Chapter 8

Governance of research and innovation policies in France

This chapter examines the governance of the French research and innovation system, which strongly influences the general effectiveness of the system and the effectiveness of political interventions. It presents the main institutions responsible for the system and the relationships between them. The ministries chiefly involved are the Ministry of Higher Education and Research and the Ministry of Economy. The General Commission for Investment, which is responsible for the "Investments for the Future" Programme, plays a pivotal role. "Vertical co-ordination" refers to relations between these entities and the research organisations and universities. Evaluation is becoming more and more important. Local and regional authorities are increasingly involved in supporting research and innovation, as are the European institutions, prompting the Government to redefine the scope of its own intervention.

The choice and implementation of a political orientation by the relevant stakeholders take place within the framework of a set of co-ordination methods, rules, etc. These are the instruments of general governance. The challenge for France in this context is two-fold: first, formulate a single strategy for research and innovation adapted to the general conditions analysed in the preceding chapters, then mobilise stakeholders to implement the strategy. The new strategy must be built on cross-cutting objectives related to France's competitiveness and social and environmental challenges. Accordingly, both its formulation and implementation require close co-ordination between operators based, therefore, on a common set of objectives. This chapter will show that the present French research and innovation system (SFRI) does not make it easy for such co-ordination to materialise. It will examine the main aspects of this issue: strategic decision making, in-terministerial co-ordination, vertical co-ordination with funding and implementing agencies, policy assessment, supranational and infranational tiers (Europe and regions).

What does governance of a scientific and technological system mean?

Governance refers to all the mechanisms involved in managing and co-ordinating research and innovation policies, and in particular co-ordinating stakeholder strategies and activities. The main aspects covered by this study cover: setting the main objectives of research and innovation policies; co-ordination between the various political players, particularly ministries and other bodies; supervision of the organisations involved; assessment; and local and regional government.

More specifically, the functions of governance of research and innovation are as follows:

- Establish strategic policy guidelines

- Arbitrate within the policy making structure, for example by reconciling the interests of the various ministries;

- Achieve horizontal co-ordination between the policies and interests of stakeholders in the various parts of the system and between the various government ministries or their agencies;

- Co-ordinate the production of knowledge, providing an appropriate mix of instrument types, of basic and applied research, between different subject areas, etc.;

- Generate and share the strategic intelligence required to design and implement policies and programmes;

- Ensure vertical direction between the "principals" (clients, such as government ministries) and the "agents" (those who implement measures, such as the funding and executive agencies);

- Raise the profile of research and innovation, including promoting understanding of science and an appreciation of the value of research and innovation.

Governance of a research and innovation system generally includes four levels (Figure 8.1):

Figure 8.1. Organisational model for the governance of research and innovation policies
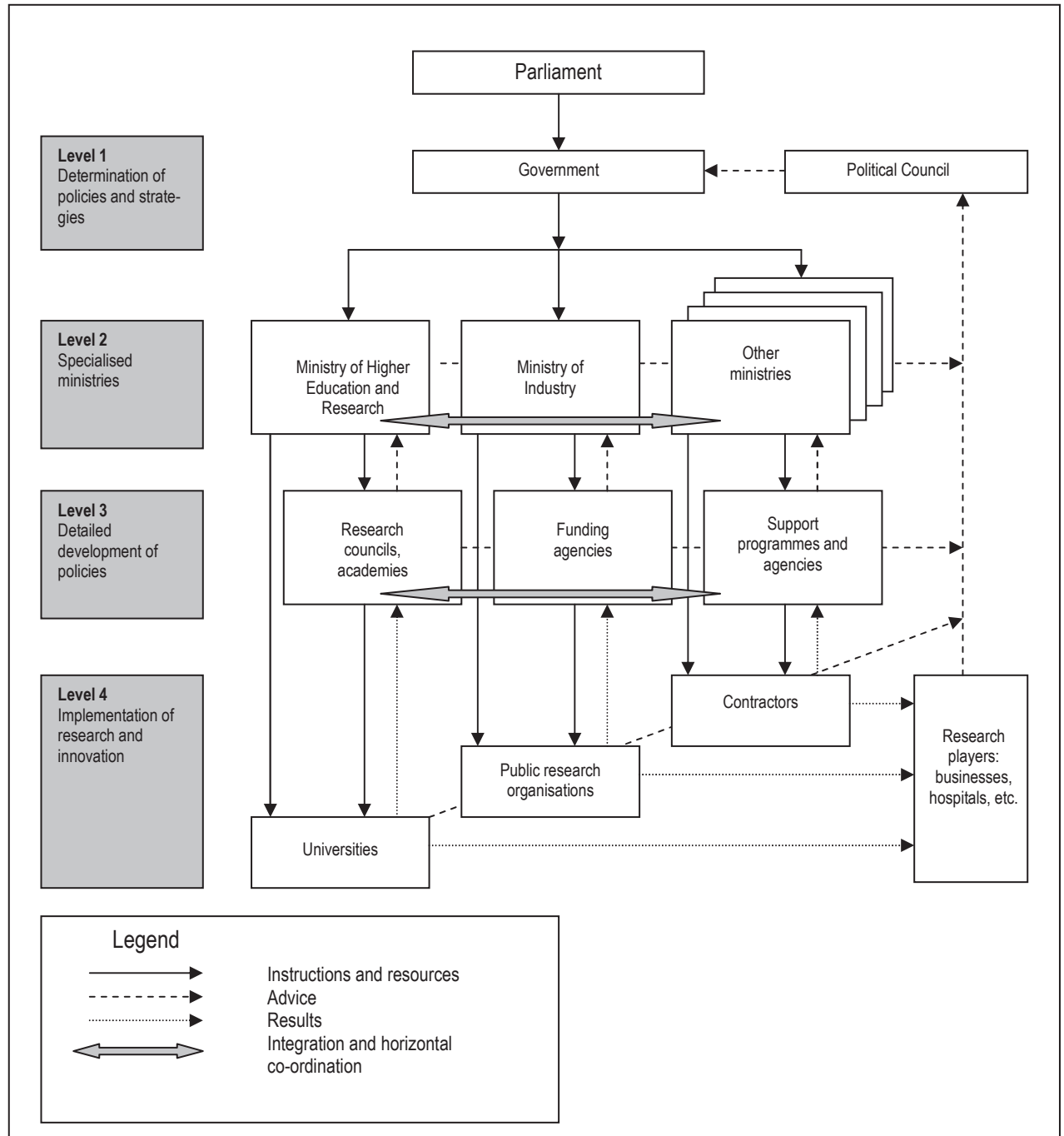

Source: Arnold et al. (2000), "Enhancing policy and institutional support for industrial technology development in Thailand. The overall policy framework and the development of the industrial innovation system", NSTDA, Bangkok.

- Level 1 is the highest level. It is where the general guidelines and priorities are defined for the entire national innovation system. It may entail providing advice to the government or more binding inputs, such as the decisions of an interministerial committee. It must include not only government input, but also input by groups of key contributors, including businesses, researchers, etc. The Finnish Research and Innovation Council, which operates at this level, has been emulated in a number of countries. That model, however, assumes a high level of political commitment to research and innovation. Such conditions do not exist in every system.

- Level 2 is co-ordination between government ministries, whose diverse portfolios incline them to pursue their own discrete policies. In practice, this co-ordination level may include both administrative and political elements. In some instances, an interministerial group also functions as a level 1 co-ordination mechanism. In a number of countries, however, co-ordination at this level is complicated by interministerial rivalries, especially over access to budgetary funds.

- Level 3 is more operational and aims to ensure consistency among the measures taken by the various funding bodies. This level may involve co-ordinating funding activities, e.g. through joint programming. Effective co-ordination requires strategic intelligence and a degree of autonomy at this level – operators without a margin for manoeuvre cannot truly co-ordinate their actions. In some countries – the United Kingdom and the Nordic countries – institutions known as Research Councils are responsible for programming and funding university research.

- Level 4 is where co-ordination takes place between the operators responsible for executing research and innovation (companies, public research organisations [PROs]). At this level, co-ordination tends to be achieved through autonomous organisation rather than formal mechanisms. This is often done through joint funding programmes and public-private partnerships.

Overall governance in France

No country entirely matches this template. France diverges from it by virtue of the fact that levels 1 and 2 on the one hand, and 3 and 4 on the other, are combined to a great extent. Indeed, ministries (level 2) play a key role in the defining the general strategy (level 1), and PROs are both funding agencies (level 3) and implementing agencies (level 4). Figure 8.2 depicts the overall governance of the SFRI in 2014. This system has not really changed since 2010, when the General Commission for Investment (CGI) was created (apart from the creation of Bpifrance as the successor to OSEO and the Strategic Investment Fund.

Figure 8.2. Governance of the SFRI in 2010
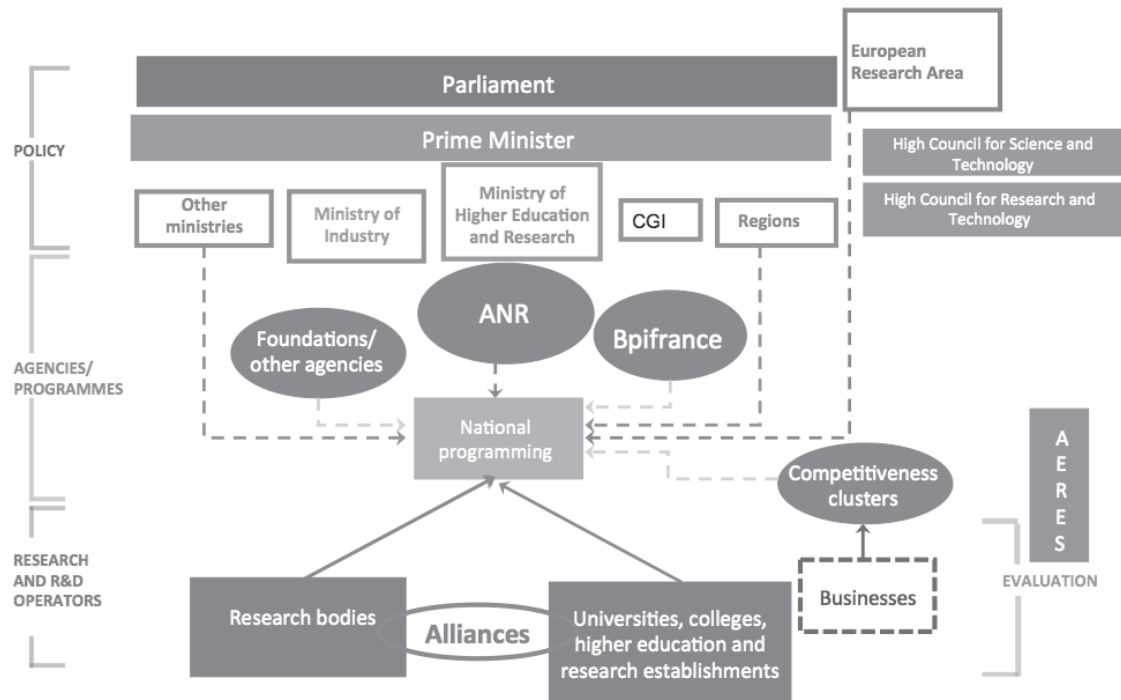
The general research priorities are normally set by the President of France and the prime minister, who avail themselves of various mechanisms for this purpose. Until 2013, they were able to base their decisions on the opinions delivered by the High Council for Science and Technology (HCST). HCST was created by the 2006 Law to succeed a similar body that had never really been effective. It is appointed by the MESR and reports directly to the prime minister. HCST, like the succession of similar committees that preceded it, had a limited impact. Its role was purely advisory, which is not conducive to inspiring active commitment on the part of its members, and the public authorities apparently made little use of its services. It could, for example, have played a key role in the preparation of the National Research and Innovation Strategy (SNRI) in 2008-09, but this was not the case.

The Law on Higher Education and Research of July 2013 heralded the establishment of a new system of strategic governance, comprising a "Strategic Research Council" ([CSR] consisting of leading scientists and parliamentarians and chaired by the prime minister), with a remit to propose strategic and scientific priorities for selection by the Government; an "Operations Committee" (consisting of the directors-general of the ministries involved in research, the heads of research alliances and major research organisations, and research directors from large enterprises), reporting to the CSR and responsible for preparing and implementing the CSR agenda; plus alliances (bringing together the operational stakeholders in the research structure, major research bodies and universities); and the National Centre for Scientific Research (CNRS), which will support the Council and Committee, particularly by informing the agenda. The CSR will propose a strategy to the Government and the President of the Republic, and the PROs will implement it. The purpose of this system is to formulate the strategy required by France. The Law, however,

does not specify the new mechanisms that would be created in order to ensure that the PROs actually implement the strategy once it has been developed.

In the light of past experience, it seems that several conditions must be fulfilled if this system is to work properly: the CSR must be vested with its own powers of strategic investigation, so that it is not bound by the strategy devised by the various stakeholders, particularly the ministries and PROs, which have their own vision and their own agenda; the Council must be truly interministerial, meaning that ministries other than the MESR must have real influence on appointments to and the functioning of the Council (see below); lastly, the roles of the various bodies must be clearly delineated, so that there is no confusion between formulation and implementation.

Other bodies represent the scientific community in the political arena. The Academy of Science and the Academy of Technology comprise eminent elected scientists. The National Council of Universities and National Committee for Scientific Research comprise both members appointed by the political authorities and members elected by their respective communities; they seek to communicate their analyses of the higher education and research system and defend their interests.

On several occasions in the past, the Government has carried out wide-ranging consultations involving the scientific community and other operators (businesses, public or private users of science and technology, etc.). This occurred in 2009 with the SNRI, and then again in 2012 with the National Conference on Higher Education and Research. Such consultations create more favourable conditions for building a consensus among interested parties – including individuals, because discussion sites are accessible on the Internet. It should be stressed, however, that research and innovation serve to pursue objectives determined by the French nation and its government, which must have the last word, and that interested parties are involved only in an advisory capacity. It is also important to involve not only producers, but also users of research and innovation – i.e. companies, consumers and citizens.

Interministerial co-ordination

Research and innovation are activities that relate to all of the tasks of government, which means that they in the portfolio of most government ministries. Research centres are attached to the ministries of agriculture, the environment, transport, health, defence, etc. Two ministries, however, have a more important role to play in the realm of research and innovation, namely the MESR and the Ministry of Industry, which has a special interest in innovation. The roles of these ministries reflect the fact that research activity is attached to two sectors, namely universities (link between education and research) and companies (link between industry and research). One of the great difficulties for any government lies in co-ordinating these two sectors and ensuring that research serves both education and science on the one hand and innovation on the other, and that the two are closely linked. In the traditional French model described in the preceding chapters of this study, the various research activities were tightly cloistered between universities and *grandes écoles*, settings of education but not research; the CNRS, the exclusive bastion of basic research; and lastly the major projects, bringing together corporations and specialised research bodies (Alternative Energies and Atomic Energy Commission, French Space Agency [CNES], National Centre for Telecommunication Studies, etc). The separation between education and research on the one hand, and basic research and innovation (applied research) on the other hand, was deeply etched into the system. France was not the only country in such a situation.

In the meantime, however, conditions have changed. Innovation is no longer the preserve of large, closed corporations with links to the Government, but is now more open: it depends on entrepreneurship and requires flexible, close-woven links with the scientific community. Similarly, responses to social and environmental challenges must now be multidisciplinary, mobilising a variety of players and flexible public-private partnerships. In these circumstances, the divide between research and innovation that characterised the previous model is no longer tenable. Likewise, quality higher education is now closely bound to research; educators have a duty to impart the latest knowledge and to imbue students with the same sense of curiosity that drives research. The *grandes écoles* are now awarding numerous doctorates. Against this backdrop, the divide between education and research no longer holds. The French governance system has taken these new trends in stride and evolved as a consequence for several decades. However, this has been only a partial evolution.

Table 8.1. Mission for Research and Higher Education (MIRES) research & development (R&D) programmes, 2012

Programme	Title	Funding ministry
142	Higher education and agricultural research	Ministry of Agriculture, Food and Forestry
186	Cultural research and scientific culture	Ministry of Culture and Communication
190	Research in the fields of sustainable energy, development and planning	Ministry of Ecology, Sustainable Development and Energy
191	Dual-use research	Ministry of Defence
192	Research and higher education in economic and industrial fields	Ministry of Economy and Finance
150	Higher education courses and university research	MESR
172	Multidisciplinary scientific and technological research	MESR
187	Research in environmental and resource management	MESR
231	Student life	MESR
193	Space research	MESR

Source: MESR.

Interministerial efforts have been made in this regard. In 2001, the Organic Law on Financial Legislation created a common system for all budget lines involving higher education and research. The system, the MIRES, aims to co-ordinate the spending of the six ministries working in these fields. MIRES has proven effective, and ten programmes are under its aegis (Table 8.1). The advantage of this arrangement is that it allows integrated monitoring of the various government research programmes, whatever the lead ministry. However, co-ordination seems a weak point. In particular, there is no joint programming, each ministry remaining entirely in charge of its own budget and retaining exclusive control of its own programmes. Yet such joint programming would be useful, at least in areas of shared interest, such as the environment, which is within the remit of the ministries of research, the environment, agriculture and the ministry in charge of industry (if not more). There is, moreover, an instrument that could carry out this joint programming effectively, namely the National Research Agency (ANR), which has already played a similar role in the "Investments for the Future Programme" (PIA), demonstrating its capacity for selective allocation of significant research budgets devoted to predefined subject areas.

In a context in which public-private transfers are seen as having a key role to play in innovation, the ministry in charge of industry and the MESR share many subject areas. Close co-ordination might therefore be expected between these two ministries. It appears, however, that such co-ordination, insofar as it exists at all, is not optimal. Such is the case for the SNRI, which was published in 2009. The SNRI identified the main subjects and areas of research focus over the next four years. A strategic exercise of this type is extremely useful, particularly in aligning the agendas of the players involved in formulating the strategy. The SNRI was not set at an operational level and did not allocate budgets, but it did exert direct influence on the PIA, indicating the thematic areas into which funding could be channelled. Although it includes an innovation component, the SNRI had essentially been prepared by the MESR with a lesser degree of involvement on the part of the ministry in charge of industry.

The MESR is currently preparing a national research strategy (SNR) for the period 2015-20, which is designed to succeed the SNRI. The SNR is to set the thematic research priorities for the coming years (ten "structural challenges" have already been identified) and will guide the allocation of public resources. While the SNR is a necessary building block for France's strategic edifice, it seems astonishing that the "I" (for "innovation") of the SNRI has been dropped: it is difficult today to set thematic priorities for public research – including its social and commercial applications – without explicitly incorporating the innovation aspect. It should also be noted that the interministerial nature of the exercise is limited compared with its ambition, which was to cover all governmental activities with an impact on research and innovation.

The strategic agendas published by the MESR (France Europe 2020, which provides the political framework for the SNR) and by the ministry in charge of industry (the "34 industrial recovery plans") have largely identical aims – to ease the energy transition and restore French competitiveness through innovation – but do not seem to reflect a co-ordinated strategy. The research bodies under the supervision of the MESR could play a very useful role in pursuing the technological development objectives announced in the "34 plans", but there is no evidence that they have ever been consulted or enlisted.

In addition to the ministries responsible for the various tasks related to research and innovation, the CGI reports directly to the Office of the Prime Minister and is responsible for the PIA. The priorities of the PIA were set in the wake of the Juppé-Rocard report, hence outside of the established administrative processes. The ministries were then closely involved in the precise selection of investment targets. A significant share (about EUR 1 billion per year) of government research and innovation expenditure is made within the framework of the PIA framework. A number of PIA programmes interact very closely with programmes run by the two ministries (in charge of research and industry), while remaining separate: the excellence initiatives (Idex) projects relating to university research, the technological research institutes (IRT) and the transfer technology acceleration companies within competitiveness clusters. The CGI reported directly to the prime minister until April 2014 to ensure that its choices were consistent with those of the Government as a whole. Now that the CGI reports to the Ministry of Economy, Productive Recovery and Digital, aims to ensure operational co-operation with the major innovation programmes launched by this ministry, especially "New Industrial France". Nevertheless, care should be taken to strengthen the coherence of the PIA with the stakeholders and programmes linked to the MESR, especially the Idex, which must be co-ordinated with the new "university communities" mentioned in the July 2013 Law.

More generally, there seems to be insufficient co-ordination today of the Government's overall involvement in research and innovation; the establishment of the CSR and its operations committee should serve as an opportunity to establish the supplementary instruments that will foster interministerial co-ordination.

Vertical co-ordination

The major research organisations are linked to their respective supervising ministries by multi-annual target-based contracts, which lay down in some detail the policies they must pursue in the relevant period. Universities negotiate a similar contract with the MESR – their four-year plan (although these have now become five-year plans and raised to the level of the sites), which specify the projects to be implemented and progress to be made over the period in all of the university's areas of activity. The four-year plans are endowed with specific funding over and above the universities' core budgets. In both cases, these are potentially powerful management and incentive tools. Their full implementation, however, requires the ministries to have significant long-term strategic intelligence resources – particularly for supervising the major research organisations, which already possess such resources. The proclaimed intention of the MESR to include in the research organisations' goals the themes featured in the SNR is a step in the right direction. It is vital that these research themes be effectively implemented, in other words that the funding allocated to research organisations be explicitly tied to these themes.

From this point of view, the limited role of competitive mechanisms in public research funding does not make it easy for the political authorities to manage the research. In fact, the political level has not always been able to implement its strategic guidelines. This was the case, for example, with the decision taken in 1999 to emphasise life sciences in public research, which apparently never had any visible effect on the distribution of resources among – and within – research organisations over the next five years (French Court of Auditors, 2007). Government supervision of universities is stronger, because beyond the four-year plans and their increasing autonomy, the universities are subject to a system of national degree accreditations. Better command of the political supervision of operational research choices could be exercised in the new governance framework announced in the "France Europe 2020" strategy. This would entail effectively establishing strategic intelligence capabilities within the MESR, negotiating multi-annual contracts with research organisations as part of the same process in order to guarantee overall consistency of research choices and institutionalised governance of the ANR.

On a more basic level, the effective implementation of the national guidelines by the public research system would be facilitated by an institutional transformation of the system itself. Evolutions such as the full transfer of research unit management to universities (which would be entirely consistent with the current policy of devolved management), the restriction of the scope of the research organisations to activities on a national scale (e.g. the management of major infrastructures or networks) and the full transfer of financing to the ANR would allow forging a more direct link between the national strategy and the units responsible for its implementation.

Policy assessment

Policy assessment within the SFRI has made huge strides in recent years. Policies (e.g. the research tax credit [CIR] and competitiveness clusters) are more frequently subjected to audits, and sometimes to independent assessments. An independent assessment agency covering higher education and research, the Evaluation Agency for Research and Higher Education (AERES) was established in 2006, operating in accordance with the relevant international rules in this field. The novelty of this approach in France posed some problems: it required "on-the-job" learning and gradual methodological adjustments. Effective, independent assessment is necessary to enhance the general quality and relevance of research and higher education. The new High Council for the Evaluation of Research and Higher Education (HCERES), which replaces AERES under the July 2013 Law, should take on this responsibility with a remit extending to all public research. It is important that independent assessment cover all operators, including the research units within organisations and the organisations themselves.

The assessment of innovation policies – as opposed to assessment of the operators themselves – is currently conducted by the competent ministries, which may commission external experts (as the MESR did for the CIR and the Ministry of Industrial Recovery for the competitiveness clusters). This self-assessment is one of the keys to effective policy management. It would also be very useful to establish systematic and independent assessment procedures, which would give the Government and Parliament a more direct overview of public action programmes. Conducting such procedures with the ministries, moreover, would allow an integrated assessment of France's policy mix, which covers programmes under the responsibility of several government ministries.

The French Court of Auditors has developed expertise in this field and has published several reports covering most research and innovation policies (public research, CIR, entrepreneurship, etc.). The detailed analysis of accounts, which is the Court's primary area of expertise, sheds unique light on the evaluated policies. The current initiative for the creation of an assessment group for innovation policies within the General Commission for Strategy and Foresight (CGSP) would dovetail neatly with the Court's activity, since it would adopt a more economic approach. Its impact on policies could be all the greater by virtue of the fact that the CGSP reports directly to the Office of the Prime Minister.

Numerous statistical indicators for monitoring research and innovation policies exist, and efforts have clearly been made to improve their quality and dissemination. There are, however, a number of key policy areas which they do not cover adequately. Specific coordinated efforts could be made by the information departments of various bodies – the HCERES, the statistical services of the relevant ministries and the Observatory of Science and Technology (OST). The aim would be to gather and compile data on key subject areas that are currently not well covered, particularly public-private knowledge transfers, the scientific performance of research organisations, etc. Provided they are not subject to statutory statistical confidentiality, the data in question should be made available for wide and open use by the research community, which would guarantee relevance and methodological progress. The data should be used for more systematic monitoring and assessment in the fields concerned. This is also the gist of the present discussion about a renewal of the OST and its possible affiliation with the HCERES. In particular, it entrusts the OST with collecting, processing and widely disseminating all pertinent data relating to the SFRI.

Several institutions, most notably Bpifrance, have recently taken or announced "open data" initiatives consisting in making available to the public the detailed data they possess by dint of their activity. Some restrictions may occasionally apply, because certain data relating to individuals and businesses are confidential. The development of such initiatives fosters the emergence of a community of analysts who provide open and independent assessment of the activity of the relevant institutions, thereby assisting both the public authorities and the relevant agencies.

Regional and local authorities

Traditionally absent from the field of innovation, the regions have become increasingly involved for the past 20 years or so. R&D expenditure of regional and local authorities amounted to approximately EUR 1.2 billion in 2010, 69% of which was spent by the French regions, 16% by the departments and 15% by the municipalities (French Court of Auditors, 2013). Much of this expenditure relates to real estate. This involvement of the regions, driven by awareness of the importance of knowledge-intensive activities as a means of stimulating local economic life, has proven beneficial to the emergence or enhancement of regional clusters centred on innovation and the implication of a higher number of small and medium-sized enterprises (which are more accessible to the regions than to central government) in innovative activities.

The regions have frequently complemented government measures, particularly in the framework of State-region project contracts, competitiveness clusters, academic research and industrial and commercial activities departments, where regional resources top up government funding. The involvement of regional and local authorities, however, has sometimes increased the complexity of procedures (by adding at least one more intervening body subject to specific constraints, which translate into additional procedural requirements). There is also a risk that national policies will lose coherence if they are crossed with specifically local elements, since location may supersede excellence as the main criterion for selecting projects, particularly in the context of competitiveness clusters. The new "sites policy" announced by the MESR in its "France Europe 2020" strategy document is fully in line with this emphasis on the role of the local authorities. Its effective implementation, however, will require recognising the priority of universities over other national stakeholders when establishing the relevant strategies, without which a coherent local strategy will struggle to emerge.

The European dimension

Europe contributed EUR 694 million to French R&D in 2011, which is equivalent to 4.4% of total public expenditure (government-funded gross domestic expenditure on research and development). Its impact is actually greater than that, however, since a significant proportion of government expenditure is "tied", meaning it covers wages and salaries and other fixed overheads and does not reflect a capacity for targeted allocation, whereas European funding is entirely "project-based", which gives the European Commission leverage and hence a great deal of power to channel national research; indeed, some European projects are carried out by teams that also receive government funding.

Since the middle of the previous decade, France has its national share of funding under the Seventh Framework Programme for Research and Technological Development (FPRTD) decline, which is now significantly lower than its allocation under the 6th FPRTD. One of the reasons put forward for this decline relates to the diverging Euro-

pean and French research agendas, particularly the more targeted and applied nature of European calls for tender compared with French public research. The measures implemented since the end of the 2000s, particularly the PIA, are designed to remedy this situation by emphasising the scientific excellence of funded research and the targeted nature of a number of the projects.

The new European programme "Horizon 2020" gives pride of place to social and economic objectives. In preparing the SNR (2014), the MESR identified thematic priorities that overlap somewhat with those of Horizon 2020. This should help reverse the past divergence, provided that the aims of the SNR are actively implemented by the PROs.

Conversely, it is pertinent to consider the influence of France on the European research agenda. The interviews conducted for this review reflected real scepticism on the part of some interviewees about France's ability to make itself heard by the European Commission in this matter. Some bodies are indeed represented in Brussels, but they have no mandate to put the case for the SNR. Hence, as it enhances its strategic capacity (as proposed above), the MESR could also enhance its European presence.

French integration into Europe on the research and innovation front is more extensive, in that much of France's space policy is pursued through the European Space Agency (ESA). In 2012, France's contribution to the ESA budget amounted to more than 50% of the Government's allocation to the CNES (which is responsible for managing this contribution). In short, a significant share of CNES activity is performed under European programmes.

Conclusion

It goes without saying that the governance of a national system as large and sophisticated as the French system is no simple matter. The diversity of stakeholders, the complexity of the issues raised and problems to be resolved, not to mention the weight of history and geography – all of these factors inevitably lead to complex governance comprising multiple mechanisms and rules that cannot fit easily into a coherent strategy.

On the whole, the governance of the SFRI has considerable proven merits; it has risen to new challenges by creating new institutions and measures (e.g. the ANR and CGI), it has driven reforms designed to adapt the system to a new context (Law on the Freedoms and Responsibilities of Universities) and it has taken the path of rigorous policy assessment. However, it seems that the present governance structure has not succeeded in completing the thorough adaptation of the SFRI required to put France on a new growth trajectory; and that this adaptation remains unfinished business. In light of the analyses presented in this chapter, the main areas of governance that merit special attention are as follows:

- The strategic guidelines must be set at the highest level of government, supported by a High Council. It is important that the latter pay attention to the stakeholders – to all the stakeholders – and that it have at its disposal its own information system for this purpose.

- Co-ordination between ministries seems effective at some levels, but sometimes seems lacking at the strategic level, as each ministry establishes its own positions and sets its own priorities. It must therefore be reinforced.

- Strategies and programmes must not be designed by the institutions responsible for implementing them – the PROs – but by one or more separate agencies, based on guidelines set at the political level.

- The evaluation function – long a weakness in France – has recently progressed thanks to the new mechanisms established to allow the independent assessment of operators and policies. This trend must continue.

References

Arnold, E. et al. (2000), *Enhancing Policy and Institutional Support for Industrial Technology Development in Thailand: The Overall Policy Framework and the Development of the Industrial Innovation System*, NSTDA, Bangkok.

French Court of Auditors (2007), *La gestion de la recherche publique en sciences du vivant*, La Documentation Française.

French Court of Auditors (2013), *Le financement public de la recherche, un enjeu national*, La Documentation Française.