More Stable Funding. A response to MoRST

February 2006.

This paper responds to an unpublished consultation paper received from the Ministry of Research, Science and Technology just before Christmas 2005. In addition to answering MoRST's specific questions, we have also tried to put "in our own words" the philosophical basis our responses are built on. MoRST kindly provided an electronic version of the paper, so that Councillors could comment on it, but asked that we not distribute it to our Constituent Organisations for comment. As a general principle, Council takes the view that our work and advice should be available to member input and timely public scrutiny.

While we express some caveats in the response, our view can perhaps be summed up in our very first sentence: "The Royal Society believes that the steps proposed in 'A More Stable Funding Environment' will materially assist in maintaining and building capability".

Picking up the Pace – Starting to Run

The Royal Society believes that the steps proposed in "A More Stable Funding Environment" will materially assist in maintaining and building capability (with one important concern on links with end-users, discussed below). We are pleased to note the move to more strategic policy making, the roles of the government in supporting the whole of the national innovation system, and the explicit recognition of serendipity within research.

MoRST's discussion paper states that provision of a more stable environment aspires to address five main problems: that contestability does not add value for all research areas; that competition can be at the expense of collaboration; high transaction costs; potential to lose capabilities; and the need for longer term emphasis in some areas.

MoRST's proposals should assist in nurturing capabilities

These problems might be reduced to three aims: more collaboration; lower transaction costs; and developing capability. We are not sure that the discussion paper makes the case that the measures proposed will do anything to encourage collaboration or lower transaction costs. Fewer applications may save time and effort, but mastering a new scheme, and its monitoring and reporting may negate the savings. However, the

proposals should materially assist in nurturing capabilities. In this respect, the responses we give here are consistent with our responses to MoRST's 2004 discussion paper on Capabilities.

The main problem in New Zealand's innovation system lies with end-user investment in research. The work presented here focuses on the public research system, but there are significant problems with how public and private research systems interact. We believe that the changes proposed here fall far short of resolving those problems. The real challenge is not in the detail of the proposed changes, but in designing (or redesigning) a science system for NZ that delivers measurable benefits for the country and provides the best "value for money" in doing so. Nevertheless, much of the devil will remain in the detail: How will formulae be developed with respect to the CRI capability fund? How would institutional funding interact with the full-cost formula? Would it be different for CRIs and universities or privately-owned research associations?

Stability means effective transition, not fossilisation

A fundamental point here concerns the incentives in place for moving resources away from ideas that are not fruitful. Experience suggests that this rarely happens unless the organisation is encouraged or forced (or otherwise incentivised) to do that. It is just too easy to continue projects that are in place, because this provides stability. It is notoriously difficult to implement transition plans for scientists without having appropriate incentives in place. Do the proposed changes provide such incentives or do they work in the opposite direction?

The role of the science management system is to make resources available to support ideas.

When these ideas appear fruitful, we should move resources towards them; when ideas decay, we should move resources away from them. If evidence is uncovered to show that a research project is no longer valid, the work should be dropped. The transaction costs of changes in resource distribution will depend upon the rate of change. However, we believe that changes in funding should be gauged and paced to allow for a transition plan for the people involved, rather than an 'exit strategy'. The mismatch in timescales between the development of new projects and the development of human resources is one of the prime causes of the low morale among CRI scientific staff.

Owners should support and foster capability

While government undeniably owns CRIs, CRI capabilities are very largely supported via contestable funds from Vote RS&T, resulting in the investor being implicitly responsible for capabilities, rather than the owner.

Investors are traditionally not responsible for human capability, whereas owners are responsible for developing staff.

Universities are arguably owned by the community, and gain much of their income from tuition fees and non-government sources. However, little explicit attention has been paid by government on behalf of the community in its stewardship role to capability building in universities. Government support for university capabilities is largely maintained through Vote Education, including a PBRF component, CoRE funding, and some funding from Vote RS&T. While the instruments to support capability exist, we see them as poorly resourced, and any moves to improve the situation must involve both Votes Education and RS&T.

We think that owners have the responsibility to support and foster long term capabilities. In the case of CRIs, this implies that government is able to articulate a clear reason for owning them. If that is done, then, to fulfil Government's ownership responsibilities to CRIs, longer term capability, "backbone" and core funding from Vote RS&T should be available to CRIs. Universities have a more complex route to access funding (though inadequate, and beyond the scope of this response). While the owners of private research organisations should also shoulder the responsibility to nurture their own institutions, we believe that other measures (for example, tax relief) might appropriately be used to lighten their burden when engaged in research for national benefit.

Other Research Players should be involved

Institutional funding to CRIs, if substantial, could well trigger a review of the full-cost rules for research. For example, if core or asset purchase funding were to become large enough to enable CRIs to buy a large item outright, then full-cost rules for CRIs might require modification to avoid claiming lease costs for that item. Of course, too great a swing in this direction could lead back to core and marginal funding, at a time when countries with such systems are seeking to inject more contestability. CRIs would need to avoid double dipping on top of any "owner's" payments received by them to pursue their long term aims. International examples such as the funding formulæ used by the US National Science Foundation and others can be drawn upon here. Worldwide, countries are looking for that psychological "sweet spot", somewhere between the extremes, which produces the right mixture of creativity and stability in research teams.

The TEC, universities and research associations will need to be involved to agree workable systems for funding allocation – for example, the formulae for Vote RS&T full-cost funding within various instruments. In cases where the full cost funding rules or formulae change, these changes

will affect the ability of non-CRI research organisations to perform research of importance to New Zealand.

We believe that universities and other researchers need to be engaged to ensure a balance, so that Vote RS&T capability funding does not become so large as to undercut the capacity of other researchers to perform research integral to the function of New Zealand, nor does it become a 'subsidy' to universities. The Research Associations and privately owned research teams who have warranted Vote RS&T funding in the past need to be consulted also, to make sure end-users receive cost-effective benefit from the research.

Public-private collaborations or sub-contracting, eg. between AgResearch and the Malaghan Institute, or Landcare Research and Cawthron, would need to demonstrate transparent allocation of work so that the institutional support formula is not impacted by game-playing within collaborations. The formula would need to be based on work actually done, excluding sub-contractors.

Setting research priorities

The problem definition presented for this work stated that research organisations should "more closely match research activities with the needs of end-users". Clearly, they should, but two problems arise with this approach. Firstly, end-users may not have clearly defined or even compatible research needs. Secondly, national research priorities should be set by government, not by individual research organisations.

The document places emphasis on research providers engaging with end-users to determine research priorities. Where tactical research is carried out for specific end-users or clearly defined industry sectors, this is beneficial. However, where end-users are disparate, conflicting in interest or lacking a strategic understanding of research, then this approach is not likely to succeed without persistent efforts to develop a research-literate end-user community. When the end-user is the nation, then setting priorities is not the responsibility of the research organisations. It is government's job to set national priorities and we believe that this should be done through a national science strategy, as called for by many other groups.

This highlights one of the most serious flaws of the proposal, namely continuing to have a system in which strategic research is funded without the strategy having been elucidated.

Related to this is the problem that New Zealand appears to have no good mechanism for determining what kind of capabilities we should have in place, or assessing the benefits and/or outcomes of currently or

previously funded research. "Loss of capability" in some areas is often feared, but how do we know when that is a bad thing?

For an example, the end-users for open-ocean oceanography could include MfE, DOC, MinFish, various NGOs and groups within the fishing industry. This is a widely disparate group, with competing priorities, varied stakeholder interests and differing levels of capability and capacity in strategic thinking. Engaging with such a complex and conflicting group is not easy. Whoever sets national priorities will need to consult widely with all these stakeholders, requiring facilitation, mediation and dialogue between competing groups. Refereeing this dialogue is the job of government itself.

The end-users of environmental research include DoC, MfE, lobby groups, health groups, and Regional Councils. The base requirement of environmental research may be to understand ecosystems so we can set standards (eg. air and water quality, pollutant levels, etc) based on scientific evidence. Although there may be a government strategy to see environmental standards developed, there is minimal linkage between the research needed by various government departments, and the priorities funded on a national scale. The government will need to develop research strategies, in consultation with all the end-users, to achieve the evidence required to support a sustainable country through quality policy development.

The Missing Link – End-User Linkage with, and Investment in, Research

To date, Picking up the Pace has focused on making the public science system work better. This is to be welcomed. However, a fundamental problem in New Zealand is the lack of end-user involvement. We recognise that national capability is a larger issue than the capability funded through Vote RS&T. In particular, government might give strong consideration to how it can increase capability in end-user communities.

New Zealand business invests poorly in science

New Zealand business invests poorly in science. BERD was 0.49% in 2004, compared to an OECD average of 1.53% (in 2002). Current rates of growth in business spending are barely more than the growth rate of GDP. At current growth rates, we might catch up with the current OECD average in something like fifty years. However, that average is not static, with several nations announcing targets for raising their research spending. We will be left behind.

Government should do more to link end-users and researchers

Within the proposals, there is recognition that government has a role to play in developing linkages between public research and end-users. Government's roles are stated in MoRST's "Anchor Paper" as building capabilities of firms to perform R&D, and supporting institutional interactions for technology diffusion. Government has also placed responsibility on research organisations "to raise the absorptive capacity of end-users" and to "more closely match research activities with the needs of end-users". The solution to this lies not solely in the hands of research organisations. Even if it did, CRIs and other industry support bodies would only have a limited technology transfer role, unless there were explicit direction and support for this role. None of the four components proposed in this package directly address these issues. Action 3.2 of MoRST's seven Action Categories – "stimulate greater business investment in R&D" – does address this directly, but it is only one of sixteen different actions. The activities listed under that topic – "Developing the Technology NZ… programmes" and enabling "NZ business to access an international network of experts" are most useful, and will contribute to the overall picture, but we do need to see the overall picture of the importance which government places on promoting greater business investment.

It is difficult to understand how devolution of funding decisions to research providers would increase end-user engagement. What and where are the incentives? It is clear that many of the schemes run by FRST to promote end-user engagement (through TBG, TechNZ etc.) have increased end-user engagement significantly. Will the current proposals move this forward? Or take it in the opposite direction?

There is a piece of management theory which says that decisions should be taken at the level nearest to where the relevant information can be assembled, and the decisions applied. One useful instrument might be to change fund application rules. For example, effectively, only research providers can currently apply for contestable research funds. At the other extreme, if end-users could lead the applications for certain funds such as "Research for Industry" (RFI), or its equivalents in the social and environmental fields, then the providers would have further reason to link in with users' requirements. In the middle ground, applications from coalitions which include users and providers might prove to be the level where the relevant information can be assembled. While, in the short term, many may doubt that industry would possess the expertise necessary to formulate effective science goals, no progress will be made unless the ability of industry to formulate such goals is itself nurtured and grown carefully over time. The difficulties here been amply demonstrated through problems with the "Partnerships for Excellence" (PfX) funding

scheme after modification by the TEC to make it effectively a private partner led scheme. The key to improving end-user engagement is getting the incentives right.

The alignment of users' and research providers' expectations' would include users understanding what research can offer them and upon their ability to specify the research they desire. This understanding and ability to communicate needs, will take time to develop and therefore a gradual roll-out of system change is more desirable than a sudden alteration in this aspect of the system.

Necessary, but not sufficient

The proposals thus lead in the right direction, but are insufficient. There is a vision here of the relationship between government research and industry, but it is not yet backed up by clear and definite actions, nor by the levels of changes to the business environment that would self-motivate businesses to make the kinds of changes that the government has stated are in our national interest. The current proposals fall far short of causing the dramatic increase in business spending needed to transform this country's economy.

Government sets the environment for innovation. There remain few deliberate incentives for companies to invest in R&D. While this has improved over the last decade, New Zealand falls far behind the level of incentives provided by many comparable nations. Tax incentives for business research are one useful action, but the whole area is worthy of full-fledged policy debate in its own right.

Responses to Questions in MoRST's Discussion Document:

Question 1:

> Are there mechanisms (other than separating short, medium, long term funding, using technical review and negotiation, backbone science and core institutional investment) we can add to the package in order to better balance the funding of new ideas and stability for ongoing successful programmes?

Response:

As we have noted above, we do not believe that MoRST's proposals in its discussion paper will per se reduce transaction costs or encourage collaboration. In some circumstances, they could have the reverse effect. The question of collaboration is worth a full policy discussion in its own right. With regard to nurturing capability, greater involvement of end-users, as discussed above, would be an additional model for consideration.

Question 2:

What is the right set of criteria (for technical review of research)? What would you remove? How would you weight the set of criteria?

Responses:

Scientific and technical quality –should be the sine qua non, as the ability to meet the other criteria is contingent upon sufficient scientific quality. Beyond sufficiency, we believe that the impact of any scientific work depends upon the fundamental scientific quality of that research, in a highly non-linear way. Higher quality research does not just have greater impacts, it has disproportionately greater impacts. Hence to achieve the best returns on our investment in science, raising scientific quality must be a key goal.

Measurement of quality needs to be flexible, eg. numbers of publications may not be appropriate for potentially commercial research. The lessons of the PBRF evaluation, that priority must be given to demonstrating fairness and transparency, should be considered. Also the PBRF has shown how it is possible to assess the quality of all forms of research, from discovery and creative activity through to implementation and comercialisation.

Level of end-user involvement, co-funding and linkages & Track record of delivering national benefit – Scientific quality underpins potential impact, but we advocate stronger linkages with end-users. The emphasis in PGST work should be on delivering benefits of national importance which are taken up by end-users. Scientific track record should lie with individuals and teams, rather than their employers. However, other components, such as the end-user engagement track record may be tied to the organisation, where that organisation can demonstrate its effective structures and processes.

Potential to deliver national benefit over the long term – This criterion goes back to the ex-ante listing of potential future deliverables that was a feature of the existing system. The emphasis of this criterion should be the 'alignment to national benefit or national needs', rather than 'the potential' as the latter can be ascertained through track record and other criteria.

Comparative advantage within the global scene / uniqueness to NZ – This in itself does not necessarily warrant government funding, unless it is an opportunity that also delivers national benefit. If it is an aim that no-one but the NZ government may be expected to fund, it must also deliver some benefit, either commercial or national.

Alignment with end-user and government strategies – This is a good criterion to aspire to, but implicitly assumes that research is developed

after strategy. This will not always be the case; indeed we hope that some research is done to inform the development of strategies. Where strategies are lacking due to government or user delay, the research may be unsupported yet valuable (eg. what environmental standards can we measure with existing technology?).

The level of collaboration between sector organisations – This should not be a criterion until the structure of research funding has changed to enable meaningful collaborations. The incentives for collaboration are, otherwise, cosmetic and used to secure funding only, rather than to do good research.

The record of prior funding might be a criterion for long-term support.

The other criteria are acceptable. MoRST's list of ten should already be a sufficient number of criteria. They must be aligned with those desirable outcomes for the funding system on page 15. Many of those outcomes depend on the 'how' the system is implemented and 'when' it is changed, rather than 'what' it involves.

Question 3:

> Is the description of 'technical review' too wide, or too narrow? What do you think review should encompass?

Response:

MoRST's concept of technical review will need to be elucidated further before it becomes a usable tool. Issues such as scale of funding and pitching assessment to the type of activity are important to enable the flexibility to cater for all types of research. In contrast, the method needs to be exemplary in its transparency and fairness to maintain trust in the system particularly where disinvestment occurs. Decisions should encompass peer reviewers where appropriate, because they are best able to determine the quality of research, while Funding and Investment Agents (FIAs) will provide complementary expertise in areas of their competence. Technical review should be very much based on international research evaluation norms, similar to the criteria used in the PBRF.

Not all scientists should not be expected to become expert negotiators; they should be allowed to focus science performance or end-user engagement. The process of review should involve scientists as much as practicable, whereas the negotiation should involve CRI management.

Long term negotiated funding is a useful tool where track record proves integrity and performance. It enables trust and efficiency. In pricing and allocation decisions, a part of all programme budgets needs to be discretionary spending, so that researchers can do work that 'they cannot yet justify' to see whether it's worthy of attracting 'new ideas' funding.

There must also be opportunities implicit in the system for responses to serendipity. In fact, 'New Ideas' is a misnomer, because such ideas will have been explored initially as part of an existing budget, until they can become justifiable, and worth investing in. Delegation of control of a portion of spending is an effective way to enable such efforts, providing that the core objectives and milestones of a programme are met in a timely manner, or very good excuses given for failing to be met.

Negotiation can be time consuming, and require a level of up-skilling of FIA staff, particularly in specific scientific areas. Peer review becomes useful at this point. This needs to be international, as within-NZ peer review suffers from too small a pool.

Question 4:

Who should lead the review process?

Response:

Reviews should be initiated by those who must approve their recommendations and initiate follow-up actions. In the case of long term core and "backbone" science, the government as owner of CRIs should initiate reviews. The government's agents, CCMAU and MoRST, would be expected to contract the reviews to experienced outside bodies able to form panels experienced in different fields. With a proper independent review, one should gain a different understanding of the organisation being reviewed. One may not like the results, but a truly independent review should be objective and unbiased, and ideally provoke action. Government might also require each CRI to commission periodic external reviews, as is done with most research institutes. New negotiation processes will mean that CRIs need to develop new skills and perhaps employ professional negotiators. Such steps may result in temporarily reduced efficiencies and reduce the relevance and transparency of the negotiation process. (ie. non scientists negotiating for scientists' livelihoods).

In the case of short to medium term contested FRST investments, FRST should initiate the technical reviews.

We note that the lack, until recent times, of an "ownership" instrument to deal with longer term capabilities has seen the Foundation for Research, Science and Technology attempt to compensate by moving into longer term agreements. If government as owner now moves to occupy this policy space (without returning to a full "DSIR" model), then FRST will need to withdraw from those areas where it has attempted to act "in loco parentis".

Question 5:

How will negotiation help in forming collaborative arrangements?

Response:

We don't think it will. The inherent structure of the system puts barriers in the way of collaborative agreements. Each CRI has its own strategic plan, known only to the board, the shareholder, and portions of which are known to staff ie. public knowledge. Each board operates autonomously from other CRI boards and universities, and as all compete for the limited government budget for research, the barrier to collaboration will continue. Only when there is a third threat, do groups collaborate, ie. at times when a lack of collaboration between two parties will mean the funding goes to a third party. The structure needs to change before this barrier is removed.

MoRST's proposals talk about achieving open exchange of knowledge between researchers. However, we believe that New Zealand needs stronger measures to encourage this. We need active collaboration. Support means more than removing structural barriers and disincentives, it means actively providing incentives, eg. supporting more research consortia.

Providing incentives for collaborative arrangements may enable some to occur, eg. by limiting some long term funding to programmes over a certain size, for which many teams will need to collaborate to achieve the critical mass required to achieve a programme of such a size. Some current arrangements exist mainly for the purposes of gaining funding, and in such cases there is little real collaboration in terms of information sharing.

Question 6:

> How should FIAs [Funding and Investment Agents] select those research programmes, or areas, which should be reviewed for transition to long-term investment? Should the FIAs make the initial choice or could a self-selection mechanism be used?

Response:

Various "Foresight" or "Future Watch" programmes, if carried through to successful results over the long term, remain the best way for a country to develop a long-term view. Foresight discussions enrich the information environment and increase the chances of consensus on ways ahead. The discussions should include policy specialists, funders, research performers and end-users. The decision to move to, or set up, a long term investment is one which should be the responsibility of government as owner, not by FIAs, though they should certainly participate in the assessment. Consideration might also be given to slightly longer term funding for those research teams who have shown a strong track record of generating new ideas.

Question 7:

Can you identify any unintended consequences or risks of using review and negotiation in making investment decisions.

Response:

Possible unintended consequences may include:

- Lack of transparency – Those with superior negotiating skills may win, rather than those with superior science. Loss of trust (or failure to regain trust) by scientists in funding decision-makers.
- Too much additional time involved in negotiation by scientists in CRIs, or…
- …if CRI managements perform negotiations, they may need to employ specific 'negotiators', who may or may not represent the science well (in the opinion of the scientists, due to lack of scientific expertise).
- Large workload for FIAs and need to upskill investment managers to understand details of research programmes or to run peer-review processes that will demand international goodwill.
- If peer-review is used, then it must be international. This would be expensive, but justifiable.
- The amount and proportion of funds in each category (short, medium, long term etc) will determine the extent of system change. If there is a shortfall and funds are allocated by some ranking mechanism, then the contest remains. Depending on the level of shortfall, it could introduce another time-intensive process for researchers
- A scoping process would be needed to estimate which programmes might go into the short, medium, long-term categories, and then the appropriate proportion of funds can be allocated to each category. Otherwise a retrospective fund allocation would be needed. (This would be better, but is it possible?)
- Review and negotiation would need to be defended against criticism from the taxpayer and/or government departments in which contestability is a cornerstone of transparency. The process needs to equally transparent and fair. A risk remains that the process will bear no credibility.
- The introduction of FRST's Outcome Based Investments (OBI) brought widespread criticism with regards to its implementation. Lessons can be learned from that process in order to better implement any changes under Picking up the Pace.

Question 8:

What process or criteria could we put in place to ensure disinvestment decisions are made in a timely and appropriate manner?

Response:

Review of objectives and milestones are traditional methods. Evaluation of impact on users should be another. Disinvestment decisions are always difficult and investments in people and equipment are made for valid reasons that should not easily be over-ridden. The justification for disinvestment seems most likely to come from changing end-users (eg. we no longer have an automobile assembly industry, hence we do not need research in automotive assembly). However, this may lead to disinvestment in high quality, well-run programmes simply because of transient changes in our industrial base. The title of this discussion is "a more stable funding environment". The system as it stands seems capable of disinvesting rapidly. The problem is not enough transition of investment.

Disinvestment decisions could occur in a situation where a research team sees a new area for investigation, but cannot carry out both, so one area is scaled down while the other is scaled up. The new area might start off in a short-term funding stream, while disinvestment in the old area is occurring. The staff and equipment capabilities would not be lost in this case, and if the new investigations prove useful, then that would transfer to long-term funding over time. Hence transition support is more useful than just disinvestment.

As we stated above, when ideas appear fruitful, we should move resources towards them; when ideas decay, we should move resources away from them. If evidence is uncovered to show that a research project is no longer valid, the work should be dropped. However, changes in funding should be gauged and paced to allow for not just an exit strategy, but a transition plan for the people involved.

Question 9:

> What mechanisms would you suggest to encourage the right level of end-user engagement at the right point in a programme's development?

Response:

Many of the reasons for the lack of uptake lie outside the ambit of MoRST, FIAs or research organisations. They may include lack of interest or uptake capability in businesses, or lack of resources in regional councils. For example, addressing these issues is outside the realm of individual researchers and they should not be penalised because of these difficulties. More effort could be made by the FIAs to effect user uptake, but many of these problems will only be improved by concerted government action.

The level of end-user involvement should begin with research priority setting, so that research is relevant and useable by end-users such as environmental, social or industry groups. They must also be part of the

milestone or objective setting during negotiations and review. Engagement must be agreed with the science team members, who know the usability of the research findings, as well as users who should commit formally in some way. The utility of research should not, however, be the sole responsibility of the scientist, as purchase of technology may be limited by users affording it, eg. regional councils purchasing information for Environmental Standards may depend on budget allotments within that council, such as an environmental protection budget, which in turn may depend on an unforeseen event such as a disaster. We believe that "Foresight" or "Future Watch" exercises are a good starting point. We have also suggested that, if end-users could play a strong role in the applications for certain funds such as "Research for Industry" (RFI), or its equivalents in the social and environmental fields, then the providers would have further reason to link in with users' requirements.

Achievement of end-user involvement may be measured using evaluation techniques and performed by the FIA in order to ascertain the efficacy of their funding allocations. Evidence of any lack of uptake may result in official recommendations from MoRST or the FIA to the agency or business concerned.

Question 10:

> How would you suggest that investments in "backbone" science be selected and reviewed?

Response:

There are examples where external forces decide our selections for us, eg. international commitments to climate and marine agreements. There are cases where it is clearly useful to industry, eg. national measurement standards.

For other possible backbone investments, criteria such as "potential to deliver national benefit over the long-term" are inherently limited. Over the very-long timescales involved here, national priorities may change dramatically. Who, in the 1950s, would argue for the vital importance of monitoring changes in greenhouse gases in the atmosphere? Indeed, there are valuable instrumental records of climate going back 400 years, from the Royal Observatory in Greenwich. Designing policy for these timescales is difficult as both goals and outcomes are so clouded by uncertainty. Hence, as the MDL study commissioned by MoRST points out, when there are no clear informational advantages, relational contracts should be used that emphasise "best efforts" by both parties.

For many of the potential investments in the science backbone, the value of the investment increases with longevity and continuity of funding. Hence, a very slow rate of change may be optimal. When reviewing, the ten suggested criteria for technical review can still be applied, but the

weight put on the findings should be limited by the inherent information disadvantage for all parties when contracting for such long-term outcomes.

Instead, weight should be placed on the value of the investment between the parties involved. Very-long-term funding with limited review presents incentives for misuse of public funds. However, the organisations charged with these contracts should take an open-book approach to accountability.

Question 11:

> What principles could be used to determine which organisations (other than CRIs) might qualify for core institutional investment from Vote RS&T?

Response:

Governments should "core" fund when they are owners or stewards of research institutes, rather than when they act as buyers of services. They core fund to build and maintain capability. Governments may also wish to encourage institutions that they don't own by means of a suite of fiscal incentives such as tax breaks, development grants etc. For example, if a private research body can show that its capabilities are required to achieve stated national goals or are currently delivering national benefit, then government has an interest in assisting it.

Private sector organisations that contain key capabilities needed for the future wellbeing of New Zealand should still be free to apply for long-term programme funding in a full-cost model. We note, however, that some countries do indeed assist selected firms through core funding.

Core institutional investment would need accountability to avoid controversies which would reduce taxpayer trust in the system. (We note, in passing, that it does not seem coincidental that the remits of both TVNZ and CRIs require them to juggle public good and commercial goals.) CRI managements will need incentives to use this investment wisely to effectively retain and develop capabilities for science rather than use it to effect short-term income streams for their organisations.

Question 12:

> Would you prefer to see the transition to a new funding approach being incremental as funds are released or an immediate shift of eligible contracts to this new package?

Response:

Technical reviews under FRST's aegis, to examine the possibility of renewing existing research over a longer time frame, would logically be carried out towards the end of current contracts.

Our suggestions for core and "backbone" funding are restricted to CRIs. We recommended in our 2004 response on capability development, that Non-Specific-Output Funding (NSOF) be redefined as a capability development fund, and government has now done this. We believe that, as this "owner's" fund is phased in, it can be made adaptable enough to encompass negotiations for core and "backbone" science.

If CRIs were to receive substantial core funding, the formula for FIA full-cost funding to CRIs would need to avoid double dipping on top of any "owner's" payments received by them to pursue their long term aims. As mentioned earlier, international examples such as the funding formulæ used by the US National Science Foundation and others can be drawn upon here. However, phased increases in the capability development fund over four to six years should allow the necessary adjustment without severely disrupting current research or research costings.

Question 13:

What risks, threats or opportunities can you see arising with the implementation of this proposed package?

Responses:

Risks or threats:

- higher FIA information costs, need to upskill staff to individual areas of science
- risk of lobbying making decisions less impartial
- technical review will result in some kind of ranking resulting in effective contest (if ranked at programme level) or government control over research projects at lab level (through ranking parts of research programmes, eg. at project level)?
- risk of everyone wanting their research to be considered long term immediately the package is implemented, and no $ left in the pots for new/short term research,

Opportunities:

- enable and incentivise good investment and business decisions with CRI senior management to enable their scientists to perform excellent research
- to allow scientists to enforce on their management the capital investment required to achieve the contracts or other deliverables
- larger programmes across groups or organisations that spin out new ideas without risking base funding for each organisation.

Lastly, we have one additional issue – what if the government were to face an economic crisis – loss of tax dollars and an across-the-board reduction in funding were required? None of the mechanisms proposed allow for that. Of course, in such times, research investment may be what

is needed to pull New Zealand out of the quagmire. Research timeframes may be longer than economic cycles, so the mean long-term investment in research should be maintained even in times of downturn.

In conclusion, we re-iterate our initial concern that the measures proposed will do little to encourage collaboration or lower transaction costs. However, the proposals have the potential materially to assist in maintaining and building capabilities.