

**Programme on Innovation, Higher Education and
Research for Development
IHERD**

Policy brief:

Research and Innovation Management

Asa Olsson and Lynn Meek

(Adapted by Natalie Cooke)

Abstract

This briefing presents strategies and options that could be adopted to address knowledge and skills gaps and build capacity for more effective research and innovation management.

Table of contents

_Toc373832612

Current trends in innovation and research leadership and management in public research organisations	2
How do we view leadership and management in public research institutions?	2
Leadership of research in institution	3
Institutional governance	4
Planning	4
Implementing institutional change	5
Ethos	6
Risk	6
Communication	6
Management to support leadership of research in public institutions	7
Organisational structure	7
Executive and management operations	7
Committee operations	7
Research management and administration	8
Leadership of researchers in institutions	9
Research students	10
Postdoctoral and early career researchers	10
Established researchers	10
All researchers	11
Leadership of institutions	11
Management to support leadership of researchers	11

Current trends in innovation and research leadership and management in public research organisations

Since many universities now operate with multi-billion dollar budgets, their sheer scale requires highly competent leaders and managers. This role requires persons of exceptional talent whose responsibilities are multi-faceted. The leadership agenda is realised through efficient and effective management strategies which clearly demonstrate the institution's contribution to local and international development (Kearney and Yelland, 2010). However, although excellence in leadership and management assure good governance, two other components are also necessary, namely gifted faculty and students and solid resources. When all three conditions are present, an institution is equipped to perform at the best possible level so to enjoy "world-class" status (Salmi, 2009).

The professionalization of higher education administrations has affected finance, student admission, building and grounds management, particularly in countries where there have been substantial increases in institutional autonomy and changes to the governance arrangements within institutions (OECD, 2008). Moreover, higher education institutions are becoming increasingly dependent on research regarding the higher education system as a whole, (e.g. to help them better understand the external environment) in order to construct relevant strategic plans (stay in the game).

Today, leaders of research also play a key role in ensuring that the researchers themselves have adequate skills in areas such as research grant writing, grant management, project planning, research team leadership, research student supervision, writing for publication, ethics, research dissemination and in some cases commercialisation. In a strong institution, governance and management roles and boundaries will be clearly defined and respected and processes will be transparent. This ensures clear lines of accountability. The most important structural issue concerns where overall responsibility for the institution lies.

How do we view leadership and management in public research institutions?

Identifying effective leadership and management of research and innovation can be approached in one of two ways – "bottom up", or "top down". A bottom-up approach would start with the knowledge and skills individual researchers need to develop to become leaders in research in their discipline(s). However, as important as this is to the outcome of improved performance in research generally, the knowledge and skills development of individuals has to be viewed and implemented through the prism of overall policy settings for research and innovation, at the institutional and ultimately the national level. It is for these reasons that the approach preferred here is top down – where the fundamental requirement in developing an overall research and innovation strategy for public institutions is to understand the overarching national policy settings.

Research and innovation occurs in publicly funded institutions such as universities and government research agencies of all sizes and types. The key areas identified are to a varying degree applicable to all types of public institutions depending on:

- The level of autonomy and the governance of institutions (for example, compare Australia and Vietnam).
- The level of funding available for research compared to the funding for teaching and learning.
- The level of international co-operation and collaboration.
- The level of research activity and the productivity of universities.
- Natural and geographic differences influence the nature of research priorities.
- The philosophy of research

Leadership of research in institution

Successful research institutions need leaders who are as aware of the conditions and developments outside their institution as those inside it. Leaders need to be aware of the broad trends in research activity such as increasing collaboration and the formation of networksⁱ so they can support their research staff and provide the conditions under which collaboration can flourish.

Similarly, it is important for leaders to be aware of national and international policy settings for publicly funded research agencies and universities, as well as the policy settings for business R&D, all of which have an impact on the potential for effective collaboration.ⁱⁱ Some government initiatives seek to increase the level of collaboration in research and innovation between public agencies and private enterprises. Such programmes offer significant opportunities for advancement of cooperation. However, success in these collaborations also requires a flexible approach on both sides so that there can be true co-operation between researchers used in very different cultures.

Opportunities for international collaboration are dependent on funding opportunities. When considering international collaborations between researchers it is important that leaders are aware of the bilateral, or multilateral, legislative requirements, related regulatory provisions and the funding arrangements that support the research activity. Similarly, they need to fully understand and respect their financial auditing, compliance and performance reporting requirements. Managing any intellectual property brought into or arising out of a collaboration is a complex area that requires close attention (OECD, 2003b).

Collaboration between researchers and institutions improves the output, impact and reputation of institutions engaged in research and innovation, as well as providing opportunities to address major research questions (The Royal Society, 2011). In contrast, the same innovation systems can mean competition for funding, something leaders need to manage carefully. Grant programmes for projects are universally highly competitive, and other funding can depend on success in winning grants, alongside other institutional performance measures. Leaders must find the ideal balance between collaborating with other institutions whilst maximising their own institution's funding

and profile (Schuetzenmeister, 2010). On the other hand, for emerging researchers in newer institutions, collaboration with their more experienced colleagues in more established institutions provides an important opportunity for development.

Institutional governance

Supervision and oversight of the management of research institutions with high levels of autonomy is often undertaken by a governing council or board. Legislative instruments define the institution and its purposes and the role and membership of the governing council or board. In addition, the board itself or the founding legislation may determine the role and membership of sub-committees such as finance, audit and remuneration committees. Research advisory committees feature in many research institutions. The board or council and sub-committees often include a majority of members who are independent of the institution. The success of these research institutions depends on the effective functioning of the governing board or council and the leadership that the body provides in supporting the organisation and its management.

It is common that the governing body of autonomous research institutions has responsibility for selecting, appointing and potentially dismissing the head of the institution. Given this relationship and the responsibility of the governing body to oversee the institution's management and performance, the head of the institution will usually want to ensure that the governing body is well supported in its operations and that all its expectations are met. The leadership team needs to be able to fully assure the governing body on the details of institutional performance and management, relationships with internal and external stakeholders and planning for the future.

In some countries, a government ministry or ministries will have oversight of higher education and research institutions rather than an autonomous council or board. These institutions may still have a governing body with some external membership and authority for making some decisions. However, the leader of the institution is usually appointed by the government or an overseeing ministry. In these situations, the relationship between the leader, governing body and overseeing government ministry is very different to that of independent institutions with higher levels of autonomy. Nevertheless, leaders of these less-autonomous institutions must still have a strong appreciation of their role and responsibilities and their relationship to the overseeing body and ministry. They must also be vigilant to ensure that the operation of their governance is efficient and effective.

Planning

One of the most important functions that leaders must undertake is to establish the broad framework for the development and future operations of the institution. Other more detailed implementation or operational plans often flow from the formulation of an institutional strategic plan.

The major elements that leaders need to consider in a major planning exercise include:

- Input from internal stakeholders, both bottom up (i.e. the staff) and top down (the governing body), as well as external stakeholders.
- Analysing the external environment.ⁱⁱⁱ (Butler, 2010)

- Analysing the institution
- Developing a vision and timeframe(s) for achieving the required steps.
- Gaining acceptance of the vision.
- Designing feasible and achievable strategies to achieve the desired outcomes.
- Establishing feasible milestones for achievements.
- Designing a framework against which the performance of the institution in achieving the desired outcomes can be assessed.
- Establishing processes for review and refinement of the plan over time.

It is essential for leaders to engage with staff and stakeholders and to communicate the developing vision and plan prior to its approval by the governing body. Without such engagement there will be little "ownership" of the plan by those who have to put it into action, and the achievement of outcomes will be compromised. Leaders must also expect to encounter, and deal with, resistance to change (Julius et al., 1999). Finally, it is essential that the leaders who develop such plans "live" it; without visible commitment by the leadership it, little if anything will happen, and the institution will have little chance of success.

Implementing institutional change

When an institution sets about making changes to its direction and profile of its research aspirations it is essential that leaders and managers pay close attention to staff planning. Nowhere is this more important than in universities where an appropriate balance has to be struck at an institutional level between the dual functions of teaching and research (OECD, 2003b). In addition, when plans call for changes in research emphasis it is important that leaders understand the highly competitive nature of research staff recruitment. Such competition can bring unexpected costs in terms of the incentives required.

Research institutions commonly aspire to establish a so-called critical mass of researchers in priority areas or areas of specialisation. The traditional notion of critical mass in academic research groups is that research groups need to reach a minimum threshold of researchers if they are to produce high quality research, however as found, researchers in a group lead to an "increase in research quality with group quantity, but only up to a limiting size, beyond which meaningful collaborations between all group members cannot be sustained (Kenna and Berche, 2011). This led to the term "upper critical mass" being coined, a size beyond which "further concentration of resources does not lead to significant increases in research quality." Not surprisingly, the upper critical mass appears to be discipline specific.

Detailed plans of certain functional areas should consider whether facilities are adequate or excessive for future operations, and take steps to deal with these issues. Indeed the costs in these areas can be prohibitive, preventing institutions from moving into otherwise desirable areas. If so, these constraints must be reflected in the overall strategic plan, as strategies must be feasible and achievable.

Ethos

A critical role for leaders of research in institutions is to establish and maintain a strong research culture and ethos. Acclimation of success and entrepreneurialism at an individual or team level, and overt support for advancing that research effort (even through improved access to infrastructure that will further the research effort) are both powerful mechanisms to engender a positive culture and ethos. Perhaps the most powerful influence on the ethos and culture of a research institution is the attitude of senior leaders to promoting and implementing codes of conduct and integrity in research. Leaders must be aware of the many international codes and practices in research integrity as well as national protocols and legislative requirements for ethical approval of research involving humans and animals.

Leaders must ensure that policies and procedures for the institution are developed and applied fairly and consistently. While much of the mechanics of dealing with these issues may fall to the senior management staff, the demeanour of the institution's leaders in dealing with these issues and promulgating best practice is the most powerful influence on an institution's culture.

Risk

The issues described above fall within the responsibility of leaders in research institutions to identify and mitigate risk. By its nature there is inherent risk in any research activity and it is for this and other reasons that peer review is such a common feature of decision making in research institutions. Risk assessment in decision making is most commonly related to the likely success or failure of the research activity to address the research questions being investigated. Other activities that require risk-based decision making include entering inter-institutional collaborations and partnerships with industry. It is important for leaders in research institutions to open such risk assessments to peer review. Making such judgments as an individual, even for the institution's leader, is indeed itself inherently risky as far as staff morale is concerned. The leader's responsibility is to ensure that these risks are identified, and that the institution has the policies and procedures in place to deal as effectively as possible with unpredicted incidents.

Communication

Effective leadership of research in institutions is critically dependent on strong communication with staff, students, alumni and other internal and external stakeholders. General internal communication can take a number of forms however, personal communication, is the most important for developing understanding and rapport with staff, as well as for testing and developing morale.

Leaders of public research institutions also have a responsibility to communicate with governments and their supporting bureaucracies beyond simply making reports to meet regulatory requirements. Authorities who provide public funding need to be kept aware of the outcomes of their funding so that they have confidence in the effectiveness of their expenditure on behalf of the public.

Communication with known and potential benefactors and commercial partners is an essential responsibility for leaders of research institutions. Relationships that have the potential to develop into worthwhile collaborations are founded on the development of trust and respect on all sides. In the context of increasing levels of international collaboration between institutions, and more diversified research workforces within institutions, it is essential that research leaders and managers have high levels of intercultural understanding and sensitivity.

Management to support leadership of research in public institutions

Organisational structure

Having a sound and appropriate management structure is essential to the effectiveness of leadership in any research institution. No single model fits all situations, however the main factors that can influence the organisation of research groups include the notions of critical mass and interdisciplinarity on the one hand, and practical issues such as space, infrastructure and other academic responsibilities such as teaching on the other. Factors such as leadership capacity, the level of devolution of responsibility and the capacity to provide effective management and administrative support to the research groups also influence decisions about structures (Taylor, 2006). It is common for research institutions to gather management and administrative support staff together to form an institutional research office as a mechanism to ensure high levels of efficiency, skill and co-ordination of policy and procedural requirements (Hazelkorn, 2005; Taylor, 2006). Above all, organisational structures need to be designed to facilitate appropriate leadership, management and timely decision making (Connell, 2004).

Executive and management operations

The design of an executive-management support structure will vary according to the needs of the institution as well as the experience and capability of those in such positions. It is essential that the positions and their roles are defined and that there is no duplication, and that taken together, the positions provide the necessary support for the effective implementation of the institution's plans, meeting the governing bodies requirements and meeting other external reporting requirements. It is also essential that the responsibilities, accountabilities and formal delegations accorded to these positions are documented, along with the expectations and measures of performance that are required of the incumbent. In larger institutions, the most senior roles are often scrutinised by the governing body or a sub-committee.

Two general points that often emerge for leaders to consider are a) limiting the number of direct reports, where possible, to a group that allows adequate attention to be paid by the leader to each individual and their responsibilities (ideally less than ten), and b) maintaining regular personal communication with each member of the team, individually as well as collectively.

Committee operations

It is essential for the efficient operation of research institutions that senior executive and management staff meet to share information, work as a team to solve immediate challenges and monitor institutional issues and performance. Committees are often

most valuable when considering issues arising in areas where different management portfolios intersect. Such cross-portfolio committees are also required to ensure that policies, systems and administrative processes are in place to support the functions of the institution and to mitigate identified risks to operations. An area of growing importance is the development of policies and procedures to deal with inter-institutional and international collaborations and contracts combining complex combinations of research, staffing, legal and regulatory factors.

A balance must be struck between purpose, frequency and the effectiveness of the group. One of the most important drivers is the requirement for senior leadership and management to meet the requirements of the institution's governing body in a timely fashion. The operational features of the latter body will in large part determine the need for and operation of the executive-leadership team and its committees.

Research management and administration

Leadership and management in research institutions involves a very wide range of responsibilities and functions.

Table 1. Typical activities in research management and administration^{iv}

Research support	
Primary activity	Related activity
Identification of funding opportunities.	Advising potential applicants.
Identification of collaborative opportunities.	Advising researchers.
Supporting research proposals.	Mentoring, quality improvement, budget advice, compliance checking, identifying and liaising with partner organisations, providing seed funding to facilitate project development.
Liaison with granting agencies.	Advising on practicality and implementation of rules; responding to agency queries about active grants; communication on grant outcomes.
Promoting regulatory accountability.	Development and implementation of policies and procedures to assist researchers to meet regulatory requirements.
Supporting regulatory compliance.	Advising and assisting researchers with ethics approvals, safety requirements, and compliance reports.
Record keeping.	Maintaining institutional databases of grants, publications, regulatory and ethics approvals, research outcomes, other recording requirements.
Milestone reporting (as required).	Ensuring contract requirements are met and reported.
Supporting inter-institutional and international agreements for collaborative research and co-use of infrastructure.	Developing, overseeing and recording documentation of agreements and their implementation and management.
Supporting research communication strategies.	Advising media and communications specialists on outcomes and achievements.
Research translation/commercialisation	
Primary activity	Related activity
Ensuring researchers are aware of opportunities and responsibilities for protection of intellectual property (IP).	Developing and providing information, policies and procedures; engaging and promulgating general advice on legal frameworks, including international obligations.
Identification and assessment of opportunities.	Recording research activities, surveying commercialisation activities and opportunities,

	identifying potential funding streams and establishing strategies and time frames.
Legal and commercial advice.	Co-ordinate advice on intellectual property and commercial linkages and opportunities.
Negotiation of agreements.	
Establishment and implementation of options, binding agreements, spin-offs, licence arrangements.	
Keeping records and contracts.	
Financial management	
Primary activity	Related activity
Costing and pricing research proposals and agreements, negotiating budgets.	Especially inter-institutional and international collaborative arrangements.
Accounting for direct and indirect research costs.	
Negotiating and checking contract agreements and commitments.	
Financial administration of payments.	Arranging international payments, advancing funds.
Record keeping and financial reporting.	Compliance requirements for grant acquittals, and data collection for institutional reports at operational and governance levels.
Asset management	
Primary activity	Related activity
Procurement and purchasing.	
Managing and maintaining equipment and facilities.	Developing and maintaining asset registers and maintenance schedules.
Assessing equipment lifetimes and replacement schedules.	Monitoring scheduled maintenance.
Provision and maintenance of IT systems, access and data storage.	Including access to off-site computing facilities.
Provision and maintenance of information and knowledge sources.	In conjunction with knowledge managers and on-line information repositories /libraries.
Performance data recording and analysis	
Primary activity	Related activity
Establishment and maintenance of publication databases.	Recording and verification of publications data.
Establishment and maintenance of thesis databases.	Recording and verification of thesis and awards data.
Establishment and maintenance of research funding data and contracts.	Liaison with financial management for performance reporting.
Analysis of performance data.	Reporting to executive on institutional, group and individual performance.

The amount of activity under each of the headings will vary with the number of disciplines and the extent of activity by discipline across institutions, as well as between institutions. Requirements will also vary in accordance with various national policies and legislative requirements.

Leadership of researchers in institutions

National innovation systems are reliant on the education, training and preparation of individuals who are attracted to a career in discovery and intellectual inquiry. The foundation for these careers is established in universities and research institutes, and those that achieve their goals and meet the requirements can go on to find employment

in those institutions and industries that depend on innovation (Toner, 2011; OECD, 2011b, 2011c). The success of any research institution is primarily dependent on the performance of the creative, imaginative and somewhat independent individuals who have chosen research as a career.

Leadership of researchers requires an “ability to co-ordinate activities, select people, assemble teams, motivate workers, resolve problems, create a supportive environment, communicate, and provide focus and leadership” (Garrett and Davies, 2010; see also OECD 2011c).

Research students

The early formative years of a research career usually occur just prior to a commitment to undertake a higher degree programme. Programmes need to be available for:

- induction to research, including research integrity and codes of good practice
- training in the identification and validation of research questions and feasible approaches to finding solutions
- training in research methods, including approval processes; literature analysis; and report writing
- training and mentoring in grant application processes
- training in management of intellectual property, publication and communication skills
- exposure to and training in entrepreneurial and business skills where appropriate.^v

Postdoctoral and early career researchers

Institutional leadership is most critical at this stage of research career development.

Staff appointments should:

- follow appropriate search strategies to identify the best candidates
- be based on achievement, potential, and international reputation
- be confirmed after rigorous probationary procedures
- be facilitated through flexible remuneration and support packages.

Staff development programmes should address:

- preparation of research proposals
- project management
- postgraduate supervision
- preparation of publications.

Established researchers

Leadership of research in established institutions, as well as those with a growing reputation or changing circumstances, requires close attention to mechanisms that will support the natural aspirations of research staff to achieve higher levels of performance and reputation in their chosen fields. It has become more vital than ever before for universities to put in place reinforcement systems that are both fair and capable of motivating excellence and of attracting and retaining the best people (Mathieu, 2003). It is important to ensure that the recognition and reward is commensurate with the level of achievement, and that the processes of selection are widely understood, applied

transparently and involve peer review.

All researchers

Some important aspects of research leadership affect all research students and staff and their career achievements (Boulton, 2010). It is important for leaders to be aware of all these factors so as to be prepared for unexpected but necessary changes in the research institution. An essential prerequisite for staff management is to ensure that all positions in a research setting are adequately defined and have clear descriptions of their respective roles, responsibilities and accountabilities.

Foremost amongst the general responsibilities of leaders is to ensure that all new students and staff receive adequate and appropriate induction to the institution. It is essential that the institution's leaders provide staff with the rationale and the overall policy direction that has been adopted by the governing body.

Leadership of institutions

Leading a research institution is a dynamic process that is often characterised by highlights coupled with significant challenges. Dealing with areas in decline or under constraint is perhaps the most difficult challenge for research leaders. Decisions to terminate activities no longer consistent with the strategic priorities of the institution must be objective and evidence based and communicated effectively. Part of the challenge is to encourage redirection of effort to alternative areas wherever possible, depending on skills and experience. Where this is not possible, then difficult leadership decisions are required.

Another more positive aspect of leadership is identifying and supporting emerging areas of strength and advantage. Such areas often require timely and significant short-term assistance.

Management to support leadership of researchers

The administration and management of research student enrolments and staff appointments is usually the responsibility of specialist units, such as a postgraduate research office and a human resources section. Tables 2 and 3 summarise the major functions for these administrative and management areas.

Table 2. Typical management and administration requirements for research students

Research student management	
Primary activity	Related activity
Advising on and contributing to external policy settings.	Liaison with government officials and sector interest organisations.
Advising on enrolment requirements.	Developing institutional opportunities and requirements and disseminating them to prospective students.
Student induction to the institution.	Ensuring awareness of institutional policies and procedures, and regulatory requirements.
Supervision arrangements and training.	Developing and maintaining supervisor training and quality programmes; maintaining a register of approved supervisors (for larger institutions); ensuring independent sources of advice on supervisor arrangements.
Training programs for research methods, publication and IP management.	
Support for study interruptions and changes in supervision.	
Facilities and infrastructure requirements.	Minimum student facilities should be defined and provision monitored.
Support for travel and conference attendance.	
Support for appropriate study-related secondments to industry.	
Monitoring progress and support.	Assist with timely completion of candidature.
Examination processes.	Ensure timely completion of the examining process, and recording of outcomes.
Graduation confirmation.	

Table 3. Typical management and administration requirements for research staff

Staff management	
Primary activity	Related activity
Creating position descriptions, including performance expectations, responsibilities, and accountabilities.	Ensure personnel records are complete and up-to-date.
Processes for recruitment, selection and appointment of staff.	In conjunction with leaders and discipline experts.
Contract arrangements.	Ensure details are complete and satisfactory.
Induction to the institution.	Provide advice on policies, procedures and sources of information and assistance.
Advising on research integrity.	Establishing and supporting official policies, procedures and training for personnel with institutional responsibility for dealing with research integrity and potential misconduct.
Advising on conflict of interest management.	Include in induction and training programmes.
Staff development.	Awareness and training for career development, mentoring opportunities, peer review and feedback.
Assisting and managing conflict resolution.	Providing independent mediation and supporting active resolution of conflicts.

Data analysis for trends in personnel profiles.	Developing and maintaining long-term data on age profiles, appointment level profiles and succession planning.
Supporting and managing staff surveys and feedback options.	Supporting institutional "wellness" surveys or similar.
Strategy and management support for workplace change.	Ensuring legal and other employment requirements are satisfied.

ⁱ The Royal Society (2011) provides a very comprehensive review of changes in international research patterns and activities as well as making high-level recommendations for future policy and action.

ⁱⁱ See for example *OECD Investment Policy Reviews: Viet Nam 2009* (OECD, 2009)

ⁱⁱⁱ For example, numbers of publications are often used in funding formulae but such indicators can drive behaviour that may not always be consistent with the aspirations of an institution. For instance the institution might prefer to publish in high-impact journals.

^{iv} Note that human resource management is described in Theme 5.

^v See also, for example UK GRAD Programme (2001).