Chapter 10

The Road Ahead for the Higher Education System and Research Universities

The success of research universities in a country depends critically on the overall higher education (HE) system in the country. However, their success also depends on the larger ecosystem comprising stakeholders such as industries and professional bodies. For example, the presence of research- and innovation-driven industry gives a boost to research universities, as much of the applied research finally benefits through products and services delivered by businesses. Similarly, respectable professional bodies help research tremendously. These bodies often give awards, prestigious fellowships, and so on to recognize achievements in research, which go a long way to support research excellence, as the respect of peers often drives researchers. Society has an important role to play as well: if researchers are highly respected and a career in research is valued, it will help the development of research universities. While many factors play an important role, the most critical support needed by research universities is from the overall HE system.

Previous chapters have discussed various aspects of research universities. In this chapter, we discuss some desirable changes that can help research universities thrive in India. As research universities cannot thrive unless the overall HE system in the country

supports research universities, this chapter has two sections. The first section discusses the desired changes in the HE system to support research universities, and the second one discusses some desired changes within research universities. However, only a few key desired changes have been discussed; no comprehensive discussion has been conducted on the set of desired changes. As the new draft NEP of the Government of India (NEP 2019) also has proposals and recommendations on various aspects of research universities and the overall higher education system, where suitable, suggestions of the NEP are also mentioned.

10.1 FOR THE HIGHER EDUCATION SYSTEM

All universities exist within a society and derive support from society, both financially and motivationally. For example, if most universities are supported by the state and the focus of the state is only on education, then research universities will find it hard to justify the investments needed for research. Therefore, the larger HE ecosystem, with its policy frameworks, should support research universities and not focus only on education. As discussed in Chapter 2, some strong research universities are needed, even in poorer countries such as India. In this section, we discuss some key support needed from the HE ecosystem for research universities to thrive.

10.1.1 A Differentiated System for Higher Education

The overall HE sector in a country is typically much larger than the set of research universities. With the massification of higher education, the HE system has expanded rapidly in the last few decades in India and is one of the largest in the world. Any extensive HE system will have to be a differentiated system; there is simply no way all universities in an extensive HE system like that of India can be research universities. Not having strong research universities is also not an option, as discussed in Chapter 2. While education and research are the two main objectives of a

university, all universities need not be, indeed, cannot be, research universities. To satisfy the educational needs, while still supporting a smaller number of research universities, a differentiated HE system is required. Without a differentiated system, all universities would be treated uniformly, which is counterproductive, as research universities have a different ethos and purpose and have to be supported and treated differently from universities that may focus more on education (Altbach 2007).

As discussed earlier in Chapter 2, a natural way to organize the HE system is to consider the system as comprising three tiers, with one tier focusing on research and doctorate, another tier focusing on postgraduate and undergraduate education and the third tier focusing on undergraduate education. This is how the famous California Master Plan for Higher Education was organized. This is also how the Carnegie Classification for Higher Education Institutions categorized the institutions in USA: research universities, masters colleges and universities and baccalaureate colleges. (There are a few other categories as well, such as associate, tribal and specialized colleges.) This is also how the NEP suggests that the Indian HE system should be organized.

In such a three-tier system, the research universities are at the top (tier I), which, while having education programmes at all levels, have a strong emphasis on research and perform research at an international level. They have strong PhD programmes and play a critical role in the research ecosystem of the country. At the next level (tier II) are universities that focus on masters and undergraduate education and may have a small PhD programme. The main mission of these universities is higher education. High-quality education requires that the latest developments are included, for which these universities will need a modest research and doctoral programme. At the third level (tier III) are colleges; their focus is mostly on the undergraduate programmes, though they may have some master's-level programmes also. Their programmes may also be based more on a well-established body of knowledge.

A differentiated system of higher education, such as the three-tier system, is necessary to keep education accessible while still having research universities. As the cost of education is necessarily much higher in research universities than in teaching-focused universities, and is higher in teaching-focused universities than in colleges, the role of tier II and tier III is critical in keeping higher education accessible. Research universities cannot be the institutions to satisfy the full HE demand, as the cost to the students and society will simply be exorbitant. Only a small percentage of students get their education in these research universities. Moreover, getting the faculty talent for such a large number of research universities is simply not possible.

In India, the current HE system is effectively a two-tier system, with universities and colleges. This stratification is not based on education goals but on the ability to design education programmes and grant degrees; universities are given this authority, while colleges are not. Clearly, out of about 900 universities in India, only some conduct good-quality research and publish in reputable international venues and thus may be considered research universities. The rest mostly focus on education. For having top-quality research universities that are at par with global research universities, research universities need to be identified and then supported so that they can achieve global standards.

Research universities can be separated from the rest through a classification system. The Carnegie Classification of USA is the best-known method. It was created in 1973, and the classification is done by a foundation instead of a government body and is widely accepted by both the government and the HE community (Carnegie 2000). The Carnegie Classification is not a ranking system. Rather, it is constructed to place all HE institutions in USA in appropriate categories. This classification system for separating research universities from the rest was adapted for India in a recent paper entitled 'Classification for Research Universities in India', written by three former vice chancellors/

directors (Jalote et al. 2019). This framework has been discussed in Chapter 2. To recap, the basic criteria for a university to qualify as a research university in India is:

Percentage of faculty with PhD >75 per cent of the total faculty and

The ratio of the number of full-time PhD students to the number of faculty >1.

These are reasonable criteria, and this is a suitable adaptation of the Carnegie Classification framework. A university that is focused on research must have research faculty. All over the world, research faculty predominantly hold doctorates. A hallmark of research universities is that they mostly employ as full-time faculty people who hold PhDs (Altbach 2007). Given that a significant fraction of the faculty in many universities in India do not possess a PhD, the criteria require that at least 75 per cent of the faculty have doctorates before the university qualifies to be considered as a research university. A reasonable expectation for a research university is that each faculty member has on average one full-time PhD student working with him/her—hence the second condition. As India's HE system is rapidly expanding, with so many new universities created within the last two decades, instead of PhDs graduated, it is better to include full-time PhD students, which also represents an investment in research, as full-time PhD students are paid stipends.

With such criteria in place, research universities can be separated out from the set of universities and institutions. This classification helped identify about 70 universities as research universities from the set of top 100 universities and top 100 engineering institutions per the Indian ranking agency, National Institute Ranking Framework (NIRF) (2018). This number is quite reasonable and comparable with the percentage in USA, and comparable in numbers with China and Korea. This number will increase with time, as it should, in an expanding system like that in India.

With research universities identified, they should then be assessed for their research contributions and capability and then be provided strong research support so as to help them reach global rankings. Funding for research universities is modest, as shown in Chapter 1, and needs to be enhanced; we discuss it further later in this section.

Research universities should be expected (and supported) to produce the majority of the PhDs in the country. In USA, just the top 50 universities produce about 50 per cent of the PhDs. The ratio produced by its research universities (which are less than 10% of the total) is probably over 90 per cent. In India, a large number of PhDs are produced outside research universities (as shown in Chapter 1). As research universities have the best capability for research, they are the ones that can produce the best-quality PhDs in the country. Hence, the effort should be to ensure that the bulk of PhDs are produced in these universities, with a modest number being produced in other universities (which can also allow some of them to become research universities in due course).

Trying to convert all universities into research universities is neither desirable nor feasible. While over time some universities in tier II can move to become research universities by suitably improving their research, the rest should continue focusing on education, and their mission should be to improve the quality of education at the bachelor's and master's levels and keep their educational programmes in line with new knowledge emerging in different subjects and disciplines. By expecting tier II universities to also do good research, their focus is unnecessarily divided, often leading to mediocre research and mediocre education.

The NEP also envisages such a three-tier system for higher education in India. It suggests that about 100 universities can be identified soon to form the initial set of research universities and these can be expanded to become large multidisciplinary research universities, having between 5,000 and 25,000 students each and producing a large number of PhDs. Over time, it feels, some from

tier II can move to tier I and the number of research universities may expand from 150 to 300. It recommends abolishing the affiliating college model and suggests that all colleges become autonomous, with full academic powers, particularly for the designing and teaching of courses and for assessment (NEP 2019).

10.1.2 Autonomy of Research Universities

Research universities are complex entities engaged in teaching, research and the third mission, as well as many other activities. They have a unique environment not found in other organizations. Moreover, they compete and collaborate at the global level with research universities across the world. These universities can only be run effectively if they have complete autonomy of operations (within the overall HE policies). If a country wants its research universities to compete at the global level, these universities should be provided as much autonomy as possible.

Autonomy implies that the university takes all decisions related to all aspects of its operations and its management. As discussed in the chapter on governance (Chapter 8), the university management can be viewed at three levels: top-level governance body, which makes policies and oversees their implementation; leadership, including the chief executive; and management and administration. Autonomy in research universities in India needs to be strengthened at the first two levels, as, generally, a fair amount of autonomy is already present at the management level. Research has shown that universities with a greater degree of autonomy and accountability and with competition perform better (Aghion 2010). The EU has taken up the cause of autonomy for universities and has developed a scorecard for autonomy to help (Eastermann 2015; Estermann and Nokkala 2009).

At top-level governance, the main body for overall governance is the board of governors (or equivalent), which we refer to as the board. The board forms all policies related to the university and is responsible for its effective functioning. Typically, the size and constitution of this board are specified in the act and statutes for

a university. Autonomy at this level means that the board should have all the powers to take decisions for the university, including the power to appoint its members (on expiry of the term of some of its members), and there should be minimal representation in the board from the government or government appointees.

A related issue is the selection of the chairperson of the board. The chairperson holds a crucial position, as he/she often represents the board, is empowered to take decisions on its behalf and is often the accepting authority for recommendations of the chief executive. With full autonomy, the board should elect its chairperson. Where some external body (e.g., the government) has to appoint the chairperson, the selection should be from a set of names suggested by the board (which can seek inputs from the faculty and other internal stakeholders) or a committee with strong board representation. It is essential that the chairperson is not an employee of the university and is independent from the chief executive.

Autonomy regarding the selection of the chief executive means that the chief executive is selected and appointed by the university itself. This will normally mean that the board of the university appoints the chief executive. Only if the board appoints the chief executive will he/she be accountable to the board. If the government makes the appointment, then necessarily, the chief executive is answerable to the government and not to the university. This aspect has many subtle ramifications. In the chapter on governance (Chapter 8), we discussed an existing model in a state university in India regarding how this autonomy can be provided to public universities. It is perhaps the foundation of autonomy that the leader of an organization is selected by the organization itself.

Public research universities must have financial autonomy despite getting financial support from the government. This is essential, as otherwise, financial support can become an instrument of impinging on the autonomy. Financial autonomy, with good accountability, is facilitated if formula-based funding is provided yearly for education. The formula to decide the level of funding could be based on the number of students in different

fields, or can include some other parameters also. Australia and UK follow this model for supporting education while providing full autonomy to their universities on the use of the funds. This approach of having funding based on the number of students also ensures an incentive for the university to expand its education and thereby be more responsive towards the needs of students. Importantly, a university gets committed funds for its educational function, so it can adequately run its education programmes from the funds it gets from the government for education, the tuition fee it collects and the other revenue it generates.

The NEP also recommends full autonomy of governance for universities. It recommends an autonomous board of a modest size with limited government representation and which has the power to appoint the chief executive, as well as to identify the chairperson. It also recommends that there be a transparent and fair method of funding HEIs so that they have predictability of finances and suggests that as the capability of these institutions develops, more and more financial autonomy be granted to them in terms of how they spend the funds.

In addition to funding for education, research universities need robust research funding. Research is expensive and has to be supported at global levels to reach international standards. Research funding has to come primarily from governmental sources, with some support from corporations. Funding for research is discussed further in the following section.

10.1.3 Research Funding for Research Universities

Research universities employ the best and most talented faculty who need to be compensated well. Moreover, to support research work, expensive research labs, high-quality computing infrastructure, a library, PhD students, travel support for conferences, and so forth have to be provided. While the government support for education can be reduced by increasing tuition fees, no such handle for research exists. Research must be supported in the universities by the government; private sector contributions even

in developed countries are very small and can at best be viewed as supplementing research income and making research more applied. In most countries, universities rely primarily on funding from government sources for research.

The level of research funding available to Indian universities is modest. An analysis of data of the top universities and engineering institutions (using the 2018 NIRF data) shows that the research grant per faculty in the top universities is about US$7,000 per year. In USA, the Carnegie Classification for 2015 (Carnegie 2016) identified approximately 330 research universities and grouped them into three categories: R1 (highest research activity), R2 (high research activity) and R3 (modest research activity), each having about one-third of the research universities. The R&D expenditure per faculty per year is more than US$300,000 for the R1 universities, about US$150,000 for the R2 universities and US$30,000 for the R3 universities. In the top 100 institutions in India, the R&D support per faculty is one-sixth of the R&D support per faculty in the R3 institutions, and less than 2 per cent of the support in top global universities. Even after considering the fact that manpower and some other costs are lower in India (though research equipment, international travel, digital library subscriptions, etc. all cost the same as in other countries), the level of expenditure and R&D investment is significantly lower than even the R3 category research universities in USA.

For India's top universities to be included among the top global universities, the investments in their research will have to increase substantially. For research universities to thrive, two types of research funding are needed:

- Long-term block research funding, based on the research performance of the university and
- Sponsored research project funding, granted based on proposals for research.

Long-term block funding is followed in UK and Australia with a great degree of success. This funding is given for 5–7 years based on

the evaluation of research contributions and impact. The universities have to improve their quality and quantity of research to get a more significant portion of this funding pie. Moreover, they get an opportunity to prove themselves and get rewarded suitably every 5 years or so. This is an excellent model, as it supports performance; better-performing universities get higher funding. This block grant also covers the overheads of the universities for executing research projects, which are not fully covered by the typically small overheads provided for in research grants, and provides support for research in areas for which grant funding may not be available.

The best practice for supporting sponsored research in universities is to have a system of giving competitive research grants to the faculty based on research proposals. This is a standard method being followed in almost all countries, including India. The challenge in India is that the overall funding for sponsored research is rather small. As shown in Chapter 1, on average, a university in the top 100 (per NIRF rankings) only gets sponsored research grants of about ₹2,000 lakhs in a year (approximately US$3 million). The total research funding available and the size of each project need to be substantially increased. It should be simultaneously ensured that for most PhD students, support comes from such grants; this will motivate the faculty to compete for such grants vigorously.

A vast system of competitive grant funding is essential for research universities to thrive. In India, the funding to universities comes as extramural funding from about 20 or so research agencies. As shown in Chapter 1, of the total research funding to these agencies, less than 10 per cent is extramural funding, of which universities get a significant share. In other words, more than 90 per cent of the government spending on R&D is spent by various research agencies, and less than 10 per cent goes to universities as research grants. This situation is vastly different from that in many developed countries (as discussed in Chapter 1), where research funding to universities from government sources is often more than that to other agencies. The extramural funding of each agency in India needs to be increased substantially to

increase the research funding available to universities. An increase in extramural funding can also facilitate more collaboration between the labs of these agencies and university researchers. Other ways to enhance R&D funding to universities can also be explored, for example, requiring government departments that can benefit from R&D to have an explicit research budget for sponsored research.

The NEP has clearly identified lack of research funding as a major area for improvement for the higher education system in India. It has recommended the formation of a National Research Foundation (NRF) which will have a substantial budget for supporting research in universities. It will set up divisions in four areas: technology, science, social science and arts and humanities. Research grants will be given based on peer review of proposals to support high-quality research based on merit. Besides supporting projects, NRF will also provide support for setting up centres of excellence in different universities, as well as provide support to those whose performance has been excellent. This aspect of supporting centres and excellent performance can easily be operationalized into performance-based funding for research for universities, as discussed earlier.

10.1.4 An Association of Research Universities

Out of about 900 universities across India, only some conduct good-quality research and publish in reputable international venues and thus may be considered research-intensive or research universities. The rest are largely teaching-focused universities doing little and potentially mediocre research. This situation is similar to many other countries in which only a fraction of the total universities are research-intensive. Earlier in this chapter, we discussed how research universities need to be separated and how they can be identified from the set of universities through some classification criteria.

Another challenge in the development and support of strong research universities is that no voice exists to represent the

interests of research universities. Research universities exist within the society and derive support from the society at large and give back to the society in a variety of ways while pursuing their academic missions. The health of public research universities is hugely influenced by the support from the government and the public at large. Due to this, they need a voice to communicate with the government and society about their role and contributions to the society and government and what is needed for them to thrive.

While each research university maintains an interface with the government and the public, an association of research universities is essential to ensure that there is a collective voice that represents the views of the research universities as a system.

Most advanced countries have such associations; in fact, many countries have many associations of universities. In USA, the Association of American Universities (AAU) is the most prominent association for research universities. Its members are 62 top research universities in North America (60 from USA and 2 from Canada). The mission of AAU, as given on its website, is that its member universities 'transform lives through education, research, and innovation…. seek to address national challenges and contribute to economic strength, …. educate tomorrow's leaders … help shape policy …. promote best practices in education…. contribute to American society' (AAU). The Association of Public and Land-Grant Universities (APLU), which has over 200 members, states on its site that it is a policy and advocacy organization for public universities in USA, with the mission 'to expand access …. deliver workforce of tomorrow…. advance and promote research to improve society, foster economic growth, and address global challenges…build vibrant communities …' (APLU).

There are other university associations in USA. For example: the American Association of State Colleges and Universities is an association of nearly 400 public colleges and universities; the Association of Jesuit Colleges and Universities has 27 Jesuit

colleges and universities in USA; and the Association of Catholic Colleges and Universities represents the collective voice of Catholic HE systems in USA.

In UK, the top research universities form the Russell Group, which represents 24 leading UK universities. It aims to 'help ensure that our universities have the optimum conditions in which to flourish and continue to make social, economic and cultural impacts through their world-leading research and teaching. We provide strategy, policy development, intelligence, communications and advocacy for our member institutions' (RussellGp).

University Alliance is a network of British universities offering technical education, professional training, R&D, enterprise and innovation. It covers about 20 per cent of all UK students and accounts for over a quarter of UK's research in engineering (UniAlliance). The N8 Research Partnership comprises eight research-intensive universities in Northern England (N8). Universities UK's members are chief executives (vice chancellors or principals of universities in UK), and as stated on its site, it 'is the voice of universities, helping to maintain the world-leading strength of the UK university sector and supporting our members to achieve their aims and objectives' (Universities UK). Moreover, its work includes advocacy, analysis, advice, and so forth. UK has other associations as well.

In Australia, which has only about 40 universities, the Group of Eight (Go8) comprises leading research-intensive universities in Australia. According to its site, Go8 'is focused on, and is a leader in, influencing the development and delivery of long-term sustainable national HE and research policy, and in developing elite international alliances and research partnerships' (Go8). The Australian Technology Network (ATN) is made up of four of the country's most innovative and enterprising technical universities, with a focus on industry, practical impact of research, industry-oriented education, and so forth (ATN). Innovative Research Universities (IRU) is a coalition of seven comprehensive universities in Australia. Its members' 'research focus is on the

translation and commercialization of research on issues of critical importance to the communities in which they are based and addressing problems of national and global scale' (IRU). Other associations also exist, including Universities Australia, which is the voice of universities of Australia, with most public universities being its member.

These countries have multiple university associations, each having members with some common views and each representing the collective views of its members. At least one of the associations is of the top research universities of the country, which represents the collective views of these top research universities to the public and to the government so that their collective inputs provide weight to the government policymakers. These associations have representations only from their members and not from the government, so they take views in the interest of their members. Also, they are largely financed by the membership subscription of their members.

Currently, India does not have any such organization of research universities. These universities have different challenges, and a general association of Indian universities, which is open to all universities, cannot represent these universities' views and can lead to pertinent issues of research universities not getting due attention from the government and policymakers. For such an association to be effective, this body should be kept modest in size so that it can work coherently. It should be self-selective, using clear metrics for inviting new members to join the association and for terminating the membership of existing members. Of course, it should only have membership and representation from chosen universities and should be completely independent of the government, as is the case with associations in other countries (e.g., AAU, Go8 and Russel Group) discussed earlier. Typically, for funding, these associations are run on membership subscription from its members and may also raise funds from other agencies. They should not get any regular government grant. How such an association can be started is discussed in Altbach and Jalote (2019).

Research universities have the highest-quality PhD programmes in a country. It is also expected that they produce the largest number of PhDs in the country. Like other education programmes, PhD programmes also need to evolve and improve with time, as discussed in the chapter on PhD programmes. While institute and programme accreditation are instruments that can be used to assess and improve institute governance and undergraduate programmes, they typically do not look at PhD programmes carefully, as they are quite distinctive and different from other education programmes. USA and Australia have an association of graduate deans, which discusses issues related to PhD programmes. The association of research universities in India can form this type of a committee of its deans to spearhead changes needed in the PhD programme in the country. It can look at various good practices in research universities to evolve useful frameworks for managing and organizing PhD programmes so that the quality of PhD graduates improves with time. Frameworks created by an association of research universities are likely to have strong credibility and can help other universities also in improving their research and PhD programmes.

10.1.5 Professionalize the Administrative Functions of Universities

A university typically employs a large number of non-academic staff for managing different aspects of its operations. Often, the staff size is as large or larger than the size of the faculty. The staff provide critical support for key functions of the university. Academics management itself is typically quite large, with staff needed to manage records, provide guidance to students, issue transcripts and other records, address student concerns, help in organizing thesis evaluations, address faculty concerns regarding classes and tutorials, provide support to faculty for exams, and a host of other activities. Student-life management is another important and often a large function dealing with student hostels, facilities for student clubs and other activities,

dining facilities and other support to student life. Human resource management in universities is also very different from that in corporations and is rather specialized. Also, some other functions such as fundraising and alumni relations, which are very specific to universities, are quite specialized and require a considerable amount of domain knowledge about HE and its operations and management.

To develop properly trained people for managing university operations, the higher education departments in many universities in USA offer master's and PhD programmes in HE administration. The goal of the master's programmes is to shape professional staff for different functions in universities. A typical master's in higher education administration has courses on academic advising, alumni relations, sports administration, enrolment management, financial aid, government and community relations, student support services, study abroad, policy research and analysis, and so forth. In addition to the courses, it provides experiential and hands-on training through internships and assistantships, during which students work in the university itself and get to practise what they have learned and experience the concepts in practice. Several universities offer such master's, including many of the top universities.

A good fraction of a university's staff in USA, particularly in specialized university functions, have a master's in HE administration. Many of them may start a job in a university and then do the master's part-time, building the competencies and knowledge that help them in their career advancement. Also, professional bodies of HE administration professionals exist that organize conferences and meetings, further promoting and developing the profession of university administration. Many university staff positions, in their advertisements, clearly state that preference is given to candidates with master's in HE administration.

Similarly, many postgraduate courses on educational leadership and administration (names vary) are offered in UK. The goal of these programmes is to prepare future leaders and

administrators, and past graduates have gone on to make careers at universities in UK and across the world, as well as in many other sectors. Australia also has many master's in education leadership programmes.

Currently, in India, such programmes are missing, and most of the staff in universities have general degrees in a variety of disciplines. They learn about the profession of university administration on the job, as they have little prior knowledge about the profession or competencies required for the profession. Lack of professional associations for the administrative staff leads to the staff not being able to share good practices and discuss challenges and issues facing the profession. Moreover, lack of professionalization has also led to most of the management functions, often even routine ones, being handled by faculty, thereby effectively wasting the talented faculty's time over such tasks when their focus should be on academics.

For a large education system like that of India, it is desirable to treat university and college administration as a profession and have educational programmes that can build suitable competencies, so that HEI administration can be considered as a career option after graduation. Also, professional bodies should evolve, which can strengthen the profession. Having education programmes and professional bodies for university administrators can go a long way in improving the management of universities. It can also help reduce the administrative load on faculty, which will be an added advantage.

Such programmes must be offered in reputed universities so that the students can also do internships in the university and experience the profession in practice. Such degree programmes can be suitably recognized and given weight in appointing staff in universities and colleges. Part-time options should be provided for the currently working professionals so that they can upgrade themselves for more leadership roles and improve their effectiveness. PhD programmes should also be started, so that people seeking to become administrative leaders, such as registrars or

even principals of colleges, can have their highest degree in HE, rather than in some non-related discipline, as is currently the case.

10.1.6 Create Some Large, Multidisciplinary Research Universities

As discussed in Chapter 1, a comparison of the top 200 universities and engineering institutions in India with the top 200 institutions globally revealed that the top Indian universities are much smaller in size. The analysis showed that 90 per cent of the top 200 universities globally have more than 10,000 students and 1,000 faculty, and only 2 per cent have a faculty size of less than 500. In India, it is very different; more than half of all institutions have a faculty size of less than 500, and only a few have a faculty size of more than 1,000 (Jalote 2019).

Broad-basing universities to become comprehensive universities has now become a trend worldwide. This trend is visible in many countries, and institutions that started with a narrower focus (e.g., on technology) have over the past couple of decades expanded their scope and become multidisciplinary universities. One can view a comprehensive university as one with departments in various disciplines of natural sciences and mathematics, social sciences and humanities, and also in various applied fields, such as engineering, business, law, pharma and medicine. The prevailing wisdom is that for conducting impactful research, a university needs to have expertise in many fields and disciplines, as the important research problems in the current times and in the future will require expertise from various disciplines to be satisfactorily addressed. Although different universities can theoretically achieve interdisciplinarity with narrower but complementary fields of strength, it is far more challenging and often impractical for different universities to collaborate effectively. Collaboration between faculty of different disciplines is facilitated if they are in the same university and share the same governance systems, space and other systems.

In India, the HE system has grown in terms of creating a large number of smaller and more focused institutions. Smaller institutions are easier to manage and easier to create and support. Although having smaller and focused educational entities can have advantages and not all institutions need to become large, there is a need for some of the top institutions to become multidisciplinary and global in size. This can be achieved through creating such universities; however, it is a much slower process, and such large multidisciplinary research universities might come up only after a decade or two.

A more pragmatic approach is to motivate some of the top universities and institutions to become large and broaden their scope. Many of the top universities/institutions have a faculty strength close to about 500, and some of these can be challenged to expand their faculty strength to more than 1,000 within the next decade. Many of the top universities/institutions have vast land area, though it will have to be redeveloped heavily for such growth. Such an expansion of research universities will require tremendous resources, not only to build the infrastructure for handling the large size but also to redevelop the existing infrastructure. It should also be understood that the existing models of governance and organization within the university might need to change to support the size.

Examples of converting focused institutions into broad-based research universities can be found across the world. For example, Georgia Institute of Technology started with a single degree in mechanical engineering and then expanded to start degree programmes in a few other engineering disciplines such as electrical, civil, textile and chemical. As late as till 1988, it had only three colleges: the College of Engineering, the College of Management and the College of Sciences and Liberal Arts. Today, it has six colleges, with 28 schools (departments), most offering undergraduate programmes in their discipline. It has over 25,000 students and is considered one of the top universities in USA and is highly ranked globally. A more recent example is

that of Nanyang Technological University (NTU) in Singapore. It started as a teaching university in 1981, with programmes in three engineering disciplines: civil and structural, electrical and electronic, and mechanical. It is now a broad-based university with colleges in engineering, business communication and information, education, biological sciences, humanities, social sciences, physical and mathematical sciences, art, design and media, and so forth. It now has a host of research centres and institutes, many in partnership with industry.

The NEP has also noted that India has too many small and narrowly focused universities and has suggested this approach for broadening and expanding some of them. It envisages, in the short term, about 100 universities being identified, which can then be supported to become multidisciplinary and large research universities with 5,000–25,000 students. Later, more universities can be identified and gradually moved to this group of research universities.

A more difficult, but possible, approach is to try merging some colleges and research labs in an existing university. Though this has all the challenges mergers bring, this can immediately expand the size and scope of the university. As discussed in Chapter 1, the merging of educational institutions has been done in many countries, and one main reason for merging is creating large, multidisciplinary research universities. China has perhaps had the largest number of mergers in recent times; in the last 25 years, it has had about 400 mergers, involving about 1,000 public HEIs in its attempt to move from specialized HEIs to having larger, globally competitive comprehensive universities (Aziz et al. 2017).

Australia followed this approach in its Dawkins reforms, which were started in 1987. Under these reforms, an amalgamation of colleges and institutes of education was done, some with the existing Australian universities and some through creating new universities. One of the explicit goals was to create a larger, more comprehensive university formed out of an amalgamation of various more narrowly focused HEIs with different goals.

Griffith University is an example where many HEIs were merged with Griffith over a few years to create a large research university. As a result, within a few years, Griffith transformed from a university of about 4,000 students and a single campus into a multi-campus university with more than three times the number of students and with a range of academic programmes. Currently, Griffith has five campuses in three cities and over 50,000 students, and is one of the topmost research universities in Australia.

QUT (Queensland University of Technology) is an example where mergers facilitated the creation of a new university. It was established as a university by merging two main educational institutions, the Queensland Institute of Technology (which itself had evolved from various institutions earlier) and the Brisbane College of Advanced Education (which itself was a combination of multiple institutions focusing on teachers' training and advanced education). QUT currently is one of the top research universities in Australia, with more than 40,000 students, two main campuses in Brisbane, offering hundreds of degree programmes at all levels, and strong research in many fields. It is ranked among the top global universities.

A recent example is that of the University of Paris-Saclay. It was the result of an ambitious project to create a large university that would be among the top universities in the world. It was in response to the relatively weaker performance of French HEIs in the global rankings. It brought together many autonomous and prestigious institutions, including two universities, 10 *grandes écoles* (professional educational institutions in engineering, life sciences management, and so forth) and seven national research institutions. The government has allocated more than ₹6 billion for the project. For planning, they had the ex-president of Caltech as the advisor for this project. The university now has about 65,000 students from over a hundred countries and over 9,000 research professors. It is already ranked well globally. France has other such projects, mostly in large cities with multiple institutions engaged in research and HE.

In India, we have experimented with breaking up large institutions into smaller institutions, perhaps to make them more manageable. It is worth experimenting with the merging of some professional educational institutions (in engineering, management, pharma, law, and so forth) with some research labs, and maybe some colleges. Of course, suitable planning and care have to be taken to only merge institutions that have a research focus and culture, and detailed planning must be done on a case-by-case basis. There cannot be any general template for merging. Institutions in major cities can be examined to evolve suitable plans of amalgamating some. This type of merger can also unlock the potential of the land they currently occupy. Such an alliance can create large universities that can make it to global levels within a decade.

10.1.7 Develop Some Higher Education Research Centres

HE itself is a subject for research. Many top-quality international journals on HE are present, and many universities have research centres on HE. Also, a large number of books on various aspects of HE are available. The breadth of the research is quite extensive; research areas include doctoral training, financing of HE, education and learning, role of HE in innovation and economic development, research and its impact, changing nature of academia, sociology of academia, and so forth.

As HE is an object of research, countries such as UK, USA and Australia, which have highly reputed and large HE systems, have research centres working on HE. A couple of examples of HE research centres in a few countries are as follows:

- **Australia**: Centre for the Study of Higher Education, Melbourne
- **UK**: Centre for Higher Education Studies, University College London; Centre for Comparative and International Education, Oxford; Centre for Higher Education and Equity Research, University of Sussex

- **USA:** Center for 21st Century Universities, George Tech; Center for Studies in Higher Education, University of California, Berkeley; Stanford Institute for Higher Education Research, Stanford; Center for International Higher Education, Boston College

Most of these research centres are present inside a university. Research centres on HE should be housed in universities whose primary mission is education and research, so that the university itself can provide the data and information and platform for analysis and research in HE. Research universities also support a culture of research. (Stand-alone and separate institutions for HE research are also useful; some of these are also present in these countries.)

In India, no major university/institution has a research centre on HE. (The National Institute of Education Planning and Administration is a stand-alone institution for providing analysis and data for policymaking to the government.) Hence, while India has one of the largest HE systems in the world, HE remains a highly under-researched field. Although the governments (central and state) invest so much on education, hardly any investment has been made for HE research. It should be noted that, unlike science and engineering where knowledge is global and applies universally, research in HE is, by its very nature, contextual. The HE system of India is like no other country's system, and the needs and evolution are very India-specific and do not follow the trajectory of those of any other country. Therefore, if we are to better understand our past in HE so that we are better prepared with research and analysis for improving the efficiency, effectiveness and reach of our HE system, we need to conduct serious research on it and cannot rely only on global research in HE.

For this, we must establish a few HE research centres in different parts of the country in reputed research-focused universities/institutes and charge these centres to build research competency and suitable research manpower and conduct research on HE in the country, as well as on the global HE context and trends. We

invest so much in HE; we must invest a small percentage of that on HE research to get better returns on our HE investment and to protect our future. These centres can then also help in running professional educational programmes for developing administrative human resources, as discussed earlier.

10.2 FOR RESEARCH UNIVERSITIES

We now discuss some of the initiatives that existing research universities can take to become stronger and improve their standing in the global association of research universities. Although the ecosystem and the policy framework support research universities, they cannot take a university to greater heights. The university has to leverage the available support from the government and ecosystem to strive for excellence in research and education, for which it will need suitable practices in place. In this section, we discuss a few initiatives that an individual research university can take by itself.

10.2.1 Strengthen Research Culture and Ethics in the University

Although sufficient resources are essential for research, a supportive and thriving research culture is indispensable to achieve excellence and higher research productivity. Universities having a strong culture of research will be more productive and conduct more impactful research than others, even with the same level of resources.

The research culture of a university refers to the set of beliefs, values, attitudes, practices, customs, and so forth of the institution that support and promote research. Strengthening the research culture will require a strong commitment to excellence from the administration, faculty and research scholars, and it will take sustained efforts. Many examples in India and across the world can be cited where a flourishing research culture degenerated to one where mediocrity thrived. The various structures and

stakeholders of the university have to be vigilant to preserve the culture and avoid the temptation of taking expedient steps and decisions that might avoid immediate unpleasantness but can damage the research culture.

The issue of building a research culture was discussed in the chapter on research management. Some of the key characteristics of a strong research culture include the following:

- **Expectation of high-quality research.** Only if the expectation is high quality and excellence in research can a university expect that its researchers will try to achieve it. A key challenge in countries such as India lies not only in articulating the expectations but also in aligning the policies and practices with these expectations. Sometimes, expedient decisions are made that can hurt the research culture. For example, if some faculty members with mediocre records are promoted, it becomes a benchmark for future decisions and drives the expectations towards mediocrity. In such a situation, excellence survives only due to individual commitments and drive.
- **Encourage collaboration.** Many big challenges require multi-disciplinary inputs for addressing them. Also, societal issues never align neatly along discipline boundaries. For many research challenges, researchers must work together to make a substantial impact. All these mean that collaboration between faculty within the department and across departments must be actively encouraged and promoted to have a vibrant research culture. While this is easy to state and understand, facilitating such collaborations needs suitable policies and encouragement. Appropriate policies and support/incentives for interdisciplinary projects or multi-researcher projects can help in promoting collaboration.
  Collaboration can also be facilitated if there are spaces and opportunities for formal and informal interaction on academics between faculty from different disciplines. Such interactions are even more important for interdisciplinary research. Informal and relaxed academic discussions are known to

lead to research ideas. Such interactions will thrive only if researchers are free to express themselves and raise doubts and questions without feeling judged. A key difference between an active collaborative research culture versus one with a low level of collaboration is in what faculty discuss during these opportunities to meet and discuss. In the latter, mostly, other topics are discussed (e.g., politics of the country, world, university, etc.), while in the former, often, discussions will be about research-related issues, which may start over a cup of coffee or lunch and then carry on.

Collaboration with global colleagues is equally important. Research articles with authors from multiple countries are often cited more. Also, the pursuit of science and knowledge has been a global endeavour always. Hence, a university needs to have its faculty as part of the global community of scientists and collaborate with them.

- **Active sponsored project programmes.** Faculty must be motivated and incentivized to compete externally for getting research grants. Applying for sponsored projects and trying to get grants must be an important part of the research culture and is a feature that is common to all research universities. This should be ensured by providing good support for getting and executing projects and suitable policies also. For example, even if it is possible for a university to support more PhD students from its own funds, it should promote supporting most of the PhD students through project funds. This will motivate the faculty to apply for research projects.

- **Rewards for good research.** Good research in a research university should be rewarded and recognized. Recognition and celebration of research can strengthen the culture and importance of research. Without recognition, research excellence might not be sustained, and those who are excelling may move to other environments that recognize, respect and value excellence. The incentives for research excellence should be a combination of prestige and recognition, extra support for the faculty member's research, compensation, and so forth.

- **Good work ethics**. It is almost impossible today to have significant research contributions with only a modest effort. Hence, a strong work ethic of putting in sufficient effort in research endeavours is an essential component of a good research culture. This is extremely important in universities, because faculty members are autonomous agents with a great deal of freedom, and their efforts are never measured. In such a system, it is easy to slide into a minimal-effort zone, making only as much effort as required to perform at an acceptable level of academics. Hence, the university and the faculty have to be vigilant to ensure that the work ethic is supportive and hard work is cherished and respected.
- **High-quality and large PhD programmes.** A thriving PhD programme is indispensable for having a healthy and vibrant research culture. An extensive PhD programme with full-time PhD students, whose only goal is to do PhD and research, will ensure that faculty are also actively engaged in research. However, it is also essential that the rigour and quality of the PhD programme are maintained and high expectations from PhD scholars are established. This was discussed in more detail in the chapter on PhD programmes (Chapter 6).

Although a high level of research activity is needed, it is also essential that ethics for research be followed scrupulously by all researchers in a university. As research is the pursuit of truth, it is even more important that high ethical standards be maintained. The research community and the government have evolved various frameworks and codes for ethical research. These codes cover the full life cycle of research, from the selection of problems to conducting research and publishing research results. We have discussed research ethics in the chapter on research management (Chapter 4). The entire research community in the university should be sensitized about ethical conduct, and ethical practices should be followed as part of the research culture.

A university should provide support for ethical research in the form of workshops, training, lectures, and so forth. Besides,

a scientist might face issues that he/she cannot solve because of a resultant conflict of interest, for example, whether an experiment they want to conduct with human subjects is acceptable or not. In such cases, an approving body is needed which can determine rules to ensure that approval for a research work is given only if it complies with their standards without any violation of the ethical guidelines. These committees are generally referred to as institutional review boards (IRBs). IRBs are present and functional in most research-based institutions to ensure that research is conducted safely and ethically. Besides the IRB, an institution also needs mechanisms to investigate claims of unethical behaviour that may be brought to notice and, based on the investigation, determine responsibility and recommend a course of action. Universities generally use committees for this purpose, which are often constituted based on the nature of the claim.

10.2.2 Establish a Teaching and Learning Centre and Focus on High-Quality Education

In the pursuit of research, there is a risk that education might get ignored. As research universities are prestigious and well-ranked, top students will always vie to get into them. These students need to be prepared well in their education programmes to take on leadership roles in the future. Given the highly selective intake of these universities, it is essential to have dynamic and contemporary programmes that are sufficiently challenging and which develop the capabilities of the young students who enrol.

Education is what the society and government expect from universities, including research universities. In fact, the expectation on education from research universities is even higher, given that significantly more public funds are spent on these universities. As discussed in the chapter on education, research universities are expected to provide leadership in education to the whole country. This can only be done by providing the best education possible to the students in the university.

Higher education has been shifting its focus from teaching to learning over the last few decades. Earlier, with smaller classes and a much smaller HE system, a teaching-led education sufficed. Universities decided what should be taught overall, and teachers often decided what was to be taught in a course and generally did a sincere job of teaching. Smaller classes allowed attention to individual students and the ability to help if a student faced difficulties. Also, the expectations on what was learned by a student were modest, as the world which employed them was simpler. In fact, often, the graduates were 'over-educated' for the jobs they took up after their education.

The situation is very different now. Due to the massification of HE, class sizes are much larger now, not permitting individual attention. The world has become much more complex, and the skills required to be effective in the workplace are more sophisticated and multidimensional. This situation often leads to the situation where what is learned in HE by students is not sufficient for working in the real world. Consequently, demands regarding what students learn in educational institutes have soared, and the focus of education has shifted from teaching to learning by students, with the learning outcomes and graduate attributes being driven mainly by the workplace of the future. In this changed scheme of things, it is indeed essential to understand that learning is the goal of education, and effective teaching has to ensure that students learn what they are expected to in a course.

A teacher teaching a course on a subject needs two basic competencies for effective teaching: subject matter expertise (SME) and an understanding of effective teaching techniques. SME is necessary (though not sufficient) to teach a subject in a manner that students can learn that subject. A teacher who himself/herself has a limited understanding of the subject cannot be expected to teach the subject well. Till recently, and even now, in many universities, SME was considered sufficient. Consequently, faculty members with the most advanced degree, that is, a PhD, were recruited even in universities that did not have a strong research agenda. It was believed that a teacher with SME, which he/she

must have obtained by doing a PhD, would naturally do what was needed in a class to ensure learning by the students.

While this approach sufficed when learning expectations were modest, and indeed has served well for many decades, it is not sufficient now. For advanced learning by students, teaching has to be much more than 'brilliant lectures by experts'. This is what effective teaching techniques focus on—what a teacher can do to ensure deep learning by the students.

Though the set of techniques that can lead to effective teaching is evolving, and it remains an area of research, some of the methods (e.g., active learning) are now well established. The knowledge of and use of effective teaching techniques by a teacher can lead to good learning outcomes in students. In fact, one can say that even with good SME, without employing effective teaching techniques, the learning outcomes achieved will be modest. Universities are filled with examples of such professors who have SME and conduct good research but are not good teachers. In research universities, the faculty members have good SME, as they generally have a PhD from a good university and a good background. These institutions, if they want to improve the quality of their education, can focus on improving the capability of its faculty in effective teaching.

Many global universities have established a teaching and learning centre (TLC, which might be called teaching excellence centre, or centre for innovation in teaching, or some other name) to improve the knowledge and capability of faculty in effective teaching techniques. The key goals of these centres are to help faculty members in making their teaching more effective and to conduct research in HE effectiveness. Even universities with the most talented faculty, for example, all the members of the AAU (which are the top research universities in North America), have such centres, which clearly shows that expertise in a subject matter is not sufficient for effective teaching. In UK, some time back, considerable investments were made to develop over 70 Centres for Excellence in Teaching and Learning.

Most such centres have short training programmes for the faculty, perhaps a few modules focusing on topics such as learning theories, student motivation, learning outcomes for courses, designing courses and experiences, effective lecturing and active learning. Most of these modules have a few sessions that might be conducted over a few weeks, that is, the time involved in the learning of these topics by faculty is quite small. Often, a certificate is provided on the completion of a module. These centres often have staff who have degrees and experience in teaching and learning, though faculty from other disciplines might also join as an adjunct of part-time members of the centre. Besides offering these training modules, such centres might also provide one-on-one help and guidance to faculty, arrange for the videotaping of lectures and/or teaching observations in class by experts, arrange workshops and seminars for sharing good practices and forming a community of faculty wanting to improve teaching, and so forth. They also study the effectiveness of these programmes, for example, by checking if the teaching feedback for faculty improves after these modules. Evidence indicates that, indeed, such modules help the faculty be more satisfied with their teaching efforts and help their student evaluations improve.

One of the key challenges in training faculty in effective teaching techniques is to make them realize that their teaching can improve with the application of some techniques and with a better understanding of the teaching and learning process, and to make them attend these programmes to learn these concepts and methods and apply them in their teaching. A couple of approaches are employed to overcome this. One method is to make it mandatory, but this can be done only for the incoming faculty. Another approach is to favourably consider the achievement of these certificates for teaching modules in the promotion process. Of course, the most effective method to motivate the faculty to take these programmes is to demonstrate the effectiveness of these programmes, so that the faculty members want to attend them, as all teachers fundamentally must want to be more effective in their teaching.

The role of these centres is increasing rapidly, with online learning deployed by many universities. The centres have, in many places, expanded their scope to include new technologies and innovations as part of their agenda. Most are also conducting research in effective learning and teaching. Some of them also have graduate-level programmes. Overall, it can be asserted that a research university, which is expected to take leadership in education, should have such a centre.

This area is, unfortunately, virtually ignored in India, and well-respected research universities need to take leadership in this area by establishing such centres. It should be clear that such a TLC must be set up within a university, as it requires access to students, faculty and the actual teaching and learning process. Research universities are eminently suitable for having these, not only to improve their education but also to conduct research on effective teaching, particularly incorporating the local context and attributes of the local learners. A TLC can also provide suitable training to PhD students for preparing them for taking up the role of next-generation faculty. Research universities have large PhD programmes, and also the most prominent source for next-generation faculty, and can leverage a TLC for suitably enhancing their PhD programmes. A TLC in a region in a respected research university can also become a resource centre for that region, helping other colleges and other universities, which might not be able to set up such centres, in improving their teaching and learning practices by transferring the knowledge and best practices. The NEP has also recommended a strong focus on quality education and the establishment of centres in universities to help in the continuous professional development of faculty, particularly for teaching.

Some of these centres may have a broader scope of being research centres for higher education. As discussed earlier, HE itself is a subject of research, and developed countries have a few centres in universities that conduct research on HE, in addition to performing the functions related to effective teaching techniques. Some of the major universities can seek support to establish such centres.

10.2.3 Strengthen Internationalization

HE and research were globalized centuries before globalization became a buzzword. Scientists and scholars travelled to knowledge centres across the world to study and share knowledge. For example, ancient universities in India hosted scholars from around the globe much before modern universities started emerging. The movement of scholars and sharing of knowledge across countries have been an important part of the development of civilizations.

However, the global movement of students in larger numbers became regular and systemic mostly in the previous century. This exchange has only accelerated in this century. This movement has mostly been students from lesser-developed countries going to developed countries with a high-quality HE system. While earlier the movement of some of these students was facilitated by richer countries through scholarships to help development in lesser-developed countries, currently, much of the global movement of students is viewed by universities and governments as an issue of trade and economic development (Rizvi 2011). In fact, in Australia, HE is the third largest export industry.

While often the discourse on internationalization revolves around the movement of students across countries for HE, internationalization for universities takes place at multiple levels. The main ones are international collaboration for research, exchange and visits of faculty, admission of students from other countries in education programmes and student exchange. For a university, reasons for engaging in these can vary, and the reasons of Indian universities might be different from those of universities in developed countries. Currently, in India, internationalization is playing out mostly in the form of Indian students going abroad for higher studies—referred to as Mode 2 of internationalization in Kapur and Mehta (2017). However, research universities in India are in a good position to enhance their engagement in many or all of these.

Regarding research, there is a broad agreement that transnational research collaborations are advantageous and much needed. A key argument for this is that many problems facing the world now are global in nature, and hence collaborative research efforts across countries, involving scientists from diverse cultures with a better understanding of impact in their countries, are more likely to evolve suitable approaches and solutions. Such collaborations also help deepen understanding across countries and are broadly in alignment with the paradigm of a globalized world. Consequently, many countries promote collaborative research, and many universities in these countries are vigorously pursuing international collaborations for research. Growing evidence suggests that the volume of transnational collaboration in research is increasing; in all the top research-producing countries, the fraction of papers published with at least one author from a different country has been increasing.

Besides benefits at the national and global levels, international collaboration has many advantages at both the individual researcher level and the university level. At an individual faculty level, international collaborations can help increase access to expertise, specialized equipment, data sets and cultural and social environments; participate in global scientific networks and stay on top of the latest developments; tap the bilateral or multilateral funding opportunities; raise international visibility, which is sought by all researchers; increase research productivity and quality; and so forth. Internationalization of research can also help a research university in multiple ways. It can provide a method of augmenting the research capabilities and facilities through partnerships and collaborations and enhance the global visibility of the institution. It can also help in improving a university's global ranking, as such rankings consider internationalization as a factor. Overall, for research universities, it is valuable to engage in international collaborations for research and evolve mechanisms to facilitate their faculty.

Reasons for the exchange and visits of faculty include all reasons discussed earlier, as these visits are likely to lead to

research collaborations among researchers. In addition, such visits facilitate the exchange of ideas about education, as visitors often actively participate in teaching and can help the research culture of the university by learning about the good practices in the visitor's country. Through formal and informal discourses on education, good practices from a visitor's countries get shared, and the visitors may take back practices from the host to their home country. These discourses also help in developing a better understanding and appreciation of other countries and their systems. However, supporting visits for international collaboration, both for faculty visiting outside and external faculty visiting the university, is challenging and requires resources, proper facilities, support for visa, and so forth.

One possibility for international research collaboration is to have joint PhD programmes with universities in other countries. Many of the top universities in the world are now open to such programmes, and many already have partnerships with some Indian universities. Typically, in such a programme, a student has a supervisor from both institutions, and the student is required to spend 1–2 years in the partner university also. Such a programme, while enriching the PhD programme of the university, also helps in reducing the migration of students to other countries for PhD by providing them an exciting collaborative PhD. It also helps expand the PhD guidance capability of a university. A key challenge in such programmes is to find financial support to encourage the visits of faculty, so that they can identify problems to work on jointly, based on which the PhD students can later work, and to financially support the student to spend time in the partner university.

Movement of students to another country for HE has, for India, generally been a one-way movement—students from India go to a host of developed countries for HE. It is the movement in the other direction that research universities in India need to apply themselves to. This movement is currently minimal. Carefully designed programmes need to be in place to initially encourage students from other countries to come and do their postgraduate

degrees in India. It is unlikely that these students will come from countries having highly evolved HE systems, but it is quite feasible to evolve programmes to attract students from some other developing countries (e.g., those in Asia and Africa). However, these programmes have their own challenges. The university has to learn to host these students and take care of their well-being (besides education). This might require not only suitable infrastructure but also the sensitization of domestic students and healthy interaction among the foreign and domestic students. Many subtle cultural and diversity issues come up when foreign students are present on campus. These issues should be resolved, and in the process, should enrich the university and make it more global.

Finally, student exchange between universities is an approach where students from one university visit another university, typically for a semester or a year. It is expected that, broadly, the number of students in both directions should balance out. Globally, student exchange has been an accepted approach for students from one country to spend significant time in another country. Student exchange programmes have not picked up to any significant level in India. Students face challenges in both directions: students going from India might find the cost of living too high, and students from overseas might find the overall infrastructure inadequate for them.

Support from the government will be needed for facilitating internationalization by universities, particularly for visas and for financial support for some of the schemes. The NEP has also recommended the internationalization of universities and encourages collaboration between institutions across countries for joint programmes, student and faculty exchange, etc., as well as attracting students from other countries to India for higher education.

10.2 4 Strengthen Autonomy

We have discussed the autonomy of research universities earlier in the chapter as a desired change from the overall HE

policies and ecosystem. We have discussed the key aspects of autonomy—what authorities a university should have to be more autonomous. While the degree of autonomy a university enjoys is constrained by the HE system (and the act and statutes of the university), the university also plays a role in it. As mentioned in the chapter on governance (Chapter 8), the autonomy of a public university is a source of tension between the state and the university. The university should ensure that the full degree of autonomy provided is exercised. Often, autonomy is eroded by universities themselves, for example, by their not fully exercising the authorities provided (e.g., to be 'safe') or by heeding to directives in matters that fall within the purview of the internal governance of the university. Research universities should attempt to exercise as much autonomy as possible and keep pushing the boundary to get more autonomy. It may be desirable for research universities to also lobby the government and HE regulators for enhancing the level of autonomy. An association of research universities (discussed earlier in the chapter) can do this more effectively than individual universities.

10.2.5 Increase the Size and Scope and Encourage Interdisciplinarity

As discussed in Chapter 1, globally respected research universities are mostly large. A large university, along with a broader scope, supports research, particularly interdisciplinary research. In India, most universities tend to be small, as discussed in Chapter 1. For many research universities, it is important to be larger and have research activity in multiple disciplines. This helps the research activity in multiple ways. We have discussed this issue of size earlier in this chapter as an initiative of the HE system to develop large research universities. While a push from policymakers can help, a push is also desirable from some research universities themselves for expanding their size.

For research universities, growing in size will require a significant amount of funding. For public universities, this funding

mostly comes from the government. While the government's policies have traditionally been towards creating small universities that are perhaps easier to manage, growing in size is also dependent on the university. Research universities have generally shied away from growing in size. While growing to an internationally competitive size will require substantial changes and may require newer internal governance structures (e.g., instead of the flat hierarchy that currently exists, another layer of governance might need to be added, as is the case in most research universities in the world), the top universities and institutions in India are capable of doing the needful for this, with experiences from across the world on how to manage large research universities helping them in this endeavour.

The importance of multidisciplinary universities and research in the Indian HE system has been emphasized in the National Education Policy (NEP 2019), as well as in other writings (e.g., Chandra 2017; Hatakenaka 2017).

10.2.6 Prevent Faculty Complacency

The complacency of faculty is perhaps the most critical impediment in achieving greater success in research in Indian research universities. Faculty are at the core of research activities, and all research is effectively driven by faculty. Therefore, if faculty are complacent and satisfied with their modest achievements and do not have the drive to pursue bigger research challenges, there is no hope for the university to excel. Complacency often starts with senior faculty, who might slow down or stop pursuing research. As in a mature university a vast majority of the faculty might be at the professor level, where they spent almost two-thirds of their tenure as faculty, complacency at the senior faculty level is hugely detrimental. It also establishes undesirable messaging to the junior faculty about the possible trajectories of their academic career.

Faculty complacency is the main source of underachievement in many top universities. In many top universities in the country,

faculty at the entry level are often at par with their peers in globally respected universities. Yet, a decade or two later, the trajectories of the faculty in globally ranked universities and those in Indian universities often diverge substantially, and achievements and research contributions vastly differ.

If there is one drive that a research university needs to embark upon, it is to do whatever is needed to ensure that complacency among its faculty is prevented. This issue can be addressed in multiple ways; some of these have been discussed in the chapter on faculty management (Chapter 7). However, in an existing university, implementing any of these will require a change in the culture and the existing scheme of things, which is always a big challenge. The challenge is heightened by the fact that the appointment of the chief executive is often made by the government and is typically for a term of 5 years, perhaps too short to bring about the substantive changes that will be needed to address faculty complacency, and certainly too small a period to see the effects of the changes proposed.

One clear approach to help in preventing complacency is to ensure that all faculty members submit a report on their annual contributions and that feedback on the contributions is given to the faculty through a due process. As discussed in the chapter on faculty management (Chapter 7), just having individual faculty members prepare a good annual report has advantages. If a review of the contributions is done, it can really go a long way in helping prevent complacency. While review and feedback themselves might suffice, their impact can be further strengthened if some, even small, incentives are granted when a faculty has had a highly productive and successful year; the positive reinforcement can motivate the faculty to remain vigilant and continue to aspire for good academics. Some other approaches for preventing complacency are discussed in the chapter on faculty management (Chapter 7). These include having a tenure system, having a large PhD programme, supporting international collaboration and ensuring teaching–research balance.

10.2.7 Enlarge the Third Mission

With the first two missions of education and research, universities engage with society by developing educated human resources, who then contribute to the society through the roles they take up and by generating knowledge that is used by corporations to enhance economic activity. The third mission of a university is broadening its traditional missions to also include activities to directly engage with various stakeholders to contribute to economic growth and social progress, in other words, deliver economic benefits to host societies, through engaging in innovation, entrepreneurship and technology transfer activities, and social benefits, through more outreach programmes. The third mission of research universities was discussed earlier in Chapter 5.

Universities across the world are embracing the third mission in a big way. They hope to not only make a direct impact on society and economy and continue to be agents of change but also generate revenues. It is appreciated that innovation and knowledge is no longer just a resource for economic growth but also an engine of growth. Universities with their strength in knowledge creation and innovation are well positioned to participate.

The pace of change today is faster than ever before. The economies of countries are changing, and new companies are being formed and rising with amazing speed. The new economy is based largely on innovation to create new goods and services and to improve the existing ones. Hence, governments want their countries to be innovative. As research is fundamental to innovation and as research universities have research capabilities and a combination of young students and mature faculty, countries are looking to universities to drive the innovation engines by directly participating in innovation, starting new companies, transferring their knowledge to existing companies, and so forth.

Universities can take a few initiatives to help economic development, as discussed in the chapter on the third mission (Chapter 5). These including promoting student and faculty entrepreneurship, promoting technology transfer, facilitating university–industry

collaboration and engaging with local economic development. To support the entrepreneurship ecosystem, universities naturally have a fertile innovation ecosystem and an academic culture of openness, new ideas and the questioning of old paradigms. They need to enhance support for the funding of new ventures and enhance the entrepreneurial culture.

Contribution to economic activity is also facilitated by improved academia–industry collaboration. A key goal is to facilitate the process of knowledge being used by industry for creating economic value. Another goal is to channelize research for directly addressing challenges faced by industries. It is desirable to have some ongoing channel for collaboration, which can help overcome the challenges of communication gap and misalignment of goals between the two sides. One successful approach is to establish cooperative research centres. Such centres will need some initial support from the government. The success of such a programme in USA—the IUCRC—in which the National Science Foundation (NSF) provides support, can be used as a starting point to guide the establishment of such centres.

A university can more actively engage and help in regional economic development also. This is a much bigger challenge and can only happen through concerted efforts by many universities and other stakeholders. Massachusetts Institute of Technology's (MIT) regional entrepreneurship accelerator programme provides a way forward for this. This model envisages a partnership between the university, entrepreneurs, government, corporate and risk capital to help accelerate innovation-driven entrepreneurship. It tries to combine innovation by universities with entrepreneurial and venture capital agencies to create firms in areas of competitive advantage for the region.

Universities often distance themselves socially from the surrounding communities to allow for the mind to roam freely and explore the unexplored and not be constrained by the often-harsh realities of the society around them. However, this has also made universities in countries such as India more insular

and disconnected from society. Just as walls are necessary for a host of practical reasons in the current world we live in, there is also a need for a research university to have direct outreach to society, so that it can engage with the latter and provide whatever benefits it can.

In a developing country such as India, there are many societal challenges; hence, it may not be desirable for a university to limit its third mission to innovation in the economic sphere alone. Many other societal challenges might be present in the region, to which a university can contribute through social engagement and outreach. However, if this has to be done, it has to be ensured that the university does not compromise its first two missions of research and education; indeed, third-mission activities should be synergistic and complementary. An approach can be to harness the power of the large and talented student body for social outreach programmes. Such programmes can deliver good benefits to the society and also benefit the students in their own growth. An example of how students volunteer in a summer camp for children from disadvantaged backgrounds was discussed in the chapter on the third mission (Chapter 5).

10.3 SUMMARY

In this chapter, we discussed a few key initiatives that can be taken to have thriving research universities in India. We have divided them into two groups—one for the overall HE system and one for the universities themselves.

We discussed a few initiatives in the overall HE ecosystem that can help research universities thrive. These include having a differentiated HE system which can clearly separate out research universities from the rest, providing a greater degree of autonomy to research universities so they can compete more effectively with their global counterparts who already enjoy much more autonomy, having special funding for research in research universities based on research performance, having an association for research universities that can voice a collective

opinion of these universities, starting education programmes to professionalize university administrative functions, creating a few large multidisciplinary universities by expanding some existing ones and by merging some institutions together, and developing a few centres for higher education research that can critically examine issues relating to Indian HE and provide information for policymaking.

We also discussed some initiatives that research universities can take. These include strengthening the research culture of the university, improving the quality of education and establishing a teaching and learning centre, strengthening the internationalization of the university, strengthening the autonomy of the university, increasing the size and scope, preventing faculty complacency and enlarging the third mission activities of the university.

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