

**A STUDY OF
INTERNATIONAL SCIENCE
COLLABORATIONS:
PART 2**

**A STUDY OF INTERNATIONAL SCIENCE
COLLABORATIONS: PART 2**

SQW Consulting

Report to the Scottish Executive
14 May 2007

CONTENTS

INTRODUCTION	1
RESEARCH FINDINGS	2
CONCLUSIONS AND RECOMMENDATIONS	32

ANNEX A: LIST OF CONSULTEES

**ANNEX B: DATA ON INTERNATIONAL COLLABORATIONS
SUPPORTED BY THE ROYAL SOCIETY OF EDINBURGH**

INTRODUCTION

1.1 This is the report on the second of a possible three part study¹ into the nature of international science collaborations established by researchers and their host organisations in Scotland². In scope, the study is concerned with Higher Education Institutions (HEIs), research institutes and related organisations, and the NHS in Scotland. In terms of determining the nature and scale of collaboration, the overall study initially had a focus on links with China and the USA, two of the priority countries within the Scottish Executive's international strategy. These remain of prime interest, but this second phase of the study has also sought evidence on collaborations more generally, including on the strategic context in which they are created. Also, the original focus on "science" has been broadened.

(Since this report was commissioned and drafted, the Scottish government has changed. The rationale for this work was conceived under the previous administration. The strategies, objectives and commitments referred to in the report should not therefore be treated as *current* Scottish Executive policy.)

1.2 Part 2 builds from and extends the exploratory work done with a small number of stakeholders in Part 1. It has involved a much more extensive programme of consultations with senior representatives of HEIs, NHS Trusts, research institutes and other publicly funded science-based organisations. A list of consultees is provided in Annex A.

Background

1.3 The findings from Part 1 demonstrated a willingness to engage in the Executive's "process" of obtaining information on international collaborations, subject to time and financial resource implications.

1.4 There was no evidence of a standard approach to information management here. Whilst there was recognition that better information would be valuable, there was scepticism over the feasibility of obtaining new information from direct approaches to individual researchers.

1.5 In expressing a willingness to co-operate, Part 1 consultees made the following points:

- some data may be commercial-in-confidence and therefore access would be restricted, or would be provided in an anonymous form if revealed
- a request for new data collection would be unlikely to receive support

¹ Part 3 of the study, should it be undertaken, would involve a survey of relevant institutions and/or their research staff.

² This study has been conducted by SQW Consulting in collaboration with Dr Geoff Gregson, University of Edinburgh Management School.

- data requests that involved significant additional work or modification to internal systems would not be supported without a strong case being made, and the appropriate resources being made available.

RESEARCH FINDINGS

2.1 In this section the main findings from the programme of consultations conducted in Part 2 of the study are reported. In order to provide the client with insight into the diversity of views received, the findings are provided in tabulated form, summarising the key inputs from each consultee.

2.2 Provided in Annex B is a summary of information received from the Royal Society of Edinburgh on the international collaborations that it supports.

Nature of international collaborations

2.3 Consultees were asked to describe the types of international collaboration entered into by their institution and its staff. Collaborations between individuals, groups and institutions with peers and with private sector organisations internationally were explored. In terms of geography, all international collaborations were of interest, but with a particular interest in those with the USA and China. Inputs from consultees are reported in Table 2.1.

Table -2.1 Nature of collaborations

Source	Findings
HEI (1)- research intensive	<p>Most structured collaborations are in teaching and learning – with formal partnerships in Middle East, Russia and the Far East.</p> <p>Research collaborations are established on an <i>ad hoc</i> basis. No plans to develop more strategic collaborations.</p>
HEI (2) - research intensive	<p>The university has c. 100 strategic agreements with peer universities around the world – some much more active than others.</p> <p>Examples include good relations with universities in Hong Kong. Student exchange, staff secondments and visits involving Hong Kong University staff have occurred over several years. There is now a wish to increase research collaborations on the back of this activity.</p> <p>With mainland China, the university has institutional links with 10-12 universities – sustained by senior staff visits and by establishing collaborative degree programmes. Shangdong, Beijing and Shanghai areas are priorities, in line with SE strategy.</p> <p>The university is part of IMMPACT, a global health research initiative funded by the Bill and Melinda Gates Foundation.</p> <p>Major new push is to develop collaborations in the Middle East – a “future powerhouse”.</p> <p>The university has a member of staff placed in Scottish Development International’s Boston office for 3 months to raise profile and promote collaboration with US universities. This initiative is due to be evaluated shortly and more of this may be done if it has proved to be successful.</p> <p>The University is intent on increasing the number of strategic links it</p>

	<p>has on the back of individual academic research collaborations.</p> <p>In addition, there is a very large number of formal and informal collaborations involving individual staff and research groups, but central management has no way of assessing how many.</p> <p>Most international research collaborations involve Europe, with China and the USA ranking second and third respectively in numerical terms.</p>
<p>HEI (3)</p>	<p>Currently most collaborations are in teaching and learning. Those relating to research are of three main types:</p> <ul style="list-style-type: none"> (a) research collaboration due to personal links. These are with a range of countries: Sri Lanka, Malawi, Brazil. The institution also has an international health and development institute which works in e.g. Bangladesh and sub-Saharan Africa (b) the institution has a small number of world-renowned academics, notably in speech science, who collaborate with peers in the US (e.g. Ohio and Louisiana) and Australia. These academics are invited to deliver key note speeches at international conferences and to deliver “masterclasses” (c) a wide range of individuals working internationally in the normal course of their research, often through serendipitous links. <p>At present, most collaborations are on the individual-to-individual level. The University is looking to increase its activity internationally and build strategic relationships.</p> <p>It currently has limited links with China and those with the USA are not any more numerous than with any other country.</p> <p>The institution’s Research Development Strategy has not identified China as a priority: however, India is a priority as the university already has a significant learning and teaching presence there. Key areas for new collaboration in India would be in health and business. Singapore is also a priority, again building on existing collaborations and transforming these into a more strategic relationship.</p>
<p>HEI (4)</p>	<p>The three main research groups in the University – in nuclear, micro sensors and thin film science/technology - all have extensive overseas partners. Based on academic reputation, these are longstanding and involve both academic and industry links.</p> <p>In addition, there are short term, often consultancy-type project collaborations, notably in environmental science and biomedical science.</p> <p>The university has MOUs with several Chinese institutions, primarily related to teaching. The scope for developing these into research collaborations is uncertain – dependent on the presence of mutual benefit.</p> <p>There are plans to develop research partnerships with institutes of technology in India.</p> <p>There are some large scale collaborations with the USA, notably in thin</p>

	<p>film technology with California-based companies.</p> <p>Collaborations with USA and China do exist but no more than with other countries. Links have been established with Germany and Italy over nuclear physics, with France and other European countries over micro-sensor technology.</p>
HEI (5) – research intensive	<p>International collaboration runs through all aspects of the university – teaching, research, knowledge exchange and policy development.</p> <p>Collaborations range from one-to-one links between like-minded researchers through to MOUs with institutions. The university also has twinning arrangements, including with two US institutions.</p> <p>The university is involved in many collaborative EU Framework Programme projects and in projects involving other EU funding sources.</p> <p>The university also has strong links with global companies, mostly in science and engineering. These usually take the form of research contracts. There are a small number of research alliances with large companies which fund for example chairs and other staff posts.</p> <p>Most international research collaborations are within the EU, followed by the US and then China. In terms of teaching collaborations, most are with China, followed by the US and then the EU.</p>
HEI (6)	<p>Collaborations are of several types: networking at conferences/workshops; individual-with-individual in projects; institution-with-institution. The research collaborations tend not to be linked to teaching collaborations.</p> <p>Collaboration activity is with the Far East, EU and North America. Links exist in China with the Chinese Academy of Sciences on environmental/water supply issues and in the US with the US Protection Agency on water toxins.</p> <p>Research has been conducted with WHO funding and EU funding to work collaboratively on obesity and cardiovascular research.</p>
HEI (7) – research intensive	<p>Collaborations include: involvement in a number of large EU Framework Programme projects; formal research collaboration agreements with institutions and with companies in Australia, New Zealand, Canada, and the US; strategic relationships for research and student exchange with several US universities.</p> <p>Although there are a number of research collaborations with universities and companies in the USA, these are no more numerous than ones in Europe.</p> <p>Although the institution has a number of Chinese and other Asian post-doctoral fellows, there are no major research collaborations with institutions in the Far East. There is no strong strategic drive within the institution at present to change this.</p> <p>MOUs are in place with institutions in Pakistan, South Africa, Malawi and others.</p>
HEI (8) – specialist	<p>Numerous teaching collaborations exist at undergraduate and post-</p>

institution	<p>graduate levels.</p> <p>On research, there are two main collaborations at present: involvement in an EU Framework Programme project and participation in an EU network that convenes seminars.</p> <p>Research staff also sit on the boards of international journals.</p>
HEI (9) – specialist institution	<p>Individual staff members practice/exhibit internationally. Staff act as curators of international exhibits. Design staff work collaboratively with business partners, but tends to be on small scale.</p> <p>Institutional level collaboration with peers in Japan involves joint exhibitions and joint publications.</p>
NHS (1)	<p>Most international collaborations are with commercial companies.</p> <p>Generally, collaborations are split evenly between Asia, USA and Europe. However, overall number is small as this is a small Trust.</p> <p>It has a nursing collaboration with the USA to improve techniques in physiotherapy: this has a research and a teaching element.</p>
NHS (2) – research active Trust	<p>International collaborations include: genetics research with institutions in the USA; drug trials with pharma companies in the EU; other commercial trials with industry, mainly EU and US companies.</p> <p>Around 75% of existing collaborations are with organisations in the US or EU.</p>
NHS (3)	<p>Collaborations include: commercial research and clinical trials, occasionally in US-initiated trials in which the Trust acts as a contract research partner for the lead organisation in the trial.</p> <p>Currently in discussion with a major US university about trialling a product for it. Some non-commercial collaborations also exist.</p>
Other publicly funded research organisation (1)	<p>Collaborations are in place with organisations throughout the world: in addition to the EU, these include links with the USA, New Zealand, countries in Africa, Cuba, countries in SE Asia and recently in China.</p> <p>The collaborations exist in the following research areas: livestock systems, pasture management, environmental and climate change, sustainable land use.</p> <p>Types of collaboration include:</p> <ul style="list-style-type: none"> - joint projects and publications with peers - collaboration between individual researchers, especially with the USA as part of an international programme of research into land use change - scientific staff exchanges - participation in conferences/workshops that help set the international research agenda

	<ul style="list-style-type: none"> - knowledge exchange with companies and public bodies.
Other publicly funded research organisation (2)	<p>Most collaborations are within the EU and associated with EU Framework Programme funding. European collaborations include: on food supply chains and grazing systems with peers in Spain and Italy; on dairy supply chain with peers in Northern Europe.</p> <p>Collaboration with US peers on livestock genetics. Only a minor consultancy at present with China.</p> <p>Main types of collaboration are:</p> <ul style="list-style-type: none"> - peer to peer links - joint research projects - consultancy.
Other publicly funded research organisation (3)	<p>Most collaborations are within the EU and associated with EU Framework Programme projects. Collaborative activities include participation in “networks of excellence” and research in the areas of drug targets for therapy and neutrogeomics. The institution is part of a 22 partner collaboration in Europe to share information on students and research.</p> <p>Only minor activity with the USA relative to the EU. Any US links tend to be still underpinned with EU funding. Recently the institution has had two collaborations with US peers that have attracted US National Institute for Health (NIH) funding. Some links planned with China.</p>
Other publicly funded research organisation (4)	<p>Collaborations are mainly with countries in the EU but also with Yemen, Peru, Brazil, China and with other parts of Asia, notably Nepal.</p> <p>Works with the British Council to obtain help in opening doors to collaboration all over the world – “gives the institution more clout”.</p> <p>Chinese links go back 100 years. Multiple and diverse links in place.</p>
Other publicly funded research organisation (5)	<p>Collaborations are mainly with organisations in Australia, New Zealand, Belgium and North America.</p> <p>Main subject areas are: parasitology, bacteria and viral research in livestock.</p> <p>Types of collaboration:</p> <ul style="list-style-type: none"> - scientist with scientist, including staff exchanges - working on joint publications - collaborative research projects - MOU with peer institution in New Zealand. <p>However, this consultee is cautious when considering MOUs as they can be of limited value – “unfocused and not necessarily a good indicator of collaboration”.</p>

Summary

2.4 Collaborations in research vary in nature:

- informal researcher-to-researcher links – these are often initiated by meeting with interesting and interested peers at international conferences
- formal researcher-to-researcher links in the context of a funded, structured research project which may be public sector or private sector funded
- strategic partnerships between institutions and/or departments/groups within them
 - ones that are active and productive
 - ones that exist on paper (e.g. through an MOU), but are associated with little or no activity
- links with large companies internationally that are associated with sponsorship of staff or student positions, or with research contracts.

2.5 For HEIs, collaborations associated with teaching and learning (T&L) are, not surprisingly, important and well developed. They are formal and structured. They tend to be established and operated separately from research collaborations, although in some cases there is an aspiration to build research links on the back of a T&L collaboration.

2.6 There appears to be quite different corporate approaches to the formation of strategic international links: some HEIs have numerous links (one reports c. 100 strategic agreements) and accept that some will be more active/productive than others. Other HEIs are much more targeted and selective in the strategic collaborations they form: these institutions are not interested in the collection of numerous MOUs with international peers. Still others seem content to operate on a more informal and *ad hoc* basis, with no evident plan to become more strategic.

2.7 For research institutes and other science/research-based organisations in Scotland, international research collaborations are important, diverse and often established through a formal and structured process that receives strong corporate endorsement.

2.8 For NHS Trusts, collaborations with international companies over the conduct of clinical trials are important.

2.9 For all research organisations, collaboration with US-based partners opens up important access to US research funding sources, notably to the National Institute for Health (NIH).

2.10 In terms of geography, the links are diverse. In the main, the USA and China are not viewed as more important than other geographies. In none of the sectors is

there a strong sense of explicit alignment with the Executive’s international strategy in terms of geographic prioritisation.

Reasons, motivations and incentives for collaboration

2.11 The objective here is to understand why international collaborations were entered into and what incentives there are to do so for an institution and its staff. Findings are summarised in Table 2.2.

Table 2-2 Reasons, motivations and incentives

Source	Findings
HEI (1) - research intensive	Collaborations tend to complement the existing research strengths in the university.
HEI (2) – research intensive	The university has the ambition of being recognised internationally. Developing certain strategic partnerships is one way of achieving this.
HEI (3)	Motivations often triggered by a teaching and learning collaboration e.g. interest in building research collaborations from existing T&L links with India, Egypt, Saudi Arabia and Greece.
HEI (4)	<p>On a strategic level, China and India are seen as key sources of innovation and scientific development in the future. Important to start building partnerships now to tap into that emerging strength and knowledge base.</p> <p>There is no explicit requirement to collaborate internationally in terms of staff promotion criteria. However, succeeding against criteria linked to research output and income generation is assisted by international collaborations and knowledge transfer. Most research-active staff in the university are “rewarded” by freeing up their time for research, which also assists them in getting involved internationally.</p>
HEI (5) – research intensive	<p>The university is looking to implement a policy of developing “quality relations with quality partners” rather than a large number of links at an individual level.</p> <p>The prime reason is to build the university’s reputation. HE is a global industry: quality links enhance reputation by association. All this helps to be seen as a true international player.</p> <p>Spin-off benefits include help in attracting more international students.</p> <p>For staff, there is no explicit requirement to demonstrate international working for promotion: it is a secondary measure. However, partnering with best co-authors internationally will lead to publications in higher quality journals. Staff working internationally – presenting at major conferences, visiting research partners, hosting visits – demonstrate that they are well networked into their research community.</p>
HEI (7) – research intensive	<p>Individual collaborations are driven by researchers wanting to work with interested and interesting people.</p> <p>At a strategic level, it is about enhancing the prestige of the institution or department.</p>

HEI (9) – specialist institution	<p>Contributes to RAE and helps attract international students.</p> <p>Promotion tends to be driven by RAE requirements. International collaborations help staff seeking promotion.</p>
NHS (1)	<p>Motivation for collaboration is financial.</p>
NHS (2) – research active Trust	<p>Motivation for collaboration is financial. The availability of a grant source, e.g. a pot of EU funding, is a key driver.</p> <p>Another motivation is necessity – rapid progress for medical and clinical trials requires going international to recruit patients.</p> <p>Some collaborations are motivated by a drive for learning and service improvement, and do not attract grant funding – e.g. current collaboration with EU peers to monitor survival rates for kidney dialysis patients.</p>
NHS (3)	<p>Motivation for involvement in international trials is to give patients access to drugs they would not otherwise get.</p> <p>Another motivation is to raise the profile of the Trust.</p> <p>The Trust encourages clinicians to become involved in research. Clinicians are motivated for professional reasons, if they have time – consultants have time for research written into their contracts. Allied Health Professionals and research-active nurses do not. The Trust has an endowment fund that can support these staff devote up to 0.5 days per week to a research project.</p>
Other publicly funded research organisation (2)	<p>To further knowledge development - to learn what is being done elsewhere. Also, to transfer knowledge from Scotland.</p>
Other publicly funded research organisation (3)	<p>Collaborations are driven by the need of researchers to learn from each other – “needs must collaborations”. The need is to access resources and expertise.</p>
Other publicly funded research organisation (4)	<p>Collaborations are driven by research needs and the requirement continually to fund work areas of interest</p>

Summary

2.12 For HEIs the key factors behind the formation of international collaborations are:

- for the institution:
 - international recognition, reputation, prestige
 - helps in attracting international students and in recruiting high quality staff
- for the researcher:

- assists in achieving research output and income generation targets that staff have in the context of promotion criteria
- leads to publications in higher quality, international journals
- brings benefits of working with interested and interesting people – intellectual stimulation.

2.13 For research institutes and related bodies the key factors are:

- knowledge transfer - to learn what is being done elsewhere
- to access resources and expertise in support of their own research
- to help in the development of their own future research agendas.

2.14 In addition to profile, our consultees in NHS Trusts emphasise the importance of the financial motivation underpinning international collaborations. Access to grant funding is a key driver in collaborating within Europe. Participation in clinical trials gives patients access to drugs they would not otherwise get. Also, Trusts may require international collaborators in order to recruit patients to progress clinical trials. There is also the motivation to learn from others in order to drive service improvement.

Origins of collaboration

2.15 To ascertain how collaborations come about, consultees were asked about any prior inputs or activities required to enable the establishment of the collaboration. Is there a structured approach or do they come about as a result of serendipity? Findings are set out in Table 2.3.

Table 2-3 Origins and prior inputs

Source	Findings
HEI (1) - research intensive	<p>Collaborations arise through staff meeting with other interested academics at a conference or they involve working with a former colleague. “Academics are more comfortable working with people they already know from prior meeting”.</p> <p>Many collaborations come about through serendipity. However, it requires research staff to go to international conferences and also for the academic body to be internationally mobile (i.e. to have staff mobility in terms of recruitment).</p>
HEI (2) – research intensive	<p>Strategic collaborations require senior staff to spend time and the institution to spend money. Collaborations often start with an invitation to the Principal to participate in a Ministerial visit, followed up by a visit by a VP and then by a flurry of academic visits and exchanges. Lots of different people at different levels in the university become involved: it is important to have one person ensuring that all the activity “hangs together”.</p>

	<p>The alternative approach, building from the bottom -up, takes less effort overall, but it can take a long time to build from single collaborations between individuals to something with bigger impact.</p> <p>This university encourages research collaboration by providing funds to help staff travel, either as part of an existing collaboration or to set up a new collaboration.</p>
HEI (3)	<p>Most collaborations are established through individual contacts – maintaining a prior relationship with a former colleague or meeting interested and interesting academics at conferences.</p> <p>International partners often approach the consultee’s institution because of its teaching quality, but then learn more about what it does, including its research. In any event, “internally, there is a close link between our research, learning and teaching so why should this not extend beyond the walls of the institution?”</p> <p>Prior conditions include:</p> <ul style="list-style-type: none"> - research credibility and range – “this needs to be pushed much more” - external marketing of institutional expertise – getting staff to conferences to give papers, i.e. sustained staff effort. To date, this has been <i>ad hoc</i>. <p>The institution provides funds to support staff delivering a paper at an international conference and in some cases to support just attendance if there is a good institutional business case.</p>
HEI (5) – research intensive	<p>Most teaching-based collaborations are with the Far East, and some of these are starting to develop research collaborations as a further spin-off.</p> <p>In the US and Europe the link tends to be the other way around: collaborations are mostly associated with research, with teaching links following behind – mostly via student exchanges after a research collaboration has been built up.</p> <p>There is a need for substantial investment in time and money to prepare and build a relationship to the stage where it will work. In the past the tendency has been to sign many MOUs and leave it at that. Successful collaboration requires close understanding and a good personal relationship between key people in the relevant institutions – “gives the collaboration something to nucleate around”.</p> <p>In the experience of this consultee, the most successful collaborations begin with a bottom-up activity, without being pushed from the top. Central management can then facilitate and provide support once the collaboration reaches a certain level of activity. This is more effective than trying to bring different institutions (brands) together at a strategic level with no activity in place to underpin this.</p> <p>This consultee argues that there should be no external push for collaboration until internal activity is sufficiently developed.</p>
HEI (6)	<p>All collaborations have their origins in high profile conferences – conferences are targeted to ensure they are ones relating to key areas of</p>

	work that are most likely to yield new collaborations.
HEI (7) – research intensive	<p>Whether a research or teaching link comes first depends on the peer institution and the initial drive. Research comes first when it is interested academics that meet and start to work together. Teaching can come first if a member of staff returns from e.g. a recruitment fair having heard of a potential partner that matches the strengths/aspirations of the consultee’s institution.</p> <p>Very little in the way of prior inputs are required for strategic level collaborations – “all it takes is a visit from a senior member of staff to sign an MOU or joint venture agreement and then the structure is in place to facilitate other collaboration”. Decisions to do this can be made quite quickly. However, these types of collaboration may not deliver much.</p> <p>For the more valuable/productive academic-to-academic collaborations, the prior inputs are an awareness of the best people in one’s field and attendance at conferences. This is expected of staff as part of their job within a high ranking research-intensive institution.</p>
HEI (8) – specialist institution	<p>Supportive of collaborations that evolve naturally through staff or institution-level contacts. Internationalisation is an important strategic agenda for this institution, but pursued through natural development not push.</p> <p>Travelling, attendance at meetings and information exchange are all required – “in enormous amounts”.</p>
NHS (2) – research active Trust	<p>Collaborations come about largely serendipitously. Most come from individual clinician/research contacts – for example, a drug company will often approach a consultant it knows and ask the consultant to participate in a drugs trial.</p> <p>Research and teaching collaborations operate separately at an institutional level.</p>
NHS (3)	<p>For commercial research, a company will most often approach a clinician known to have an interest in the subject area (through the clinician’s research profile or prior involvement in a trial). Any collaborative project needs to be endorsed by the Trust’s research office.</p>
Other publicly funded research organisation (1)	<p>Collaborations are the result of careful design and planning. Many arise out of networking at conferences that are attended with the aim of seeking out useful collaboration in order to further research interests. Conference attendance is highly selective – selected largely on the basis of the potential opportunity it offers to further research and enhance profile.</p>
Other publicly funded research organisation (2)	<p>The majority of collaborations are established through individual personal contacts and serendipity. They can develop as a result of raised profile through publication and from the institution’s staff being part of the relevant research community.</p> <p>MOUs are often “window dressing” – collaborations thrive without the need for them.</p> <p>Teaching/training and research collaborations tend to be quite separate.</p>

Other publicly funded research organisation (3)	“Needs must collaborations”, i.e. ones required to progress research objectives, are common: they are entered into whether or not there have been prior collaborative contact or not. However, forced collaborations do not work: there has to be a perceived benefit for the scientist or the institution - and this must work both ways between the partners to the collaboration.
Other publicly funded research organisation (4)	Some of the collaborations arise due to serendipity, but many are the result of historical precedence (“including links first established in the days of the Empire”).
Other publicly funded research organisation (5)	<p>Most collaborations are based on historic links formed over prior 30-40 years, especially with countries facing similar livestock-related challenges as Scotland.</p> <p>Some arise from one scientist becoming aware of another’s work through publication or from meeting at a conference.</p>

Summary

2.16 The picture amongst HEIs is varied, with bottom-up and more strategic top-down origins in evidence:

- many collaborations between individual researchers come about through serendipitous contact, mostly at conferences - although some consultees argue that the conferences are carefully selected with the aim of initiating research collaborations in mind
- collaborations sustained with former colleagues who have moved to posts in other institutions
- invitations to the Principal to participate in ministerial visits, with follow-up visits by other senior staff
- approaches from international peer institutions because of reputation in teaching which may then lead to research links.

2.17 One consultee has strong views against any “external” push from the public sector for collaboration between institutions where there has been little or no prior activity between the parties.

2.18 Some consultees argue that very little in the way of prior input is required to establish strategic level collaborations. However, these types of collaboration appear not always to deliver much value. Others argue that substantial time, money and care are necessary to establish high value, productive collaborations at an institutional level.

2.19 For the research institutes and related bodies collaborations arise from:

- careful design and planning by the institution

- personal contacts made at conferences.

2.20 One consultee argues that although the presence of an MOU could be counted as evidence of an international collaboration, these are often no more than “window dressing”.

2.21 For the NHS Trusts collaborations arise from:

- serendipitous personal contacts
- contact made by companies due to the previous involvement of NHS staff in clinical trials being known.

2.22 For some institutions there is a coherent, structured approach in place. For others, things appear to be left largely to chance and to individual staff actions.

Value of international collaboration

2.23 Consultees were asked to comment on the value of international collaborations to their institution, to groups/units within it and to individual staff members. Findings are set out in Table 2.3. Some of the responses overlap with those provided to the questions above.

Table 2-3 Value of collaborations

Source	Inputs
HEI (1) - research intensive	<p>They reinforce staff enthusiasm for their research. They bring different perspectives on research, including on how things are done elsewhere, how other universities work and on the standing/quality of members of staff’s own research internationally. Working only within Scotland fails to provide sufficient perspective on quality of work, even with the RAE.</p> <p>However, there are no explicit references to the value of international collaborations in the university’s promotion procedures: this focus on outputs (publications, research funding) rather than the means to get these.</p>
HEI (2) – research intensive	<p>Collaborating within the EU has exposed the consultee’s institution to partners very keen on joint working. These partners are prepared to put in real effort to establish and sustain partnerships.</p> <p>International collaborations help the university to learn from other institutions. Examples include: learning from what the University of Melbourne has done in teaching and research; learning visit by a group of senior staff to institutions in The Netherlands; links with top US institutions has allowed benchmarking at an institutional level.</p> <p>International collaborations assist with international recruitment. The university has a target to increase its number of international students by 10-15% over the next 2-3 years. University world rankings use</p>

	<p>number of international students as one indicator of quality.</p> <p>For individual staff members, international collaborations bring the prospect of winning additional research funding e.g. US funding via US partners; links in the developing countries are now a requirement of much EU funding.</p> <p>Value is also in intellectual stimulation.</p>
HEI (3)	<p>Improved career prospects of individual staff members. It is acknowledged in staff promotion criteria.</p> <p>Intellectual benefits to staff – shows staff how research is done elsewhere.</p> <p>International collaborations inform staff teaching, bringing in ideas picked up from different labs and different cultures – increasingly valuable in the context of the growing international make up of the student body.</p> <p>For the institution, value is in enhanced reputation and increased number of applications from people overseas wanting to do research degrees.</p>
HEI (4)	<p>For the institution, it is important to be “open to the outside world” and in particular in the context of targets to recruit more international students in future (especially Chinese). Partnerships, whether in teaching or research, help with understanding the markets the university is working in.</p> <p>International partnerships help the university tap into/capture information on new, fast moving research: they help in getting involved in new areas of research.</p> <p>Individual academics see value in working with other interested and interesting people – benefits the staff member and his/her research.</p>
HEI (5) – research intensive	<p>Key value is reputational – at both institution and individual levels.</p> <p>For staff, US and EU collaborations enhance reputation and visibility on a world stage; expose them to new ideas, new facilities and new talent. Also, it opens up new funding sources, e.g. through US partners accessing National Institute of Health (NIH) funds.</p>
HEI (6)	<p>Key benefits are around access to international research expertise that is at the cutting edge and adds real value. Also, opportunities to further the institution’s own research agenda and enhance its reputation/prestige by working with top people in the field.</p>
HIE (7) – research intensive	<p>A documented international dimension is required under the RAE in order to rank highly. Therefore, the university expects its academic staff to engage internationally in some way. It is not a direct consideration in terms of promotion, but an indirect one.</p> <p>It enhances the university’s reputation/prestige by association.</p> <p>For individuals, the value is in more interesting and enjoyable research; international travel; intellectual stimulation; insights into how things are done/how approaches differ in other countries.</p>

	<p>The majority of effective collaborations with research institutions result in publications.</p>
HEI (8) – specialist institution	<p>Value is in engaging with peers and in being part of a wider community - crucial as this institution is the only one of its kind in Scotland. Helps to publicise the institution, to enhance its reputation, to attract international students, to source external examiners.</p> <p>For staff, it broadens horizons and exposes them to new things, including new ways of doing things. Provides useful insights from community/network discussions and problem solving.</p>
HEI (9) – specialist institution	<p>International collaborations add to the status/reputation of those involved. Enhances profile/reputation by association and helps attract international students.</p> <p>International profile assists with the RAE.</p> <p>The institution tends to target themes within its research strategy rather than specific countries. It is keen to develop research projects which also involve collaboration between groups within the institution as traditionally projects have involved sole practitioners.</p> <p>The institution has identified strategic value in targeting China to develop teaching and learning collaborations, and hopes that research links will develop from these. This happened in Japan.</p> <p>Value to staff comes from interacting with new, like-minded people: it helps creativity and brings opportunities to work on new things.</p>
NHS (1)	<p>For both the institution and individual staff members, the value is primarily in the opportunity it brings to see how other health service providers work and to transfer learning back to the Trust.</p> <p>There is also value in the increased profile it brings.</p>
NHS (2) – research active Trust	<p>For individual staff members the value comes for the exchange of ideas, but also for getting access to materials (drugs) at no cost which helps with budgets.</p> <p>For the institution and for groups/units, the value is around improving medical techniques through learning: ultimately the value is for the patient.</p>
NHS (3)	<p>Income generation from trials can be significant.</p> <p>Enhancing reputation of the Trust as a research-active organisation: this helps to recruit and retain high quality staff.</p> <p>For the clinician, the value comes from being able to offer treatments or a new drug that would not be possible otherwise.</p>
Other publicly funded research organisation (1)	<p>For the researcher, the value lies in being part of a process to win funds for research. Also, it comes from the intellectual stimulation derived from working with new people and in potentially new areas. Collaboration can lead to high quality published work and enhanced profile. Publication is the key metric for judging success.</p> <p>For the institution, the value comes from enhanced reputation gained</p>

	<p>from high quality, high profile collaborations and their outputs.</p> <p>Research collaborations are in general not linked to teaching/training collaborations,</p>
Other publicly funded research organisation (2)	<p>Value/benefits are, in order of importance:</p> <ul style="list-style-type: none"> - income – funding from research funding bodies is a key driver - kudos – to maintain and enhance the reputation and prestige of the institution and its staff - experience – broadens experience and expertise - intellectual richness – links to the above: “most academics are not in it for the money”.
Other publicly funded research organisation (3)	<p>Perception is that science progresses more quickly with collaboration. Researchers access expertise and resources. It enhances scientific reputations. It raises individual and institutional profiles.</p>
Other publicly funded research organisation (4)	<p>Main value is prestige, especially from the institution’s own links with China.</p> <p>Other value is in learning how scientists from other countries do things. However, the flow of learning is commonly from Scotland outwards in the case of this institution.</p>
Other publicly funded research organisation (5)	<p>Income generation – the collaborative projects attract funding.</p> <p>The research output is valuable.</p> <p>Individual scientists have the opportunity to share information and facilities.</p>

Summary

2.24 For HEIs, the value of international collaborations is in:

- for the institution
 - profile and reputation
 - contributions to achievement of a higher RAE ranking
 - insights into how things are done by leading institutions elsewhere
 - insights into target international markets
 - international recruitment of staff and students
- for staff
 - they reinforces staff enthusiasm for their research – interest and enjoyment

- bring new perspectives on research and how things are done elsewhere
- they are a route to involvement in new areas of research
- they assist, albeit indirectly, with promotion
- provide access to sources of research funding.

2.25 For research institutes and related bodies, the value for individual researchers is in reputation, intellectual stimulation and access to research funds. Higher quality research publications may result. For the institution, reputation and income are key.

2.26 In addition to profile and reputation for both NHS Trusts and their staff, there is value in learning from others and transferring this back to the work of the NHS in Scotland. The access provided to new drugs is valuable, as is the income gained from participation in trials.

Barriers to international collaboration

2.27 Consultees were asked to identify any barriers to collaboration that face their institution, groups/units within it and individual staff members. Responses are given in Table 2.4.

Table 2.4 Barriers

Source	Inputs
HEI (1) - research intensive	<p>Time and cost of developing strategic collaborations, e.g. time to set up staff exchanges.</p> <p>Staff will not engage without the prospect of a “concrete” output – e.g. a publication, funding, an exchange of students.</p> <p>Definite outputs are often difficult to demonstrate at the outset, but without output collaborations tend to stay at a low level (e.g. occasional e-mail correspondence) rather than develop and grow.</p>
HEI (2) – research intensive	Barriers are around limited time and money.
HEI (3)	<p>Barriers are around lack of funding and limited knowledge of sources of funding. Also, present funding routes are considered to be “not transparent”.</p> <p>New funding tends to emphasise science and technology so some institutions lose out.</p> <p>The onerous bureaucracy of some international funding institutions.</p>
HEI (4)	<p>The main barriers are not internal – the institution and its staff are “geared up” for collaboration and there is strong demand for UK partners from institutions internationally.</p> <p>The key barrier is the lack of funding to instigate collaborations:</p>

	<p>according to this consultee, there should be a fund available for this purpose comparable to that available to establish collaborative projects in the EU Framework Programme.</p>
HEI (5) – research intensive	<p>There can be legal hurdles to overcome for the institution.</p> <p>Lack of funding to support the collaboration. Some research funding sources, notably US sources and to some extent EU sources, do not cover all the costs of collaborative work. EU and US projects tend to run at a loss. There is a need to weigh up this against the longer term or spill-over benefits of the collaborative project.</p> <p>Where partners are relying on home sources to fund the collaboration there are more places where the collaboration can fail before it starts.</p>
HEI (6)	<p>Limited funding for the relevant research areas. Difficulties in the recruitment of suitable researchers and immigration issues</p>
HEI (7) – research intensive	<p>Funding constraints can be a barrier, but if the people involved are committed and of high quality then they should be able to obtain support.</p>
HEI (8) – specialist institution	<p>For a small institution especially, lack of time is a key barrier. Also limited funding.</p>
HEI (9) – specialist institution	<p>EU bureaucracy.</p> <p>Some sources of research funding can drive together “artificial” collaborations.</p> <p>Overheads in setting up a new collaboration can be high.</p>
NHS (1)	<p>Constraints on staff being able to have time freed up to take research opportunities. Taking up a research fellowship implies a move from permanent to a temporary employment status.</p>
NHS (2)- research-active Trust	<p>“The Executive only funds national and not international collaborations. No support from the Chief Scientists Office for collaborations outside the EU.”</p>
NHS (3)	<p>Differences between legal contracts in the UK and USA for clinical trials.</p> <p>Time and workload conflicts for clinicians.</p> <p>Still some reluctance by clinicians to become involved in commercial work.</p>
Other publicly funded research organisation (1)	<p>Funding – “there is never enough”.</p> <p>Policy – main Scottish research funding source focuses on domestic policy-relevant area and this does not always fit well with an international research agenda.</p>
Other publicly funded research organisation (2)	<p>EU Framework Programme bureaucracy.</p>

Other publicly funded research organisation (4)	<p>Pre-determined national science strategy can be a barrier – research activity has to be within the scope of this. Not always appropriate for international collaborative research.</p> <p>Lack of flexible funding.</p> <p>Scale of the institution – too small to bid for big EU projects.</p>
Other publicly funded research organisation (5)	<p>Narrow range of policy relevant research in Scotland used to be a major barrier: collaborative work needed to be within this narrow range if it was to attract funding from the main source in Scotland for this institution, even if research outside this boundary would further the research aims of the institution. Procedures now more flexible.</p> <p>Language – especially in China.</p> <p>Ineligibility for funding from UK research councils.</p>

Summary

2.28 There is a good measure of consistency in the responses. Barriers include:

- time and costs of developing effective partnerships
- lack of funding to instigate project level collaborations
- bureaucracy of some international funding bodies, notably in Europe.

2.29 The NHS Trusts face legal and contractual challenges when working across different regulatory regimes.

Factors facilitating international collaboration

2.30 Consultees were asked to identify the most important factors helping to facilitate international collaboration and whether these factors were present and at an appropriate level within Scotland’s research support system. Responses are reported in Table 2.5.

Table 2.5 Facilitating collaboration

Source	Findings
HEI (1) - research intensive	<p>Funding facilitates collaboration: to set up collaborations and then longer term strategic support to embed these.</p> <p>Referred to the useful role of Carnegie Fellowships (fund one person to visit for 6 months), but there is no follow-on support to ensure this initial collaboration is sustained for the longer term.</p> <p>Need is for more “encouragement” from policy makers and funders, with greater clarity over defining their expectations of ongoing</p>

	collaborations and what they might lead to.
HEI (2) – research intensive	<p>Key factors are support from in-country networks and contacts. According to this consultee, the relevant international trade body in Scotland “has been of less value than British Embassies which tend to provide a better service.”</p> <p>Having a strategic focus helps, but “Why Malawi?” There is merit in knowing and building on existing strong links on order to establish more strategic initiatives. This requires prior analysis. “An appropriate selective approach is a good way of enthusing people to get involved.”</p> <p>The use of structured visits can work if access is granted to the right people. However, in the view of this consultee, there have been so many visits to some countries and areas that the best institutions in these places have become very selective in terms of who is offered access.</p> <p>Collaborations are facilitated by having a built-in resource to enable follow up after the first visit.</p>
HEI (3)	<p>The perceived pattern of policy makers picking priority countries and then changing them after a short period is seen as unhelpful.</p> <p>The approach to building up sustainable, strong long term collaborations should be to map existing strengths internationally and to explore how these can be supported and levered to gain enhanced benefit.</p>
HEI (4)	Funding – there is willingness to do more, but not the financial resource.
HEI (5) – research intensive	<p>A substantial top-down financial push would not be welcome, but rather the availability of small amounts of funding would be useful, not least to liberate/leverage funding from other sources. These funds should be focused on those who wish to build upon already working and demonstrable collaborative activity on the ground.</p> <p>Our consultee notes that key US universities are very keen to work with Scottish partners – facilitated by common language; prior staff movement each way; existing links and related trust; similar outlook/culture.</p>
HEI (6)	<p>Funding facilitates collaboration.</p> <p>Also, individuals with common research interests have to meet: the most effective facilitator is international networks and conferences.</p>
HEI (7) – research intensive	A pot of money to support new collaborations getting off the ground would be useful, especially targeted at researchers in the early stages of their careers as these would benefit most.
HEI (8) – specialist institution	<p>Awareness of other researchers and raising awareness of work in Scotland. Participation in international events (e.g. Tartan Week in New York).</p> <p>Appropriate strategic priority setting by the Executive – “Malawi is of little or no interest. Australia for example would be a much</p>

	<p>more interesting target.”</p> <p>Help needed to facilitate initial contacts. Funding is also required to develop collaborations once initial interest is expressed.</p>
HEI (9) – specialist institution	<p>Staff awareness is key, including awareness of and a culture disposed to seeking funds to support international collaborations.</p> <p>Individual staff members can draw on small internal grants, research council funds or funds from venues where exhibitions are to be held.</p>
NHS (2) – research active Trust	<p>Research funding is the most important facilitator. Infrastructure funding also assists. Although both are available in Scotland they are not linked to any form of direct encouragement of or support for collaboration with specific target countries.</p>
NHS (3)	<p>More efficient ways of accessing/collating the information and background documentation required to establish the collaboration would help.</p> <p>Effective, efficient source of legal/contractual advice helps.</p> <p>A national costing system for contract work would assist.</p>
Other publicly funded research organisation (1)	<p>Funding facilitates collaboration. Equally important is attendance at conferences/meetings/ workshops and general networking.</p> <p>Enhanced marketing of Scotland’s research expertise through more international trade missions and conferences to raise awareness would help.</p>
Other publicly funded research organisation (2)	<p>Merit in finding new ways to assist smaller institutions pool resources in order to help them compete more effectively internationally for funds.</p> <p>For smaller institutions, sabbaticals are crucial in facilitating and fostering collaborations that are sustainable in the longer term. More should be funded through the Scottish science support system or at least ways found to make sabbaticals more affordable.</p>
Other publicly funded research organisation (3)	<p>Funding facilitates collaboration, “especially funding with not too many strings attached”.</p> <p>Participation in networking/meetings internationally is important.</p> <p>The internet helps in finding out who’s doing what.</p>
Other publicly funded research organisation (4)	<p>Ability to bid for joint funding facilitates collaboration.</p>
Other publicly funded research organisation (5)	<p>Funding facilitates. The greater flexibility over use of public sector research funding in Scotland is helpful.</p>

Summary

2.31 For HEIs, the facilitating factors are:

- funding to initiative collaborations and then to embed them – existing schemes tend not to address follow-up after initial, short term contact
 - small amounts of funding help
- awareness of and profile within in-country networks
- help of the British Embassy in-country
- opportunities for researchers to meet at international conferences
- better marketing of Scotland via trade missions and conferences
- more affordable sabbaticals would help.

2.32 Consultees from smaller organisations point to benefits that could be realised by more pooling of resources in support of international activity, e.g. in constructing bids to international sources of funds, in accessing specialist legal/contractual advice.

Information held on international collaboration

2.33 Here the issues of interest relate to operational matters. Consultees were asked to indicate the kind of information held by their institution on its international collaborations, including collaborations at the level of groups/units and individual staff members. The purpose was to determine what if any data are collected and if so how they are collated. There was also an interest in determining willingness to provide such information/data to the Scottish Executive. Findings are reported in Table 2.6.

Table 2.6 Information holdings

Source	Findings
HEI (1) - research intensive	<p>No central information as collaborations are <i>ad hoc</i> and informal.</p> <p>There is a central electronic publications database which could be trawled, but staff are not obliged to populate it and therefore it is not comprehensive. In any event, the database would be time consuming to search because of the way it is structured.</p> <p>Suggests “Web of Science” would be a better source of publications data.</p> <p>The university would be happy to share what it does have if requested.</p>
HEI (2) – research intensive	<p>Information on all MOUs is held centrally, but the MOUs are now so numerous that even these records would take significant time to search through.</p> <p>There are also institution-level databases on research contracts and</p>

	<p>publications, but these are patchy. The later is updated for RAE purposes. However, neither database is searchable on country, nor on subject area.</p>
HEI (3)	<p>Information on grant applications, tenders and information on contracts are held centrally. MOUs are held centrally.</p> <p>There is an electronic academic database which all staff are required to update. This captures publications; external links, including international links (including country); duration of activity; individuals involved and type of activity. This helps to monitor the number of staff working internationally. It has a search facility.</p> <p>Information is searchable for school, subject area and staff name.</p> <p>The information held by the institution could be made available to the Executive.</p>
HEI (4)	<p>The university has a central Excel database on collaborative activity – who is involved, funding, duration, subject area. It is kept up-to-date as staff pride (linked to the RAE) and institutional recognition encourage staff co-operation. The university Secretary holds information on MOUs and joint venture agreements.</p>
HEI (5) – research intensive	<p>MOUs are recorded centrally. Relationships of a contractual nature are stored centrally, detailing partners, funding, timeframe etc. Searching both repositories would be time consuming.</p> <p>There is a central electronic repository for staff publications – “filling up slowly”. There is an interactive publications database established for RAE purposes – not yet mandatory for staff to populate it.</p> <p>Happy to share data with Executive, with two caveats: some consideration of the effort incurred against potential return; clarity over what the benefit is going to be.</p>
HEI (6)	<p>Information in electronic form on joint research projects and joint publications is held centrally and could be made available. This includes the researchers involved and their international locations; the funding involved, the subject area. Also available is information on conferences attended.</p>
HEI (7) – research intensive	<p>No central database. A previous attempt by the VP to find out about international collaborations was unsuccessful as most were informal.</p> <p>The institution’s database of research projects only holds information on the institutions’ role in them, not on partners. This is the case also with contracts.</p> <p>A database for RAE purposes has been developed which holds information on individual staff members, value of research contracts, studentships, publications. The publications data only captures first three authors. It omits therefore some collaborators and is not comprehensive – not mandatory for academics to populate it.</p>

	ISI and PubMed would be better sources of information on publications.
HEI (8) – specialist institution	Comprehensive information on its two present collaborations is held electronically and could be made available to the Executive.
HEI (9) – specialist institution	<p>Information is periodically collected centrally, but this is not a systematic process. Information is being pulled together for the RAE and will be reasonably complete now because of this. Often a collaboration is not documented until there is an output.</p> <p>Research grants are documented, but this captures only a minority of collaborations.</p> <p>There is documentation on staff travel movement.</p> <p>The institution would be happy to make available what is already collected.</p>
NHS (1)	Central database exists of all R&D collaborations that are related to the priority themes of the Chief Scientist Office in the Executive. However, these data would not show up international collaborations.
NHS (2) – research active Trust	<p>Although information is held centrally on funded projects and clinical trails, it would not provide information on any international aspects of a collaboration.</p> <p>Even information held on licenses could be misleading – a license agreement could be in place with the UK-based subsidiary of an international pharma company, but the work leading to the license could have been the result of an international collaboration with other parts of the same company.</p> <p>The annual survey of R&D project information for the CSO would not as presently conducted yield any information on international collaboration.</p> <p>Recommends using PubMed and Medline as proxy sources.</p>
NHS (3)	Contract information is held centrally. Company client/collaborator would need to give approval to release of any information.
Other publicly funded research organisation (1)	<p>There is a central electronic database of joint projects which contains a list of countries involved; scientists involved, disciplines involved, funding attached, contractual information and publications. Also, there is a database of conferences/workshops that staff have been invited to address internationally or have attended.</p> <p>Data would be available to the Executive if timescales are reasonable.</p>
Other publicly funded research organisation (2)	<p>A central database exists on all contracts of more than £10k. This includes subject, topic area, funding body, collaborators, duration of project.</p> <p>A central database of international consultancy contracts exists –</p>

	<p>there are confidentiality constraints on releasing this.</p> <p>Subject to confidentiality constraints, data could be made available within several days, but would appreciate assistance to fund the staff time required to undertake the task.</p>
Other publicly funded research organisation (3)	Central database exists of all collaborations. Output on data fields could be provided given reasonable timeframe.
Other publicly funded research organisation (4)	Information on all international collaborations over past 5 years can be made available. Would take a few weeks to action.
Other publicly funded research organisation (5)	Central database holds information on projects, their funding, duration and identify of participants. Data also available on joint publications, MOUs, in-kind contributions, studentships and lab visits. All could be made available for last 5 years.

Summary

2.34 In short, there is no consistent pattern. In some places it is mandatory for staff to populate internal databases: in others, this is voluntary and as a result records are patchy. Formal collaborations, not surprisingly, are better documented, but even here not always in ways that are searchable for the international characteristics. However, the existence of a formally documented collaboration does not always equate to an active or valuable collaboration. The research institutes appear consistently to be more advanced in terms of information management.

2.35 There is a widespread willingness to assist the Executive by providing access, with some limited restrictions, to institution-level information holdings. However, there is a reluctance to undertake anything that requires the expenditure of much resource, unless support for this is made available. This is in line with Part 1 findings, i.e. it would be possible to obtain what institutions already hold, but this would provide a very mixed set of information, in terms of parameters and comprehensiveness.

Feasibility of obtaining information by survey

2.36 In the absence of collated information, consultees were asked what it might be possible for the Executive to obtain by survey without incurring unacceptable costs. Comments additional to those given in response to the related question above are set out in Table 2.7

Table 2.7 *Feasibility of a survey*

Source	Findings
HEI (3)	<p>The institution's central international activities database was developed for corporate purposes, to demonstrate international standing. However, in reality it proved difficult to get it populated by staff and since its initiation updating has slipped. There are ongoing internal discussions about how to address this.</p> <p>The institution has attempted to use the information provided in the context of informing academic promotions – extracting relevant information from staff CVs rather than rely on staff submissions. Again it has been hard to get staff to keep information up to date. “So demanding submission of information because the Executive wants it is not likely to get a good response if university status and promotion drivers haven't!”</p>
HEI (4)	<p>“Depends on level of detail required – could be a lengthy process and it is uncertain what value the detail would have.”</p>
HEI (5) – research intensive	<p>Institutional databases not very useful at present for the Executive's purpose: “use ISI instead for publications data”. Population of internal databases by staff is patchy.</p>
HEI (9) – specialist institution	<p>Would not wish to see any additional work for staff and the institution centrally.</p>
HEI (1)	<p>The Trust could seek to collect data as part of its annual R&D data collection exercise. However, this would not cover all collaborations, e.g. it would not cover a clinician's involvement in the steering of an international project if there was no funding for this. This kind of information would take a very long time to collect.</p>
HEI (2)	<p>To use existing information to identify all collaborations would require resource intensive “digging” by a research manager. Possible to do, but would need to be funded.</p> <p>This consultee suggests that a survey of staff would be the best approach and argues this would be feasible.</p>

Summary

2.37 There is no evident support for a survey of individual research staff: many institutions already find it difficult to get staff to contribute to internal data gathering processes. Only one consultee, in an NHS Trust, explicitly indicated that the use of a staff survey would be feasible.

Standardising the collation of information on international collaborations

2.38 Finally, consultees were asked if they could envisage any benefit in seeking to develop a national standardised approach to the collection and collation of data on collaborations. Findings are reported in Table 2.8.

Table 2.8 Benefits of standardisation

Source	Findings
HEI (1) – research intensive	<p>It would enable Scotland to see the links that already exist. It could help build on these to establish strategic alliances.</p> <p>However, this would require significant will and resource. It would need to be clear what the outcomes would be – “what positive things would result from expending the effort?”</p>
HEI(2) – research intensive	<p>“Main value would be to stop public sector bodies contacting the University all the time with request for information on very short timescales.”</p> <p>Scotland needs to push to make its mark globally and knowledge of what Scotland is doing and where internationally is needed: “it would be really worthwhile to have all this information as a marketing tool for HE and research in Scotland, as well as for individual institutions. “However, doing it properly will be very costly”.</p>
HEI (3)	<p>In the long term, it would reduce administrative load, but is dependent on academics keeping the information up-to-date. Information could be more easily extracted from a standard system for a range of purposes institutionally and nationally.</p> <p>Especially valuable if academics would share who they are linking with internationally – more strategic activity could then be build up based around existing patterns of significant engagement.</p>
HEI (4)	<p>Useful at a macro-level and “do-able”, as it would provide an overall picture of where Scotland is as a country. Would also permit comparison by university or region, helping to drive competition and thus increase the level of international collaboration.</p>
HEI (5) – research intensive	<p>It would be useful internally to have more information on staff collaborations, but limited value at a pan-Scotland level in terms of e.g. selling Scotland. People who want to collaborate with a “good Scottish institution will know who these are and contact the institution directly”.</p>
HEI (6)	<p>Depends on use. Could be useful if it was used as a baseline against which to measure progress towards increasing collaborations.</p>
HEI (7) – research intensive	<p>Benefits for selling Scotland and the UK, but concerns that a database could end up with too much information of limited</p>

	<p>meaning. Important to decide what information would be of most use/value.</p> <p>Also, there is need to classify what a collaboration is – from informal link with lots of discussion, but no published output, through to something with formal documents underpinning it.</p> <p>“A standard database may have value if it stops unrealistic (notably on time to response) enquiries to universities being made by certain public bodies in Scotland.”</p>
HEI (8) – specialist institution	<p>A single data base covering all the international research and other partnership activities of the smaller specialist institutions in Scotland would be useful in giving them a collective focus. Could assist in the development of a single Creative Research Strategy for Scotland.</p>
HEI (9) – specialist institution	<p>This would help to capture arts data on a similar basis to data from the sciences and would enable cross-discipline comparisons.</p>
NHS (1)	<p>Of benefit in encouraging collaborations to publish so that they could be more easily measured/valued. However, it is not always easy to publish and a broader approach could help to capture more than just published outputs.</p>
NHS (2) – research active Trust	<p>This consultee sees no real benefit. Better approach is for the Executive to put resources into encouraging/supporting collaborations with USA and China. Suggests the CSO sets up “joint boards” with US and Chinese counterparts and invite leading researchers to sit on them.</p> <p>Suggest learning from the Wyeth collaboration. Also refers to the Translational Medicine Research Institute (see: http://www.tmri.co.uk/)</p>
NHS (3)	<p>No value from this Trust’s perspective.</p>
Other publicly funded research organisation (1)	<p>Yes, beneficial. It is important to measure international scientific research in order to encourage it: international activity is an important barometer of the quality of work an institution or country is doing.</p>
Other publicly funded research organisation (2)	<p>Depends on the use to which the information would be put. If to boast of the number of collaborations then value is minimal. If to look to ways to foster linkages by seeking to join up the efforts of individual institutions then of positive value.</p>
Other publicly funded research organisation (3)	<p>No value. “What use could it be put to, how robust would the data be in any event and interpretation would be problematic”.</p>
Other publicly funded research organisation (4)	<p>Depends on purpose. If the objective is to encourage collaborations then funding achieves this not measurement.</p>
Other publicly funded research organisation (5)	<p>Yes of value, but why an emphasis on China and the USA in this study? Countries such as India and Malawi are of greater interest to this institution.</p>

Summary

2.39 On the positive side, consultees pointed to the following benefits of a standard approach:

- to demonstrate the links that already exist and help to build on these to establish strategic alliances
- to assist in responding to enquiries
- to help with international marketing
- in the long term, to reduce administrative load, but only if academics keep the information up to date
- to drive competition and thus increase the level of international collaboration
- to provide a baseline against which to measure progress towards increasing collaborations
- for some specialist institutions, to assist in the development of a single Creative Research Strategy for Scotland.

2.40 On the negative or at least cautionary side, consultees point to the following:

- this would require significant will and resource – “doing it properly will be very costly”
- it would need to be clear what the outcomes would be – what positive things would result from expending the effort?
- limited value at a pan-Scotland level in terms of e.g. selling Scotland. “People who want to collaborate with a good Scottish institutions will know who they are and contact the institution directly”
- a database could end up with too much information of limited meaning. Important to decide what information is of most use/value
- important to agree what is meant by “collaboration”
- one consultee sees no real benefit. Better approach is for the Executive to put resources into encouraging/supporting collaborations with USA and China if these are the priorities. Suggests the CSO sets up “joint board” with US and Chinese counterparts and invite leading researchers to sit on them
- no value from one Trust’s perspective

- depends on the use - if to boast of the number of collaborations then value is minimal. If to foster linkages by seeking to join up the efforts of individual institutions then of positive value
- if the objective is to encourage collaborations then funding achieves this not measurement.

Input from the Royal Society of Edinburgh

2.41 Through consultation and exchange of e-mails with staff in the RSE, it has been possible to draw up a picture of the links supported by its schemes to support international activity (see Annex B).

2.42 Notably, the RSE operates joint projects with the National Natural Science Foundation of China (NNSFC): two projects are currently funded. (The guidance for applicants which provides information on the purpose of the Joint Projects, eligibility etc. is available from the RSE on request.) The RSE is in the process of signing a Memorandum of Understanding with the NNSFC which sets out an agreement to work together and to support research collaboration between Scotland and China (and specifically to fund Joint Projects).

CONCLUSIONS AND RECOMMENDATIONS

3.1 There is no common approach to the acquisition and collation of information on international collaborations amongst the institutions consulted. Some have a highly structured, comprehensive systems in place, for others there is no system in place and indeed, at present, no sense of needing to introduce one.

3.2 Although some institutions do collate information on international collaborations for what seem to be internal, strategic reasons, others do the minimum necessary to comply with external demands of funders or the UK Research Assessment Exercise (RAE).

3.3 There is no consensus on the value of introducing a new, national, standard approach to establishing information on international collaborations. This means that any action taken by the Executive to request standardised information, however basic, needs to be carefully considered and explicitly justified on a value adding basis. It is important to note that a sub-set of consultees do see value in just such a standard approach, albeit for different reasons.

3.4 In more detail, whilst there is considerable willingness to support the Executive in obtaining information on international collaborations, there are a number of important matters to bear in mind:

- there is currently no common approach to building, valuing or recording international collaborations amongst the institutions consulted
- there is little sense of international activity by institutions being aligned deliberately with the Executive's international strategy at present.

3.5 There is no appetite for expending additional internal resource to supply information unless two issues are addressed:

- there is consideration given to the resource requirements
- the Executive clarifies and convinces institutions on the strategic value of undertaking this information gathering activity - the value nationally and to the institutions themselves.

3.6 Some institutions could furnish the Executive with high quality and comprehensive information. Others, including some large research-intensive institutions, would be able to provide only limited information.

3.7 However, it would be possible to conduct an information gathering exercise with the institutions in Phase 3 of this study, but only to gather very basic information, and even then returns may be patchy. Also, basic data from any one institution would in any event not always be comprehensive. Care would need to be taken on how these data were interpreted and make public.

Recommendations

3.8 It is recommended that any decision to undertake a data gathering survey be delayed until it is clear if the parallel work commissioned by the Executive into the analysis of publications data yields the hoped for results. It is the view of the authors of this report that an analysis of international data sources on research publications remains the best – the standard, most comprehensive and efficient, readily repeatable, and output-based – pragmatic method of charting Scotland’s international science collaborations.

3.9 If this proves not to deliver the required results, only then is it suggested that a request is issued to institutions for very basic information in the first instance, based on what the present study indicates would be “lowest common denominator” information content.

3.10 However, if international science or wider research collaborations continue to be an important plank of the Executive’s international strategy, then the insights in this report on type, value, barriers and facilitators of collaboration should be exploited in the context of developing and disseminating policy in a deeper manner with institutions than appears to prevail currently.

3.11 It is clear that forward thinking, ambitious institutions in Scotland recognise the strategic importance of international collaborations and wish to improve how they establish and sustain them for institutional and national benefit.

ANNEX A: LIST OF CONSULTEES

Name	Job Title	Affiliation
Professor Brent MacGregor	Vice Principal Research and Knowledge Transfer	Edinburgh College of Art
Gillian McFadzean	Director of Technology and Research Service	Heriot-Watt University
Professor Richard Aspinall	Director	Macaulay Land Use Research Institute
Professor Julie Fitzpatrick	Director	Moredun Research Institute
Karen Bell	R&D Manager	NHS Ayrshire and Arran
Professor Alison McLeod	R&D Director	NHS Grampian
Dr Catherine Sinclair	Research Manager	NHS Highlands
Professor Hassan Hassan	Vice Principal Research and Commercialisation	Paisley University
Professor Alan Gilloran	Vice Principal Research and Development	Queen Margaret University
Kim Gilchrist	Senior Office, Strategic Development Office	Queen Margaret University
Professor Peter Morgan	Director	Rowett Research Institute
Professor Mary Gibby	Director of Science	Royal Botanical Gardens Edinburgh
Celia Duffy	Head of Research	Royal Scottish Academy of Music and Drama
Dr William Duncan	Executive Director	Royal Society of Edinburgh
Anne Fraser	I	Royal Society of Edinburgh
Professor John Oldham	Head of Research	Scottish Agricultural College
Professor Peter Robertson	Vice Principal, Commercialisation and Development	The Robert Gordon University
Professor Dominic Houlihan	Vice Principal Research and Commercialisation	University of Aberdeen
Dr Ewan Chirnside	Director of Research and Enterprise Services	University of St Andrews
Professor Alistair Ferguson	Deputy Principal	University of Strathclyde.

ANNEX B: DATA ON INTERNATIONAL COLLABORATIONS³ SUPPORTED BY THE ROYAL SOCIETY OF EDINBURGH

RSE International Exchange Programme involving China and the USA (as at November 2006)

Country	Year	Scottish institution:	
China	2003	Heriot-Watt University (outgoing)	
		SCRI (outgoing)	
		University of Paisley (outgoing)	
	2004	University of St Andrews (outgoing)	
		2005	University of Abertay (outgoing)
	2006	University of Dundee (outgoing)	
		University of Aberdeen (outgoing)	
		The Robert Gordon University (outgoing)	
		University of Edinburgh (incoming)	
		University of St Andrews (outgoing)	
MLURI (outgoing)			
USA	2003	Glasgow Caledonian University (incoming)	
		MLURI (incoming)	
		University of St Andrews (outgoing)	
		University of Glasgow (outgoing)	
	2004	MLURI (outgoing)	
		The Robert Gordon University (incoming)	
		University of Edinburgh (incoming)	
		University of Aberdeen (incoming)	
		University of Strathclyde (outgoing)	
	2005	The Robert Gordon University (outgoing)	
		University of Glasgow (incoming)	
		Scottish Association for Marine Sciences (incoming)	
		University of Edinburgh (outgoing)	
		SAMS (outgoing)	
		2006	The Robert Gordon University (incoming)
			University of Abertay (incoming)

RSE International Exchanges by country- 1st April, 2006 to 31st March, 2007(supporting visits of up to 12 weeks duration)

Country	Number of exchanges
China	3
Slovenia	1
Hungary	1
Poland	7
Taiwan	18
Argentina	2
Australia	7
Botswana	1
Canada	5
Finland	1
France	1
Germany	5

³ Note: not restricted to science collaborations

Iceland	1
India	4
Japan	4
Lithuania	2
The Netherlands	1
New Zealand	2
Norway	2
Russia	2
South Korea	1
Spain	1
Thailand	1
USA	11
Venezuela	1

J M LESSELLS SCHOLARSHIPS for graduates - location of research visits by Scotland-based recipient

YEAR RESEARCH LOCATION

1985 Taylor Instrument, Rochester, USA
 1985 National Chemical Laboratory, Pune, India
 1987 University of Southern California, Los Angeles, USA
 1990 Cornell University, Ithaca, USA
 1990 Institute of Ocean Sciences, Sidney, Canada
 1990 Massachusetts Institute of Technology, Cambridge, USA
 1991 Massachusetts Institute of Technology, Cambridge, USA
 1992 Strassle GmbH, Italy
 1992 Massachusetts Institute of Technology, Cambridge, USA
 1993 European Institute of Technology, Florence, Italy
 1993 L'Institut de Mecanique des Fluides, Toulouse, France
 1993 Open University, Colombo, Sri Lanka
 1994 Clinical Research Institute, Montreal, Canada
 1994 Heinrich-Hertz-Institut, Berlin, Germany
 1994 Massachusetts Institute of Technology, Cambridge, USA
 1994 L'Université de Technologie, Compiègne, France
 1995 Harvard University, Cambridge, USA
 1995 Princeton University, Princeton, USA
 1996 New Jersey, USA
 1997 University of Toronto, Canada
 1998 INSA de Lyon, France
 1999 Colorado State University, USA
 1999 Tennessee Technological University, USA (1st year of MBA)
 2000 Tennessee Technological University, USA (2nd year of MBA)
 2000 University of Malawi, Africa
 2000 Institute of Technology, Tokyo, Japan
 2001 Universities of Maryland, Texas, Vanderbilt, Michigan State
 2001 Stanford University and University of Calgary
 2001 International Space University in Strasbourg, France
 2002 New York
 2002 Conference in Fort Lauderdale
 2002 Hydro Vision 2002 in Portland, Oregon
 2002 North Carolina State University
 2002 Qatar University
 2002 Delft University of Technology, Holland

- 2002 Warsaw Institute of Technology, Poland
- 2002 Technical University of Denmark
- 2003 Forest Research Centre, New Zealand
- 2003 National Institute of Water & Atmospheric Research, New Zealand
- 2003 Dept of Electrical & Computer Engineering, University of Toronto
- 2003 Conference on off-shore mechanical & arctic engineering Vancouver
- 2003 Conference at Bogazici University, Istanbul
- 2003 International Thermal Spray Conference, Orlando
- 2003 Information School, University of Washington, Seattle
- 2004 Massachusetts Institute of Technology, USA
- 2004 Terralog's Offices, California, Utah
- 2004 Institute for Snow, Davos, Switzerland
- 2004 University of California at Berkley, USA
- 2004 NEC Corporation, Nsukuba, Japan
- 2004 University of Illinois, USA
- 2005 School of Management, University of California
- 2005 Swiss Federal Institute of Technology, Switzerland
- 2005 MP Interconsulting, Le Locle, Switzerland
- 2005 Istituto di Chimica dei Composti, Italy
- 2005 Laboratoire de Mecanique, Nantes, France
- 2006 University of Minnesota
- 2006 University of California, Berkeley.

RSE/CRF European Visiting Research Fellowships in Arts, Humanities and Social Sciences - Awards 2006 - funded by the Caledonian Research Foundation

Travel to Scotland:

Researcher in Universita Commerciale "L. Bocconi" Italy visiting the Department of History, Glasgow University

Research project: Household and Plague

Researcher in Department of English Philology, University of Malaga, visiting the Department of English Language, Glasgow University

Research project: Digitisation and Electronic Edition of the Middle English Manuscripts in the Hunterian Collection.

Researcher in Taganrog Institute of Management and Economics, Russia, visiting the School of English, University of Aberdeen

Research project: Scots and Eastern Slavonic Languages: Some Common Features of Language Development

Researcher in Department fur Anglistik und Amerikanistik, Universitat Munchen, Germany, visiting the Centre for the History of the Book, University of Edinburgh and the National Library of Scotland

Research project: Books Across Borders: John Murray's handbooks to Italy and Germany

Travel from Scotland:

Researcher in School of Law, University of Glasgow, visiting Robert Schuman Centre of Advanced European Studies, European University Institute, Florence, Italy

Research project: European Criminal Law and Justice

Researcher in Department of Politics, University of Glasgow, visiting the Department of History, University of Aarhus, Denmark

Research project: Three Roads to Europe: A Comparative Study of Denmark, Ireland and the Netherlands

Researcher in Department of Modern History, University of St Andrews, visiting the School of History, Free School of History, Free University of Berlin

Research project: Crown-Prince Frederick and the Political Culture of Imperial Germany (1858-1888)

Researcher in Department of English Language, University of Glasgow, visiting Fachbereich Literatur-und Sprachwissenschaften, University of Hanover, Germany

Research project: Investigating the influence of television on language change

SE Travel Grants – April 2006 to March 2007

Details of travel support for individual researchers based in Scotland:

To travel to Washington, USA, to visit the Environmental Molecular Science Laboratory to complete a research project “Adiabatic Following Spectroscopy Using Quantum Cascade Lasers” in October 2006

To travel Japan and Malaysia to present to the 56th General Assembly of the International Academy for Production Engineering and to deliver a keynote address at the International Conference on Manufacturing Science and Technology

To travel to Madagascar to visit the Bemaraha National Park, Tampolo Forest and a disused coffee plantation

To travel to Brazil to attend the VI Brazilian Symposium on Geomorphology and to co-chair one of the plenary sessions in September 2006