would underline the role of the IAP Programme as an active participant in the building of a European research space as proposed by European Commissioner Busquin.

[24] This requires to solve the issue about funding. A minimum would be to consider "co-ordination" costs (see further). Whatever solution arrived at, such costs should be directly included in the total budget allocated to each network, and not treated separately.

Box 8 - Teams status in the fourth phase

There are 35 networks with 42 steering groups, i.e. co-ordinators and main partners. In their analysis of the effective participation, the consultants add 54 "co-steering" entities which represent as many university teams (quite a few being part of the same centre, lab or department). Each official steering partner received on average just below 59 Million BEF. This amount varies between 30 Million BEF (9 cases) and over 100 Million BEF (5 cases). The amount is of course far less for each participating team – on average of 25.7 Million BEF.
Partners in networks (called promoters) amount to 119 (130 with the "co-promoters" identified by the consultants). Altogether they have received just below 45% of the total amount allocated by the IAP Programme, the average support being 16.5 Million BEF (or 15 Million taking into account the co-promoters).

Altogether following the calculations made by the consultants, we have 161 official entities participating to the programme (a different number from this of OSTC which counts 154 official partners): 42 steering partners, and 119 associated or satellite partners. Taking into account "co-participants" (which we understand as separate university teams), the effective amount is 227 teams, this 40% increase being concentrated on the steering teams, which amount more than doubles (+ 128%).

Differences between scientific domains

The programme was started with only natural and life sciences. Social sciences and humanities were introduced at the second phase. They build up one third of the networks and gather one fifth of identified network participants, arriving at far smaller networks than those in the two other domains (box 9). Does this have to do with characteristics of social science and humanities which make them different from natural and life sciences, or is it an effect of the strong differentiation made in the support granted to steering teams, i.e. 30 Million BEF over 5 years? It is not easy to distinguish these two, but the latter definitely plays a role. And it is clear that such a choice does not encourage activities mixing both qualitative and quantitative approaches (which gain again more and more importance in social sciences, and push the average yearly cost of a researcher to a near to similar level of this of their colleagues in engineering or life sciences), neither does it foster collaborations between so called "hard" and "soft" disciplines, as we have witnessed in some networks. Furthermore, it has left small space for networks which, gathering all relevant teams in their area, were aiming at organising a research space.
In order to push further the international integration of Belgian social sciences and humanities, the panel is of the opinion to suppress this distinction, and to link any difference in the level of support to specific characteristics of networks and projects proposed.

Box 9 - Network characteristics by scientific domain

	number of networks	average number of teams	networks of "extended laboratories"	pools of complementary competences	networks structuring the domain
Natural sciences	7	8,6	4	-	3
Engineering sciences	5	6,6	1	-	4
Social sciences & Humanities	11	4,0	4	2	5
Life sciences	12	6,4	8	4	-
(out of which genetics / molecular biology)	(4)		(1)	(3)	-
	35	6,2	17	6	12

Differences between types of networks supported

The panel favours the grounding of differences made on the true dynamics of networks supported. This conclusion directly derives from the observation of the multiple forms collaborative research can take, and of the different teams involvement they entail.

The consultants report has established an important distinction between networks centred around research outputs and networks dedicated to fostering interaction in a given field or speciality. This distinction is quite commonly shared by most collaborative programmes, and notably by EU programmes, which oppose "shared cost actions" and "concerted actions" or "thematic networks".

While the former focus on aligning (and often integrating) research activities towards a given goal (which achievement will give rise to joint outputs, articles and recognition), the latter aim at structuring a field, an area or a domain in such a way that all aspects/ dimensions are covered, it aims at co-ordinating research agendas rather than at developing a joint project. These "interaction-oriented networks" foster the ability of teams to co-operate and develop joint projects both for the construction of a critical mass through collaboration and because of complementarity developed for tackling given scientific problems. Such networks are not limited to periodic meetings or conferences. But they entail more and more the building of doctoral schools (with joint seminars for all Ph.D. students), the development of summer schools, the adoption of shared quality approaches, and even (as witnessed in life sciences), the sharing of facilities such as gene or data banks, etc. The "output geared networks" often derive from the pre-existence of organised "research space". It is thus important in relatively large fields to promote such "community" organisation. Similarly the consultants report highlights the quite significant number of "output-geared networks", with a clear focus on networks of "extended laboratories"

We recall these results to insist upon the fact that funding, to be most effective, should adapt to these configurations and not the other way round. The IAP Programme has to enhance research infrastructure and contribute to the renewal of the fabric research, and the rules and distinctions should serve those purposes primarily or exclusively[25].

Does this mean that all rules regarding funding should be abolished and funding thus remain ad-hoc? The panel is not of this opinion. It proposes to link funding to three main differentiations which are more linked to activities performed within the network than to the type of network per se. And it suggests the addition of two specific items.

- A first distinction lies in the fact that the network does or does not face strong *co-ordinating and/or integrating activities*, which should be demonstrated as such and build up a specific funding support (for instance, equivalent to one or two persons/year per year).

- A second distinction lies, as presently, in the status of participating members: how many *"steering" teams* are there? Minimal level of support per steering team could be dependent, as suggested above, upon the number of steering teams as opposed to the total number of participants. We however advocate for minima that make of the supported project a core

[25] Recognising different configurations has also for effect to drive proposed networks to be more precise about their objectives and the corresponding forms of co-operation. This will help in organising a better external check of "networks dimensions" which have had up to now limited impact upon the selection process.

activity of participating teams, i.e. over 30 Million BEF, the minimum allocated to social sciences and humanities.

- A third distinction lies in the *status of other participants*: are they fully integrated into a project for which they share the main results, or are they "associated" partners (to take an EC distinction) which are only involved in one part of the project? Only the latter should be entitled with the minimal amount presently granted to so called "satellite" teams, while, as is presently the case, the level of support of the former depend on real involvement and is "ad-hoc" (with a de facto maximum of 30 Million BEF).

These three distinctive features will help in solving most cases. But they are not answering two specific aspects.

- The present funding rules require 60% of total funds to be allocated to manpower costs. The panel is of the opinion that this priority, central to long-term capability building, should remain central, but could be relaxed to 50% when necessary e.g. to take into account co-ordination costs. Such a choice does not take into account the growing need for accessing dedicated research facilities (such as technical platforms in life sciences, high computing facilities or virtual reality platforms for engineering sciences, or specialist settings in quantitative surveys for social sciences). Such needs should be clearly identified in projects and give rise to *"special facilities allocations"* (the level of which could be revised over time, depending on effective use – see proposals on monitoring).

- In "interaction-oriented networks", which are dedicated to research space organisation even while they get the same amount of money, it is rather easy to identify a "networking" budget but more difficult to identify "research costs". Should then the support to such networks be limited to these costs, as is the case in EU thematic networks or in COST actions? This is one possibility to "rectify" the anomaly. The panel is against it, however, because it sees IAP as funding programme for research. Even in "interaction-oriented" networks, the core of the funding must be for undertaking research activities. In the present implementation of the programme, each participating team is given ex officio a lump sum. Is this the best solution? Could there be another approach for the allocation of this budget? A possibility (which would, however, also limit the number of candidate networks) is to only support those networks which are able to propose a first set of "co-operative projects" between participating teams, even if only bilateral, covering the first two years of activity. The networking budget (which could be shared between steering teams) would be complemented by a "co-operative research budget". But this second budget would only be fixed for the first two years, and reserved as a global sum (but not yet allocated) for the three following years and would depend on the new co-operative projects which the monitoring would have to validate.

We are conscious that these funding rules might be slightly more complicated to elaborate, but the global situation the programme is faced with, is far less complex than before, since it takes into account the already established networks, which will no doubt represent the majority of next round funding.

Summary of proposals about categories and differentiations to make for the management of the programme

- *Relax the rule of only one participation per university in a network, provided the general rules – 3 universities from the 2 linguistic communities – are satisfied.*
- *Keep (and even enlarge) the possibility of having more than one steering team per network, and consider the possibility of a reduced minimum amount for smaller networks (retaining as an absolute minimum the present level for steering teams in social sciences and humanities).*
- *Avoid networks made of multiple satellites around one steering team (star networks) and, more generally, limit the number of teams getting only the minimal amount (i.e. 12.5 M BEF).*
- *Suppress the difference in the funding of steering teams for social sciences and humanities.*
- *Define conditions for the inclusion of non-Belgian teams, in networks that already satisfy the criteria of Belgian university participation.*
- *Develop incentive mechanisms within budgetary allocations of Belgian public research institutions for favouring their inclusion in networks that already satisfy the criteria of Belgian university participation.*
- *Reconsider budget composition by distinguishing networking/co-ordination costs and co-operative research costs. Create a "special facilities allocation" to be considered separately from the rest of other network budget (and on top of minimal amounts for participation).*
- *Develop a specific budgetary approach for networks focusing on the organisation of a research space or the management, at the Belgian level, of a given speciality, so called "interaction-geared" networks.*

Strategic management

Nearly most issues discussed required strategic management, i.e. not only strategic analysis and decision making for renewing the programme, but also and mainly during its lifetime. This requires an evolution, which the panel considers crucial for the future of the programme. Traditionally national (and a fortiori European) programmes of this relative importance are all assisted by a programme committee, whatever title is given to this committee. This is not the case here[26].

Such committees are generally made of representatives of main stakeholders. In technology programmes, it is for instance usual to have representatives of the research, industry and user components. They thus differ from "scientific" committees, which are populated by disciplinary peers. In the case of IAP, the trajectory and effective functioning of the programme indicates that the critical stakeholders are the university rectors or the heads of the university research boards. As in most countries, rectors are gathered in a national association. It could be its role to nominate representatives (for instance earlier rectors or similar people

[26] The sole committee established deals with co-ordination between the federal government and the two communities. To our knowledge, this committee only met once, it for instance never met for preparing and discussing the present evaluation. And, should it work, that the panel would not consider that an inter-administration committee answers the issue raised.

with experience and overview) to build the core of this strategic committee. The EU rule for the presidency of its FP5 management committees could also be applied in this case.
But would this be enough to guarantee bench researchers about the quality of the compromises made? The panel doubts it, even if "observing" administrations are enlarged to regional ones. It considers that it might be useful to complement it with some "external guarantors", with both overview on and experience, even present responsibility, in handling university research. Altogether, such committees, including participation from relevant administrations, should not have more than a dozen members.

These committees are generally entrusted a "strong" advisory role, meaning that usually their recommendations are followed, and, when this is not the case, it requires from the government clear explanations of the reasons why not to follow the recommendations made.
This role usually covers three main activities:

(i) Shaping the actions of the programme (such as finalising calls for proposals and criteria for selection and proposing the relevant compromises for effective selection once scientific evaluation has been made). This typically includes the three above-mentioned issues. The first is to implement the results of the scientific evaluation and deciding upon the networks granted direct continuation provided their institutional "business plan" is feasible[27]. The second is to negotiate the new actions and their composition (under control of the quality check – cf. selection procedures). And the third is to implement specific calls linked to "staging".
(ii) Changes to, or inflexions in already decided networks following monitoring of the development of the programme (see below). This would include specific follow-up (and corresponding action) about emerging new teams.
(iii) Keeping the programme flexible and receptive to changes in the environment or to new emerging possibilities. If a pro-active approach is decided upon the identification of societal priorities, it would typically be a central role of this committee to promote corresponding anticipatory processes and/or take hold of their results.

Said otherwise, the IAP Programme has been up to now living in traditional administrative spheres, requiring "ad-hoc" decisions only every five years[28]. We suggest that this form of "strategic management" is not best suited for the importance of the investment, and that more pro-active and participatory decision-making might be fruitful for the dynamics of the Belgian University research in the Belgian society.

Summary of proposals on strategic management

- *Establish an IAP strategic committee made of representatives of university rectors and European counterparts acting as guarantors.*
- *Insure the presence of OSTC and the two linguistic communities in its activities.*
- *Entrust it with a "strong advisory role" about the shaping and evolution of the programme*

[27] Universities are there in dual positions, since they will no doubt be parts of such plans. But these plans would have to be shared between universities and set in the open, thus limiting further internal power games.

[28] The fact that the evolutions witnessed for the fourth phase derive from an internal and not circulated administrative evaluation (this does not preclude about its quality) is typical of this situation.

Monitoring processes

The panel has examined the present management practices and rules, for finalising and execution of contracts, including reporting rules about employment contracts. It considers them satisfactory with the exception of ongoing monitoring. Appropriate monitoring is not just a question of the adequate administrative functioning of contracts, it also and mainly considers the scientific functioning and the networking activities. In the IAP Programme, it is not a question of too much bureaucracy or too much paperwork. On the contrary present official requirements can be considered as "light" as compared with most other programmes the panel knows of. It is neither a question of its informal dimensions, linked to the interactions between participants and OSTC staff.

The issue the panel wishes to raise lies in the third and central component of monitoring procedures. That is the actions taken (by networks themselves or by the administration) on the basis of formal and informal monitoring, e.g. change of approach, change in responsibilities, even change of composition (an often central issue in most research networks members of the panel have studied). In the present framework, OSTC staff cannot take substantial action, even while they may be in a good position to diagnose what is necessary. The panel has proposed a few new approaches and rules, which require decisions after the initial ones. It is an open question who should be responsible for these further decisions. This also depends on whether there will be a strategic committee or not, and what its role will be. We do recommend the flexibility in the programme that substantial changes in a network can be made, provided it is submitted to a strategic committee (and linked with relevant monitoring data).

Complementing on official requirements, the panel also suggests the following improvements.

- The official reporting can become further facilitated by using internet, as in the websites required by the USA Engineering Research Centres which allow NSF staff to check and if they wish intervene. Such experience could be used to update present reporting rules and the equilibrium in the reporting of scientific developments on the one hand, and of activities undertaken on the other. It has further interest in rendering the network activities, outputs and achievements visible not only to the administration, but also to colleagues and the relevant international community, which is the real target of networks.
- Bibliometric analyses linked to co-authored articles having raised a number of issues, the panel is of the opinion that a simple way to capture the production strongly linked to the IAP activities, is to only consider papers which acknowledge IAP support. This would also clarify reporting rules and their long lists of publications.

Summary of proposals on monitoring processes

- *Update official requirements, especially by fostering internet use and by taking into account publications acknowledging the IAP Programme.*
- *Officially recognise that networks can undergo substantial change following their monitoring.*
- *Require such changes to be overviewed by the strategic committee.*

CONCLUSION

Rounding-up: main recommendations made

We have made a substantial series of recommendations about the ways to help the programme evolve and be even more effective.
These recommendations are based upon keeping the five principles that make up the programme. The panel wishes to insist upon this point.
The recommendations deal with

- the scientific evaluation of present networks and continued support given to "world level" networks,
- the selection procedures for the next phase,
- the introduction of a part of the programme dedicated to strategic research and the anticipation of new societal issues,
- the introduction of a limited staging (around 20% of the total programme budget) to allow for adaptation to a fast changing environment and to effective network activities,
- a greater role of the programme in fostering the renewal of the public research fabric, especially around the emergence of new teams,
- a significant evolution of the present categories building up the budgetary implementation of the programme, getting rid of the "segregation" of social sciences and humanities, and getting closer to effective activities undertaken by networks,
- introducing a more active monitoring,
- and finally the creation of a "strategic committee" for enabling an ongoing pro-active management of the programme.

In this concluding sections we would like to round-up our views on the programme by recalling the selection criteria we have de facto elaborated through this set of recommendations, and by proposing the principles on which the programme "road-map" should be built and offer a first possible skeleton.

Rounding up: about selection criteria

We do not consider here "world level" networks for which the continuation of a support during the next phase is linked to the development of a business plan for a further productive activity without IAP support. We focus on new networks and the criteria, which could be considered for their selection

- Network composition is at the heart of the programme. The rule all networks have to follow is the presence of three Belgian universities from the two linguistic communities. There should not be any exception to this rule. But flexibility should be introduced for having more than one participant per university (respecting their effective structuration), and for the inclusion of foreign partners and partners from Belgian research institutions (conditions required for their participation – e.g. demonstrating own core funding, etc. – are still to define).
- Participants track record is central for the selection, the main criterion being excellence for all established teams and newness and will of the network to nurture start-ups for the others.
- The expression of Network finalities and objectives should be fostered by relating them to the different configurations observed. Special analysis of the Belgian situation will

play an important role for the selection of those networks aiming at organising a research space or shaping a given speciality.

- Such articulation will help in better characterising, beyond the scientific objectives aimed at, the interactions needed and their organisation. All proposals should have a clear section devoted to "networking activities" and the human and logistical support they require.
- The core of budget funding will be for teams research activities and for increasing the human potential of teams. This does not only concern those directly recruited with the network budget, it should also take into account other non-permanent personnel included in the activities of the network (especially doctoral students). Specific attention should be given to the presence within permanent staff of "promising" young scientists.
- New "heavy" equipment and facilities should be described into a specific section to be treated separately and above "ordinary" budget allocation. Whenever new facilities are required, this should consider the Belgian situation regarding such equipment/facility and proposed conditions of access for other Belgian teams for which the facility might be a resource (facility sharing).
- Finally those networks aiming at entering the part of the IAP Programme dedicated to "emerging societal issues" (part which relative importance is to determine), should develop a specific section about the reasons why the issue they raise will turn central for society in the future, and how the research effort they propose could help in addressing them.

Rounding up: a possible programme "road-map"

The relevance of a public programme depends upon its adequate embedding in its environment, its performance is further linked to a consistent set of actions and their coherent development over time. This is why the concept of "road-map" has become more and more fashionable in research and technology circles. It highlights the conditions framing the actions to take, and the necessary decisions to be made (taking into account that no decision is a decision to continue with the present arrangement). The panel is of course in no position to develop such a road-map. But he has considered it useful to suggest what he sees as framing conditions and what is, from his perspective, the set of unavoidable choices to be made.

We see three main framing conditions.

The Belgian system gives the university rectors a central role in shaping university research (a situation which strongly differs from France or the United Kingdom). To be effective the IAP Programme has to build upon it, and be part of wider interuniversity research structuring.

In this movement, the renewal of the public research fabric becomes more and more central. The action of the IAP should not develop in isolation but be part of the global approach to this renewal, which requires probably more active and more visible co-ordination than has been the case for previous phases.

Up to now the programme has been more reactive than pro-active in creating new spaces for research. The choice for a more pro-active approach, which we advocate for the next phase, taking into account the 15 years of existence of the programme and the lessons learnt, requires more effort and expenses to be put on programme overheads. This is exemplified by the contrast, in such expenditures, between the very pro-active UK research councils and the conservative Deutsche Forschungs Gemeinschaft (DFG).

As far as necessary choices are concerned, we again see three major decisions organising the evolving structure of the programme

There cannot be a clear position about existing networks – and thus the timeframe of the intervention of the IAP Programme – without a credible scientific evaluation of the present networks. This requires sufficient funding (in the order of the five-year support of a satellite team, which seems quite feasible to consider!) and to be undertaken and finished before the call for the next phase is launched.

There cannot be any ongoing strategic management without (i) the creation of a strategic committee with strong advisory role, (ii) the recognition that initial budget allocation are subject to changes depending upon effective activity, and (iii) the introduction of limited "staging".

Finally, a decision has to be taken about having a part of the programme (and which part) for new emerging societal issues, and about their bottom-up and/or top-down definition processes.

Would the Federal government choose not to enter in any of these changes, the IAP Programme would still remain an interesting and important research policy instrument to keep, even if opportunities will be missed.

As we intimated before, the IAP Programme and its specificity may have been the result of particular and-hoc answers to the specific and contingent situation of Belgium. The interuniversity keys would be a concrete example. Still, the IAP Programme has shown interesting and important results. So it could bear more generality and could be a useful instrument in quite a number of countries, especially those faced with strong regional "feelings".

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