OPEN LETTER

India Research Management Initiative (IRMI) – an initiative for building research capacity in India [version 1; referees: 1 approved with reservations]

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Abstract
Research and innovation are growing in India with significant investments being made towards institutions, researchers and research infrastructure. Although still under 1% of GDP, funding for science and technology in India has increased each year for over two decades. There is also increasing realization that public funding for research should be supplemented with that from industry and philanthropy.

Like their counterparts worldwide, Indian researchers require access to professional research management support at their institutions to fully leverage emerging scientific opportunities and collaborations. However, there are currently significant gaps in the research management support available to these researchers and this has implications for research in India.

The India Research Management Initiative (IRMI) was launched by the Wellcome Trust/DBT (Department of Biotechnology, Government of India) India Alliance (hereafter India Alliance) in February 2018 to narrow these gaps. A 12-month pilot phase has enabled conversations across multiple stakeholders. In this Open Letter, we share some insights from the IRMI pilot phase, which could aid systemic development and scaling up of research management as a professional support service across India. We anticipate these will stimulate dialogue and guide future policy and interventions towards building robust research and innovation ecosystems in India.

Keywords
Research, Management, India, Extramural Funding, Scientific Administration, Science careers, Professionalization, IRMI Pilot

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Background
Research and Innovation in India is supported through significant investments from the Government of India, international agencies and more recently from the private sector. While robust systems for managing intramural funding to research institutions are in place, corresponding processes for helping Indian researchers compete successfully for extramural funds have lagged behind.

In 2016, the Wellcome Trust, UK commissioned a scoping study on research management (RM) in India, which included five Indian research institutions receiving funding from the Wellcome Trust/DBT (Department of Biotechnology, Government of India) India Alliance (hereafter India Alliance). The India Alliance subsequently coordinated a panel discussion titled “Research Development Offices: The Need of the Hour” at its 2017 Annual Fellows meeting. Additionally, a voluntary and anonymous survey of India Alliance Fellows was carried out in 2017 to assess existing support for laboratory, data and research management, and research misconduct. Only 18% of respondents in the survey confirmed the presence of a Research Development Office at their institutions\(^1\). These early steps highlighted the need for developing and sustaining RM support at Indian research institutions.

Following on from these exercises, the India Alliance formally launched the India Research Management Initiative (IRMI) in February 2018 as an India-led 12-month pilot study aimed at creating awareness for research management, engaging in dialogue with Indian institutions and building a baseline of information upon which to base future policy and funding opportunities. The IRMI pilot has allowed us access to scientific leadership, faculty members, research managers and administrators at 31 participating institutions (Figure 1, Figure 2 and Table 1), staff at major research funding agencies in India and members of the international research management community.

We interacted with individuals in roles supporting grant management, project management, scientific outreach, innovation management, academic programs, financial management, operations, policy development and ethics in India, hereafter defined as Research Managers and Administrators (RMAs). These conversations have allowed us to build a broader picture of expectations, constraints and requirements for various stakeholders.

Insights from the IRMI pilot
The research funding landscape in India
Over 50% of research at Indian institutions is supported with public funds from the Government of India, with the rest coming from private sources (i.e. industry), philanthropy and international agencies. There are significant opportunities for international collaborative research via bilateral and multilateral collaborations, including the European Molecular Biology Organization (EMBO) and the Human Frontier Science Program (HFSP). Several philanthropic organizations such as the Bill and Melinda Gates Foundation, Howard Hughes Medical Institute, Simons Foundation, Tata Trusts and Wellcome Trust support investigators and research projects in India. The current funding landscape presents both a need and an opportunity for India to develop a sound RM support base.

A broader working definition of RM is required for India
Indian institutions encourage their researchers to raise funds from external sources, both to further research and as peer-reviewed endorsement of their research. Several institutions therefore have in place dedicated grant management offices, such as the Project Management and Evaluations (PME) Cells at research institutions of the Council of Scientific and Industrial Research (CSIR), wherein support services are largely centred around financial management and reporting on extramural grants. Such offices need to widen their scope, incorporate proactive approaches and provide more responsive support to researchers.

Figure 1. Diversity of institutions engaging with the India Research Management Initiative (IRMI) initiative, including autonomous research institutions of Government of India Departments such as Indian Council of Medical Research (ICMR), Department of Biotechnology (DBT), Department of Atomic Energy (DAE), Ministry of Human Resource Development (MHRD), CSIR; Universities, Medical Centres & associated research units and Others.
India now requires a more comprehensive and inclusive definition of RM, which is also acceptable across institutions as well as funders. A more contemporary view of RM includes grant management at pre-award and post-award stages, partnership building, outreach to funding agencies, ethics, policy, managing team-science, impact analysis and others. Indian institutions developing their RM activities would benefit from taking this broader international scope into account for creating correspondingly well-structured support services.

The beginnings of wider RM in India
In the last decade, a small number of research institutions have taken steps to create science-led RM structures that extend beyond financial management. The National Centre for Biological Sciences (NCBS) in Bengaluru, the Translational Health Science and Technology Institute (THSTI) in Faridabad and Indian Institute of Science Education and Research (IISER) in Pune are pioneers, with operations including international activities, partnership building, grants management at pre- and post-award stages,
outreach and ethics. These institutions have a track record of successfully attracting and managing diverse sources of external funding, including the highly competitive India Alliance fellowships. Researchers and the leadership at these institutions regard support from research offices to be crucial for their success, and include these in future planning.

Other government and privately funded institutions have also started investing more broadly in RM. Examples of these are the National Centre for Cell Science (NCCS) in Pune, Centre for Stem Cell Research (CSCR) in Vellore, Public Health Foundation of India (PHFI) in New Delhi, Shiv Nadar University in Delhi-National Capital Region (NCR), George Institute of Global Health (GIGH) in New Delhi, Tata Translational Cancer Research Centre (TTCRC) in Kolkata and Ashoka Trust for Research in Ecology and the Environment (ATREE) in Bengaluru.

At some of these institutions, development of de novo RM structures has been driven by the lateral movement of scientific administrators trained at funding agencies including the

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<td>1 Jamia Hamdard, New Delhi</td>
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<td>2 National Institute of Epidemiology, Chennai</td>
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<td>3 Centre for Stem Cell Research Vellore</td>
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<td>4 Regional Centre for Biotechnology, Faridabad</td>
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<td>5 CSIR- Centre for Cellular and Molecular Biology, Hyderabad</td>
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<td>6 Translational Health Sciences and Technology Institute, Faridabad</td>
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<td>7 National Centre for Cell Science, Pune</td>
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<td>8 Indian Institute of Science Education and Research, Berhampur</td>
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<td>9 Indian Institute of Science Education and Research, Pune</td>
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<td>10 Indian Institute of Science Education and Research, Thiruvananthapuram</td>
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<td>11 KEM Hospital and Research Centre, Pune</td>
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<td>12 Institute for Stem Cell Biology and Regenerative Medicine, Bangalore</td>
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<td>13 National Centre for Biological Sciences, Bangalore</td>
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<td>16 Shiv Nadar University, Uttar Pradesh</td>
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<td>20 Public Health Foundation of India, New Delhi</td>
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<td>21 National Institute of Plant Genome Research, Delhi</td>
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<td>22 CSIR- Institute of Genomics and Integrative Biology, Delhi</td>
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<td>23 St Johns Research Institute, Bangalore</td>
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<td>24 Ashoka Trust for Research in Ecology and the Environment, Bangalore</td>
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<td>25 International Centre for Theoretical Sciences, Bangalore</td>
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<td>26 Kidwai Cancer Institute, Bangalore</td>
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<td>27 Institute of Public Health, Bangalore</td>
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<td>29 Tata Translational Cancer Research Centre, Tata Medical Centre Kolkata</td>
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<td>30 Centre for DNA Fingerprinting and Diagnostics, Hyderabad</td>
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<td>31 LV Prasad Eye Institute, Hyderabad</td>
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CSIR - Council of Scientific and Industrial Research
Wellcome Trust, Department of Biotechnology and India Alliance. These professionals have transmitted funding best practices to their new organizations and have worked in close collaboration with visionary and supportive management teams to build research offices from first principles. These are promising developments, which should be amplified across many more institutions.

**Building new research offices**

At present, Indian investigators spend a significant fraction of their time on administration, including the time spent on individually following up on their grants with funding agencies. Outreach to funding agencies via a centralized office is required for efficiency and creating institutional memory, and would be immensely beneficial to individual researchers, particularly in the context of proactive fundraising from diverse sources.

Institutions should take the initiative to build RM structures to support their unique research priorities. This additionally requires consistently demonstrating the value of RM to researchers and administration alike, to ensure acceptance and long-term sustainability. Leaders should create a climate of trust and actively promote the use of their research offices.

Individual researchers at institutions can take an interest in developing their institutional grants offices, and provide inputs and constructive feedback into how such offices could best support their needs. They could also connect with peers across India, via leadership networks, shared administrative structures and platforms such as IndiaBioscience, to explore solutions to issues encountered in creating research offices in India.

**Diversity of Indian research organizations: implications for RM**

Research in India is conducted both at universities and at over 200 autonomous research institutes supported by various arms of the Government of India such as the Department of Biotechnology (DBT), Department of Science and Technology (DST), CSIR, Indian Council of Medical Research (ICMR), Department of Atomic Energy (DAE), Ministry of Human Resource Development (MHRD) and others, including private funders. Research at these organizations spans agricultural, biological, biomedical, chemical, physical, mathematical, earth, engineering and materials sciences, and other disciplines including social sciences. Institutions such as the All India Institute of Medical Sciences (AIIMS) and Indian Institutes of Technology (IITs) impart quality education in medical and engineering disciplines, respectively, and are also well regarded for their research efforts. Systemic efforts at boosting RM in India should also take into account the operational sizes and administrative complexities of India’s myriad research institutes and universities. This currently varies widely, with an average life sciences research institute supporting 30–70 faculty members and the universities, AIIMS, IITs and others having much larger faculty bodies. With changes to funding structures for central and state universities, these higher education centres will also need to establish RM systems suited to their unique requirements.

**Pre-award grant management- a missing element**

Support from a central office at the pre-award stages was found to be available at only a small minority of institutions. In many cases, grant applicants do not have access to dedicated support, neutral advice and alignment with institutional focus at the pre-award stage. Likewise, the leadership at several institutions often do not receive timely support with due diligence on applications, which leads to submission delays. Lack of awareness also makes some researchers sceptical of the value of pre-award support, which was viewed as a hindrance or an administrative bottleneck.

The lack of proactive pre-award support compromises the ability of Indian researchers to identify and seek funding in a timely manner, and for the institution to benefit from pre-award due-diligence and proper budgeting for grant proposals. This feeds forward into the ability of investigators to manage their grants in alignment with agency norms. Collaborative proposals involving Indian institutions lacking research offices often suffer delays, inadequate due diligence, underestimating of proposals on the Indian side, inadequate overheads and sluggish project management. This aspect of RM will need to be addressed, both from the perspective of changing attitudes and in developing the required professional support at Indian institutions.

**Team-science: reducing the administrative burden on investigators**

Indian researchers are now increasingly participating in complex multi-institutional, often international, team-science projects to address major research questions. With India contributing to international consortia such as EMBO, HFSP and others, Indian researchers have an opportunity to participate and compete at a global level. Such activities benefit from dedicated RM support, to reduce administrative burden on the investigators and facilitate seamless interactions across all participating national and international stakeholders. Team-science efforts in India are being funded from both local and international sources and Indian institutions should be willing to request and justify direct resources for RM personnel on grants supporting team-science, rather than expecting their investigators to take care of all administrative requirements.

**Sustainability of careers**

India has a substantial pool of early career researchers trained to the PhD and postdoctoral levels. With limited academic positions, scientific administration at funding agencies and research institutions is emerging as an attractive career option. In parallel, there is an expectation from researchers that professionals with “blended” scientific and RM skills will be required to drive a wave of change within current administrative structures.

Scaling up RM in India will require the creation of long-term employment opportunities and career structures for RMAs at research institutions across the country. The availability of RM jobs in Indian research institutions should become the norm rather than an exception, as it currently stands. Institutions
receiving core-funding from the Government of India face challenges in recruiting RMAs, particularly those with successful academic backgrounds. There is currently no clear path for hiring scientifically trained staff to purely management roles in research organizations supported by the government. Changes to present recruitment norms are required at the policy level to enable government-supported institutions to employ scientifically qualified research managers and create RM structures and roles.

Institutional overheads are globally accepted as a means of supporting research office costs. However, more clarity is needed in India about the use of grant overheads for recruitment of RMAs. It would be beneficial for institutions to work within their respective administrative frameworks to develop clear policies for costing overheads on grant proposals and to utilise a proportion of overheads received towards the recruitment of RMAs.

Capacity building
With the profession being at an early stage in India, concerted efforts on several fronts are required to prepare and develop an RMA workforce for the next decade. Training programs need to be coordinated in diverse areas of RM, at exploratory, beginner and advanced levels. In order to widen the scope of RM in India, RMAs need access to training modules in several aspects of RM. Training and exchange opportunities should be made available to RMAs in India, potentially through the work of multiple stakeholders.

Individuals with backgrounds in areas such as science, medicine, dentistry and public health would likely play key roles in shaping RM structures for Indian institutions, in a manner that caters to specific institutional requirements and priorities. The profession will hence need to be open to participation from a wider pool of staff with diverse training. Career development programs for Indian RMAs would have to take cognizance of these considerations and incorporate suitable standards.

There are already two RM training programs being offered in India. The RM courses supported by the Department of Science and Technology (DST) are aimed at active scientists at different levels and do not specifically cater to the career requirements of RMAs. Opening such courses to RMAs would significantly widen the benefits to institutions. Workshops on scientific administration are being supported by the Newton Bhabha Fund and offered by IISER Pune in partnership with the British Council and India-Bioscience. These workshops, aimed at women candidates wishing to develop careers in scientific administration, have elicited growing interest from the community.

Indian RMAs would also benefit from inclusion in a global community of professionals. IRMI workshops and attendance of Indian delegates at INORMS 2018 were the first opportunities for Indian RMAs to interact with each other and with peers from other parts of the world. There is now a dedicated Linkedin page as an early online community for Indian RMAs. Such networking efforts require nurturing and development. In the longer term, once there is a sizeable RM community in India, it would be beneficial to have a professional association of RMAs, which would be expected to cater to future networking and career development needs of India’s RMAs and for ensuring their connectivity with the international RM community.

The gender issue
A recent survey has highlighted that in several countries, RM is female dominated. This is true for India as well. At the IRMI institutions, the majority of RMAs from academic backgrounds are women at early or intermediate stages of their RM careers. The Indian research ecosystem needs to accept RM as a bona-fide profession and not merely as a route for retaining scientifically trained women in the workforce, who may then get relegated to ill-defined support roles with unclear paths for career progression.

Wider participation from other stakeholders
The primary mandate of the India Alliance, which supported the IRMI Pilot, is to enable biomedical research. Conversations during this phase show that RM systems in India need to be inclusive of all areas of science, including social sciences. Beyond IRMI, a wider effort would require collaboration between several funders to support this across disciplines. In particular, the development of RM as a profession in India will require commitment and participation from the Government of India for maximal impact.

Conclusions
Indian institutions now need to invest in developing a sound RM support base for their investigators. Without such support, the time of a researcher and funds invested in research are not being optimally utilized. The lack of good RM support also risks future growth and the ability to sustainably attract extramural funding from government, private, philanthropic and international sources. Building RM as a viable profession in India will require concurrent creation of sustainable jobs at Indian institutions and training of RM aspirants at different levels. The nascent RMA community in India will benefit from the creation of a formal members association, which can then serve to channelize training, networking and international collaborative opportunities. Such an association could also function as an advocacy group for key funders supporting research in India. With wider participation from RMAs, institutions, mentors and funders, RM can grow considerably in India and make a significant impact on its research and innovation landscape.

Data availability
No data is associated with this article.

Grant information
This work was supported by the Wellcome Trust through a Wellcome/DBT India Alliance Grant [IA/IRMI/18/00001].
Acknowledgements
The advisory group that helped develop a framework and international linkages for the IRMI pilot included Dr Simon Kay and Ms Claire Cunliffe at the Wellcome Trust and Dr John Kirkland, Chief Operating Officer of the National Institute of Economic and Social Research. They are gratefully acknowledged.

The authors also thank staff members at the India Alliance, in particular Dr Madhankumar Anandakrishnan, Dr Sarah Iqbal, Dr Banya Kar for their insights and inputs on the development of IRMI, and Ms. Saritha Vincent for logistics. Members of staff from the DBT and the DST are thanked for their participation in IRMI events through 2018. Support from research managers at all institutions participating in the IRMI initiative is gratefully acknowledged, in particular those attending INORMS 2018 and the IRMI workshops and discussions. Several members of the international RM community helped with ideas on RM as a global profession. We also thank all institutions and researchers who engaged with the IRMI pilot at site visits, workshops, panel discussions and on social media, and provided the essential researcher perspective for this initiative.

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Open Peer Review

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Overall the Open Letter is clear and compelling - India should invest in Research Management and Administration (RMA) infrastructure in order to better support researchers in their endeavours. The specific recommendation for the creation of a national association for RMAs is also welcome. However some of the assertions are not underpinned with evidence, at least not with evidence provided in the article.

This is a real shame as the overall argument is (in my opinion) sound, but it is perhaps because of my experience as an RMA that I believe this, rather than with the evidence presented in the article - in some cases the Open Letter does not provide evidence for the assertions made. However it does appear that much evidence will have been gathered in the IRMI work. This could perhaps be more explicitly and directly drawn into the Open Letter – one method could be the incorporation of quotes from participants; but this could be problematic post hoc, and would perhaps change the tone of the article. Another is to provide more detail on claims, for example “At present, Indian investigators spend a significant fraction of their time on administration…” there is no indication of what this fraction might be, or how the data to make the assertion was collected.

In terms of unsupported assertions, another example is “Collaborative proposals involving Indian institutions lacking research offices often suffer delays, inadequate due diligence, undercosting of proposals on the Indian side, inadequate overheads and sluggish project management.” - is this the case, where is the evidence? It seems (to me) to be a reasonable assertion, and one I presume that came from the IRMI work – but the authors do not state this. However, most of these assertions do reflect the findings of others, but again they are not referenced.

India / IRMI specific assertions were similarly unsupported, for example “Support from a central office at the pre-award stages was found to be available at only a small minority of institutions.” How many of the 31 institutions looked at was this? There is no underlying dataset to help answer this.

One specific assertion that I do not quite follow is: “Individuals with backgrounds in areas such as science, medicine, dentistry and public health would likely play key roles in shaping RM structures for Indian institutions, in a manner that caters to specific institutional requirements and priorities.” As shown in their 4th reference (disclaimer, this was work I led), around the world, RMAs come from a wide variety of academic backgrounds. It is not clear why this would be focussed around science and medicine in India. However the IRMI work was based around institutions predominantly it seems in these subject areas and so perhaps, given the newness of the profession in India and the apparent propensity in countries where
RMA is developing for RMAs initially to be researchers moving into administration, then perhaps this is to be expected.

One specific weakness is in addressing opposing views. This is only highlighted with the sentence “Lack of awareness also makes some researchers sceptical of the value of pre-award support, which was viewed as a hindrance or an administrative bottleneck.” which is then not countered or debated. For example David Colquhoun makes some strong statements http://www.dcscience.net/DC-research-fortnight-020610.pdf; however the majority of the literature suggests that “good” research support can indeed unencumber the researcher from administrative burden, and even help improve the chances for research bids to be successful. See for example Pamela F. Miller (2017)\(^1\), and Natasha G. Wiebe and Eleanor Maticka-Tyndale (2017)\(^2\).

Given the use of the worded “blended” in terms of professionalism, one might have expected a reference to the work of Celia Whitchurch. In general there is a low level of citation.

I would have liked to see “Research Management” and “RMA” included in the keywords.

Overall the authors are to be commended in covering such a large amount of ground in such a short space, however this does mean that the reader has to take some assertions on face value. Perhaps as an Open Letter, to provoke debate, this is not unreasonable but the arguments would be much stronger with the evidence base that the IRMI work surely produced – allowing the conclusions to be properly justified.

In summary, the effectiveness of Research Management and Administration is in general an under researched area, and this Open Letter and its recommendations are welcomed, but is felt that some work is needed to show robust evidence for the conclusions made.

References
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Is the rationale for the Open Letter provided in sufficient detail?
Yes

Does the article adequately reference differing views and opinions?
No

Are all factual statements correct, and are statements and arguments made adequately supported by citations?
Partly

Is the Open Letter written in accessible language?
Yes

Where applicable, are recommendations and next steps explained clearly for others to follow?
Yes
**Competing Interests:** The reviewer has been minimally involved in the Wellcome Trust/DBT India Alliance / African Academy of Sciences initiative that the authors have played a major role in; however we have not worked directly together.

**Referee Expertise:** Research Management and Administration

I have read this submission. I believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.