Chapter 5

Third Mission

Contribution to Economy and Society

The modern university initially evolved to provide higher education and certification of achievement to a select few. In the 19th century and early 20th century, research was added to universities as their second mission, in response to the need for new knowledge and technologies for society as well as the military, which is sometimes referred to as the first revolution in universities (Etzkowitz 2001). Over the years, the synergistic nature of education and research was recognized, and universities across the world included the second mission in their charter; those placing strong emphasis on research emerged as research universities. Through the research and education missions, universities helped national economies and societies by providing educated workforces and new knowledge which could be exploited commercially.

However, over the past few decades, universities are being asked to play a more direct role in society and economy, particularly by leveraging their core competencies in research and higher education. This is in response to the changing nature of the world where innovation-led industries are playing an increasingly important role in the economy of countries. As research is key to innovation, governments and society expect research universities to contribute more, and more directly to the innovation-based economy and entrepreneurship, giving rise to the third mission

(TM) of universities. Further, it is recognized that universities play an important role in their surrounding society and are expected to play a direct role in it as well. In this chapter, we discuss the TM, starting with a discussion on the nature of the TM itself.

5.1 THIRD MISSION, ITS RISE AND CHALLENGES

The TM of a university involves the broadening of its traditional missions to include activities to directly engage with various stakeholders and hence contribute to economic growth and social progress (Pinheiro et al. 2015). Another definition of the TM is that universities deliver benefits to host societies by engaging in social, enterprising and innovation activities (Zomer and Benneworth 2011). With the first two missions, universities engage with society by developing educated workforces, which then contribute to society through the roles they take up, and by generating knowledge, which is used by corporations to enhance economic activity. With the rise of the TM, universities are now expected to influence economy and society more directly. Despite the broad understanding that the TM implies directly engaging with and contributing to stakeholders outside universities and research communities, the scope of TM has not been clearly defined, and multiple perspectives have been presented in the literature (Pinheiro et al. 2015).

One perspective is to consider the TM contributing to eight different types of activities (Laredo 2007), which can be grouped into two basic dimensions: economic and social (Pinheiro et al. 2015). In the economic dimension, the TM activities are expected to contribute directly to the enhancement of economic activity in the region or the country. Four different aspects have been identified for this: human resources, intellectual property, spin-offs and industry contacts. In the social dimension, TM activities are expected to contribute to society at large. Four key activities identified for this are: public contracts, participation in policymaking, involvement in social and cultural life and public understanding of science. For our discussion in this chapter,

we will use the economic and social aspects as the two broad dimensions of TM.

Another framework developed by a group of European scholars identified three core dimensions of the TM (as reported in Pinheiro et al. [2015]): technology transfer and innovation, continuing education (CE) programme and societal engagement. The first one is related to economic activity, while the second one helps in both economic activity and society. The framework in Roessler et al. (2015) identified four dimensions of the TM: university–economy interaction, social engagement, knowledge transfer in a broad sense and cultural and political engagement. Again, the last three can be considered as part of the broad social engagement dimension.

In this chapter, we briefly discuss the two basic dimensions of the TM: economic engagement and social engagement and outreach. As regards the economic dimension, we focus on innovation, entrepreneurship and technology transfer, and as regards social engagement and outreach, we discuss continuing education (which can also be considered as contributing to economic development) and social outreach programmes.

Although the TM may be an acceptable mission for a university, universities have to choose how much they want to engage with it, which depends on the overall mission and vision of the university. The situation is like the research mission; it is an accepted mission, but not all universities have to engage with it—different universities place different emphases on it. The same should be expected with the TM. As the research mission led to the emergence of strong research universities, a strong thrust towards the TM might lead to the emergence of entrepreneurial universities, which will have strong interfaces with the government and industry, an alignment of its other two missions with the TM, capabilities to assist in the creation of corporations, etc. (Clark 1998; Etzkowitz et al. 2000).

Many factors have given rise to the TM. We discuss some of the key ones here, some of them based on discussions in Zomer

and Benneworth (2011). The new NEP of the Government of India also emphasizes the role of universities in innovation and entrepreneurship and also encourages universities to develop in their students a sense of community service (NEP 2019).

5.1.1 Changing Nature of Innovation

Universities have traditionally focused on creating knowledge and disseminating it through education. Knowledge was viewed as leading to the development of new products and services, and this conversion was expected to be done by the commercial world, facilitated by well-trained manpower, also developed by the university. In other words, the impact of research and education on economic activity was indirect and assumed a linear model of innovation wherein knowledge created by research was input for innovation.

The earlier linear model of innovation has given way to the networked model of innovation. It was observed that even when knowledge was published, there were some tacit knowledge components which made it hard for people not engaged in knowledge creation to fully appreciate and leverage the knowledge. It was also recognized that there were many sectors and corporations which did not have the capability to absorb knowledge or to change it suitably to facilitate innovation. It was also realized that innovation is an iterative process, frequently requiring research and development (R&D) in the loop. These types of observations led to the network model of innovation in which R&D is an important member (Laredo 2007). As universities are at the core of the R&D ecosystem, it is natural to expect that they become more integrated with the innovation ecosystem.

Consequently, towards the end of the previous century, the importance of knowledge creation as part of innovation was recognized, leading to the need to strengthen the linkage between knowledge generation and its commercial exploitation. In USA, this was given a boost by the passing of the Bayh–Dole Act, which gave universities rights to the intellectual property created

through federal research grants. This led to the growth of patenting and collaboration with industry in US universities—a development which still implicitly saw knowledge production as helping firms in improving their products and services or in creating new ones. In other words, research was seen as an economic resource (Berman 2012). It was realized that while knowledge indeed has the potential to help existing firms, it also has the potential to drive economic growth through innovations leading to the formation of new companies. In other words, research started to be viewed also as an economic engine, and this view has been accepted and promoted by governments (Berman 2012).

Due to the importance of knowledge and innovation as economic engines that can drive growth, it is natural for universities with strong research capabilities and talented manpower to engage in the TM and directly contribute to the innovation-based economy. Moreover, it is natural for governments to expect, and promote, this engagement.

5.1.2 Resource Generation

We know that research universities are expensive. The education mission for most research universities is highly subsidized, with tuition fees covering only part of the costs. Moreover, research can always use more funding. Thus, a research university is perpetually in need of more funds. As government funding for universities is getting reduced in many countries, research universities need to diversify their sources of funding to ensure that their education and research missions are not compromised.

As innovation and knowledge have drawn great attention for their economic potential, universities see the possibility of generating funds by leveraging their research and educating capabilities, leading to initiatives to commercialize research and some educational activities (such as continuing education), with a key goal of generating more revenue for the university. As research and knowledge are critical components of the innovation process and ecosystem, and as utilization of the latest knowledge often

requires tacit knowledge also, it is natural for universities who create knowledge and also have tacit knowledge to try to benefit financially from these. The hope is that it will generate additional resources for the university, thereby broadening its revenue base.

5.1.3 Changing Expectations and Universities' Desire to be Agents of Change

Universities have always viewed themselves as agents of change. Earlier, the focus was on changing thinking and mindsets through education and scientific knowledge. Although scientific knowledge has changed the world's thinking, it is the use of knowledge that has changed economies and societies. In today's world, much of the change is happening through innovative technologies and their creative applications. For universities to remain agents of change, it is imperative for them to directly engage in innovations and take them to society, in addition to creating knowledge and educating people. Expectations of society from universities is also changing.

Earlier, progress in science helped technology, which, in turn, helped in economic development. Now, societal challenges are more complex, requiring multidisciplinary approaches. The rapid pace of change in technology has led to undesirable side effects on society and people. Today, a more comprehensive view of technology has to be taken, one that has a better understanding of its impact on society and how society can benefit from it. The global challenges of today also require a multidisciplinary problem-solving approach. As universities have strong capabilities in many disciplines, societies are looking up to universities to address the challenges being faced.

The pace of change today is faster than ever before. 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. Therefore, governments want their countries to be innovative. Research is fundamental to innovation, and

universities have research capability and comprise a combination of young students and experienced faculty. Hence, countries are looking up to universities to drive the innovation engines by directly participating in innovation, starting new companies, transferring their knowledge to existing companies, and so forth.

The world has changed. Now, entrepreneurs are icons and respected worldwide. Wealth creation and enrichment of individuals are lauded. Such a value system motivates academics also to become entrepreneurs, which changes expectations by faculty and students from research universities to accommodate and respect such aspirations and consider innovation and entrepreneurship as part of legitimate academic activity. At the same time, societies and governments are questioning the 'knowledge for its own sake' paradigm of research and expect knowledge to provide more direct and tangible benefits to society. These changed values and perceptions create pressure on universities to engage more in TM activities.

5.1.4 Challenges for the TM

The TM, which is a more recent addition for research universities, naturally faces challenges in acceptance and implementation. For research universities, engagement with the TM has some risks which must be mitigated. The main risk is that engagement with the TM may dilute its focus on its other two missions of teaching and research. This is likely to be the case if the TM is chosen as an additional mission that is separate from the other two missions. However, this risk can be mitigated if research and teaching support the TM and the TM is viewed as beneficial to them. Engagement with the TM cannot be a half-hearted effort by a few—all departments and faculty should imbibe the entrepreneurial culture, which should be supported suitably by the university through suitable outreach structures (Clark 1998).

Another risk is expectations from governments and society. As a university crosses the boundary from knowledge production to using knowledge for public good, expectations can rise.

Universities may be expected to start working on complex social problems, even though they may be squarely in the domain of political, social, administrative or business sectors. Earlier, universities posed research questions, and the answers provided were used by policymakers, government, corporations, etc. to take suitable action. Now, universities may themselves be expected to address the problem, and they are not organized or resourced for such direct action.

An important point to be noted is that not all universities need to emphasize the TM as a core mission, just like not all universities emphasize research as their core mission. How important the TM is to a university and the level to which a university should engage with it should be entirely the choice of the university. A university should ensure that engagement with the TM is not at the cost of its teaching and research missions, and should engage with it in a manner that supplements its other missions. This requires that a university should get into the TM in any significant manner only if it has complete autonomy over decision-making, so that it can control the level of its engagement with the TM. Otherwise, the university risks this engagement being forced upon it by external entities such as the government.

Significant challenges are faced for internally promoting the TM. Faculty are still generally aligned to disciplines, with journals and conferences, awards, peer recognition and review, and so forth all tied to the discipline. Also, disciplines are defined in a manner that they encourage in-depth exploration of the discipline rather than developing value or new methods by putting knowledge from diverse disciplines together. However, societal problems, particularly in a developing country, are never around disciplines. This poses a challenge of getting different disciplines together to work on some common problems, which is important for the TM.

5.2 INNOVATION, ENTREPRENEURSHIP AND TECHNOLOGY TRANSFER

Universities have been engaging with industry for a long time. However, earlier, it was a minor activity tolerated or even

encouraged but not taken as an important dimension of a university, as the focus was on the two missions of education and research. However, with changes in time and the increased dependence of the economy on innovation, engagements of universities worldwide with the business and commercial world have increased, and universities are looking to find ways to commercialize their research findings. The framework of triple helix promotes a direct role in innovation and economic development by universities, in collaboration with industry and government (Etzkowitz and Leydesdorff 2000). The NEP also proposes to facilitate linkages of universities with government departments and universities, so research and innovation can help business as well as governance and create a synergy between the three important stakeholders for research and innovation: universities, government and industry (NEP 2019).

A study was conducted by the National Advisory Council on Innovation and Entrepreneurship (NACIE) in USA on what universities are doing to nurture innovation, entrepreneurship, commercialization of research, and so forth. The study found that while universities may pursue these activities for generating resources or making an impact, they have strong pedagogical value also (NACIE 2013). Of course, such activities have a direct impact on research being conducted in a university. In other words, activities related to the TM are not an add-on to the first two missions of a university but may be considered as a natural progression of the two missions and their alignment with the changing world and economic systems.

NACIE has identified a few different types of activities, including promoting student and faculty entrepreneurship, promoting technology transfer, facilitating university–industry collaboration and engaging with local economic development, which universities are engaging in for promoting innovation and participating in economic growth. We discuss these briefly in this section. Many of the concepts discussed are from NACIE (2013). Many of these are also encouraged in the NEP of the Government of India.

5.2.1 Innovation and Entrepreneurship among Students and Faculty

Many universities have shown considerable excitement in directly participating in the start-up ecosystem. While earlier this culture was present only in a few universities known for innovation and which were located in an entrepreneurial region (e.g., Stanford University and Silicon Valley, Massachusetts Institute of Technology and Boston area), it is spreading among many universities. If a university wants to be active in the start-up ecosystem, the university should promote innovation and entrepreneurship among faculty and students—who form the main intellectual manpower of the university. Many universities have developed policies and support to promote entrepreneurship among their faculty and students.

Three main components are required for a successful entrepreneurship ecosystem: a fertile innovation ecosystem, entrepreneurship culture and funding for new ventures (NACIE 2013). Universities naturally have a fertile innovation ecosystem, given the engagement of faculty and students in research and exploration, the academic culture of openness and new ideas and the questioning of old paradigms. Many universities have initiated programmes to address the other two factors.

Many universities have included entrepreneurship as part of their educational programmes to encourage the culture of entrepreneurship. These may take the form of a minor in entrepreneurship, or some courses on it, or some actual entrepreneurship projects involving direct experiential learning, etc. These provide good learning and experience of entrepreneurship to students and also engage the faculty who teach these more in entrepreneurship. As an example, in IIIT-Delhi, students are offered some courses on entrepreneurship; they can do an experiential summer course that engages them in the full process of entrepreneurship, ending with the creation of a company, and can do their final BTech/capstone project in entrepreneurship.

These for-credit initiatives are supported by activities like business plan and venture contests, talks by entrepreneurs,

elevator pitch opportunities, internships in start-ups, mentorships by alumni who are entrepreneurs, entrepreneurship clubs, and so forth. Regional or national contests related to innovation also help. Universities are also providing innovation spaces to motivate students to collaborate for developing innovative ideas. Many times, the winning idea/project receives financial support, which can act as the initial capital for the start-up. To further provide student support, entrepreneurship fellowships are also being offered (e.g., in IIIT-Delhi, a graduating student can get a fellowship for entrepreneurship—they are effectively treated as PhD students for the duration of the fellowship and are provided a stipend, hostel accommodation, and so forth.)

For faculty, a different set of initiatives is needed. To promote entrepreneurship, a university needs to consider it as a legitimate part of faculty work and give weight to it in internal assessments and promotions, which is a fundamental change requiring a change in policies and mindset. This change is also reflected in how faculty members are assessed for recruitment; besides capabilities for research and teaching, capabilities for innovation and entrepreneurship are also assessed and given weight. Many universities are also providing leave for entrepreneurship to allow faculty to dedicate themselves fully for a few years to creating a venture. The faculty thus get an opportunity to engage with the world of business, which has a positive impact on their research and teaching and also encourages entrepreneurship.

Entrepreneurship is facilitated by networks and connections with corporations, venture capitalists (VCs) and angel funders, end-user groups in the community, and so forth. As universities often have good connections with all of these, they leverage them to support entrepreneurship. For example, universities may have programmes, such as entrepreneur in residence, in which some entrepreneurs spend a few days in a university and are available to faculty and students for discussions. Universities may provide a connection with the industry and VC networks, for example, by having an interaction day in which faculty can pitch ideas to some VCs and get their feedback, and possibly also financing.

Universities are also supporting these activities with awards such as 'innovation/entrepreneur of the year' for faculty, much like their counterpart 'researcher/teacher of the year' awards. With many such activities embedded in the academics of students and faculty, the culture of entrepreneurship gets strengthened.

Universities are also facilitating in the third component, namely, finance. Many universities have established incubation centres, which may provide space for the incubation of the companies of their faculty and students at a discount. The presence of an incubation centre in proximity also supports the transition from a university lab to a marketplace and continued engagement with professors and students. It also facilitates the hiring of manpower and interns from the university while getting ongoing consultancy from faculty. Universities are increasingly providing funds as well, from entrepreneurship fellowships for students to small seed capital from a fund created for this purpose, to venture capital through the network.

Incubation centres are quite common in India now, particularly in engineering institutions. These centres provide a seamless movement from academics/labs to the commercial world; the work/prototype/idea is moved from the lab where it was created to the incubation centre, to be incubated as a company. Incubation spaces may be provided to students, faculty and alumni at reduced rates, giving a further boost to their entrepreneurial dreams. The NEP also recommends that HEIs should establish such centres, and has proposed that, following the global best practice, the IP created from projects funded by the government agencies will rest with the university, which can commercialize them (NEP 2019).

5.2.2 Facilitating University–Industry Collaboration

Academia–industry collaboration has been a topic of interest for many decades. A key goal is to facilitate the use of knowledge created in the university by corporations for generating economic

value. Another goal is to channelize research for directly addressing challenges faced by industry. These collaborations are becoming even more important, as time for knowledge to be translated into innovations and generate value is shrinking. Earlier, this was done through the ecosystem of knowledge exchange, with some corporations and bodies facilitating technology transfer. Now, as the pace of knowledge generation and innovation is rapid, there is a need for both industry and universities to collaborate—productive collaborations can benefit both sides (Ankarah and Al-Tabbaa 2015).

One direct way of engaging industry, which has a long tradition in academia, is to encourage faculty to provide consultancy. Most universities have policies to allow faculty to spend some time on consultancy activities, which helps in many ways. First, the knowledge available from the expert faculty is directly available to the industry, which can leverage it to improve its own products and services. In return, the industry pays consultancy fees, which helps in improving the overall compensation of faculty, which can help in retaining faculty and even attracting new faculty. If the consultancy fees are shared with the university, then some resource is generated for the university also. Such engagements may also lead to research problems, which the faculty, perhaps jointly with the industry partners, can work on. Regular interactions between the faculty and researchers in the industry can potentially lead to more extensive engagement in the future in the form of larger grants from the company or joint proposals. Given these and other benefits, most universities have provisions for faculty to engage in consultancy.

Another way to engage with industry, which is available in most universities, is through projects from industry. These can be like any other sponsored research project, although they may involve more deliverables and even some intellectual property protection. Some corporations have earmarked research funds for giving grants to universities.

Engagements such as consultancy and projects are on a need basis. It is also desirable to have a specific ongoing channel for

collaboration. Often, efforts to establish ongoing collaboration did not succeed earlier, due to communication gap and misalignment of goals between the two sides. Lack of funding for these collaborations, which are risky for both sides, was also an issue. Realizing the benefits of strong collaboration between universities and industry, many governments started facilitating these through various means, including funding support.

For example, for the Industry–University Cooperative Research Centers (IUCRC) programme in USA, the National Science Foundation provided financial support for jointly created and operated centres, which resulted in many such centres across various universities in USA (Berman 2012). The basic objective of IUCRC was to encourage industrial innovation so as to support industrial growth. As universities have been at the core of knowledge creation and have the expertise, it was felt that academia–industry collaboration for innovation should be encouraged to promote industrial innovation. This collaboration facilitated some initial experiments in which centres were set up jointly by a university and a consortium of companies to work on problems of mutual interest. The government partially funded the centres for a few years, while the companies also contributed to funding. It was envisaged that, in due course, these centres would become self-sustaining, and many of them did. The model was then adopted by many states in and by 1990, hundreds of IUCRCs were operating in universities across USA (Berman 2012).

While a few types of collaboration have been mentioned above, there are many more possibilities, and such collaboration can take many different forms and for different reasons. A good survey of the types of collaboration is given in Ankarah and Al-Tabbaa (2015).

5.2.3 Technology Transfer and Patenting

It has become increasingly important that the new knowledge that research generates should be applied for creating value to society

and firms. If the research has a potential commercial value, then the question is who benefits from this value, that is, who monetizes it? Earlier, universities were largely putting their research outputs in the public domain, leaving it to the larger society to leverage it for value. In other words, while a university created the knowledge, the value from the knowledge accrued to some other organizations; the university was satisfied with the fact that its research had helped the economic activity in society. As discussed earlier, given the need for resources and other reasons, universities are now increasingly looking to monetize the value of their research for themselves. To promote the commercialization of the research output, most universities have established a technology transfer office (TTO). This office helps in the commercialization process, which is often quite complex and tedious.

The main routes for commercialization of university research are to patent the invention or license the invention to some firm (including, perhaps, a start-up launched by the students or faculty involved) on some specified terms. Both of these are complex and time-consuming processes requiring careful negotiations and documentation, and most faculty members do not have the time or the inclination to engage in these. This has led to the need for an office such as a TTO, which is managed by experienced professionals who can drive these processes with some inputs from inventors (i.e., faculty and/or students). TTOs also often undertake workshops to sensitize faculty and other researchers about intellectual property laws and processes. Once inventions are patented, they need to be protected also, which often requires serious legal support. TTOs also help in this.

Although facilitation can reduce the tedium involved, in itself, it may not motivate faculty to license or patent their work, as most faculty are very focused on publishing their research so that their peers can appreciate their contributions. For this, universities have devised policies for revenue sharing from any royalties that may accrue from patents or any income that comes through other forms of commercialization. This incentive, along with the charm that the research may find its way into actual products and

services, can go a long way in motivating faculty to commercialize their results.

In US universities, patenting is now quite common. Chapter 5 of Berman (2012) gives an account of how patenting has evolved in US universities. It should be noted that currently, though a few universities earn handsomely from patents and licences, most universities earn a very modest amount from these. However, most have mechanisms for patenting inventions by faculty and students, as universities do not want to miss any opportunity in the risky world of intellectual property.

Universities have followed a few different approaches for patenting (Berman 2012). One is to have a fully owned but separate entity that manages university patents and returns any income it generates to the university. Another is to have a third party take care of all the patenting, with some revenue sharing between the two. Several universities manage patents internally, through a unit specifically for that purpose, with certain committees helping in evaluation. For patents that may be used for creating new companies, a common method is for universities to take an equity in the start-up in lieu of royalties or the licensing fee, which helps the start-up to get going without requiring funds to pay for the intellectual property, and the university stands to gain if the innovation proves successful in the market.

5.2.4 Engaging with Regional Economic Development

The presence of a university itself helps in regional economic development, as a university is also a commercial entity, often with large budgets, which inevitably benefits the local economy by providing jobs, sale of goods, demand for local services, and so forth. It is of mutual benefit if a university can more actively engage and help in regional economic development. Universities have the ability of innovation, and their innovations can help in the development of industry locally. Moreover, as the regional economy grows, it provides a better surrounding climate that helps the university by making the region more attractive for

faculty and students. This aspect of universities engaging in regional development is not actively pursued in India, and many universities actually try to isolate themselves from the surrounding society. However, now some efforts are being made to create R&D clusters in some cities with the intent of doing applied research, which can directly address challenges facing the city and boost the economic activity in the city through innovation, the starting of new companies, and so forth.

There are multiple ways in which a university supports regional economic development, and there have been studies to assess the impacts of different aspects, for example, Bramwell and Wolfe (2008), Drucker and Goldstein (2007), Murray (2004), etc. Encouraging entrepreneurship among faculty and students (discussed earlier) is one way which has direct benefits to the regional economy. The impact can be enhanced if the research and innovation parks and commercial spaces around are present to house the incubated firms as they grow. A university can also help in promoting entrepreneurship in the region by motivating and educating potential entrepreneurs, making university incubation facilities available to them, providing them technical help in their problems, providing student interns and part-time workers, and so forth. The university can also help in the growth of existing industries by helping them in technology and business improvement, making their labs and expensive resources available.

Overall, a university helps regional economic development in many ways, and many of the activities that universities engage in have direct advantages to the local economy. Of particular interest has been the issue of whether technology and science–led economic activity in a region can be boosted by research universities. It has been seen that it is indeed the case—technology and science–led firms are attracted to a region by the presence of strong research universities, and they engage with the universities in multiple ways to benefit; engagement methods involve leveraging the human capital of the universities, as well as the social capital that researchers and faculty earn by being part of the

global network of scientists (Bramwell and Wolfe 2008; Drucker and Goldstein 2007; Murray 2004).

MIT has proposed a model to leverage a university for regional development, which is called the Regional Entrepreneurship Accelerator Program (MIT). This model envisages a partnership between the university, entrepreneurs (who may be from the university or outside), government, corporate and risk capital to help accelerate innovation-driven entrepreneurship. It tries to combine innovation from universities with entrepreneurial and venture capital agencies to create firms in areas of competitive advantage for the region. It is a 2-year structured programme whose design is tailored for the region, based on the specific strengths and weaknesses of the region, and which educates, trains and motivates stakeholders to collaborate for regional development.

It should, however, be understood that while research universities can act as a catalyst for developing the knowledge-based sector in the region, they by themselves are rarely sufficient to have such developments take place, even though many policies seem to wish that supporting various initiatives in universities can by itself spur regional economic development (Bramwell and Wolfe 2008; Brown 2016; Drucker and Goldstein 2007). Universities help regional economic development in many ways, but developing an innovation and knowledge-based economy requires many factors to align and other key stakeholders to also participate, as indicated by the Regional Entrepreneurship Accelerator Program (REAP) model.

5.3 SOCIETAL ENGAGEMENT

Universities have often distanced themselves from society to allow the mind to roam freely and explore the unexplored and not be constrained by the often harsh realities of the society around it. This situation is particularly true in developing countries such as India. The realities outside universities are often too harsh and complicated, and therefore universities try to create a full living community, sheltered from the realities of the 'real world'. Thus,

often, universities not only build walls around their campus, but they also try to have all direct stakeholders to stay within the campus. With a fully residential campus, which many universities provide, even the connection with society through people staying there is minimized.

These walls are created to allow students and researchers to focus on academics and not worry about their daily struggles. However, this has also made universities in countries such as India more insular and disconnected from society, and a direct outreach is necessary for a university to engage with society and provide whatever benefits it can. Various attempts have been made to expose students to these realities so that they develop an understanding of issues.

The focus of the TM in most developed countries is to leverage research for economic benefits to society through innovation and incubation. A developing country such as India has many societal challenges. Hence, it may not be desirable for a university to limit its TM to innovation in the economic sphere only. A university can possibly contribute to some societal challenges in the region through social engagement. 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, and indeed, TM activities should be synergistic and complementary. We later discuss an example of innovation from IIIT-Delhi which contributed directly to society in a very different way without diluting the research and teaching missions.

5.3.1 Continuing Education

A continuing education (CE) programme is an organized and structured education programme (which may involve lectures, labs, assignments, and so forth) for educating individuals who are not enrolled as students and providing them with knowledge and skills that can help them in their professional or personal life. By offering CE programmes, a university can extend the benefit of its teaching capabilities also to those who are not enrolled in

degree programmes of the university. (In the context of CE, we will use the term programme generically to represent a course/module or a series of courses.)

CE plays a vital role in society. In the current age of rapid change, individuals need to update themselves with newer technologies and developments regularly. CE programmes facilitate this upgradation. Even without the changes taking place, given the breadth of knowledge in any field, no education programme can hope to provide all the necessary knowledge for a job. These knowledge gaps can be filled through CE programmes. In some professions, CE programmes may be required to be completed regularly to maintain a certain status (e.g., to continue holding the licence to practice). Indeed, CE programmes are a necessity in the modern world, serving multiple goals (Scanlan 1985; Cervero 2000).

In a broad sense, CE includes all types of education provided for different purposes such as preparation for a test, professional development, getting or renewal of a license, personal growth, credits for a degree, and so forth. Universities mostly engage in CE for professional development. Our discussion here is also limited to this aspect of CE.

For professional development, as a university has faculty members who are in touch with the latest developments (indeed, often, they may be driving them), they are in a good position to offer programmes for professional development. Moreover, as higher education is a basic mission of a university, CE becomes an extension of this mission, providing education to nonstudents.

CE for professional development has been around for a long time, which got a boost with the professionalization of various professions and jobs. It is also a big business; in some cases, a firm's expenditure in providing CE for its employees may be more than the budget of some universities (Cervero 2000). The focus of most professional development programmes is to update working professionals about the latest developments so that they can perform better in their profession.

In most universities, CE, while providing an important service, is also treated as a source of revenue generation for the university and the faculty engaged in it. CE programmes also provide a direct linkage with the professional world, which strengthens their connections with universities, and they can also offer useful interactions to faculty. Due to such benefits and others such as facilitating change and fostering growth (Scanlan 1985), most universities have CE programmes and some unit through which these programmes are offered. Universities and professional associations are most active in providing CE programmes, and they are collaborating to provide such programmes (Cervero 2000). Collaboration between universities and professionals is a natural way to combine academic rigour with practical insights to update professionals.

Of particular interest in India are CE programmes for faculty—particularly for colleges and universities. Most colleges and universities have faculty who are not very active in research and so are often not updated about the developments in the field, and who may often be teaching courses using a very old and outdated syllabus. As research universities generally lead the advancement of courses, as well as the development of new courses (as discussed in the chapter on education), their faculty are well placed to offer CE programmes on developments in the subject, how the courses on the subject should evolve and how they should be taught. CE programmes can be useful for school teachers also, though the purpose of such programmes will obviously be different. Such CE programmes of training the trainers have a clear multiplier effect on education. The NEP also suggests a strong teacher development programme by top research universities as part of revamping the education in the country (NEP 2019).

Traditionally, universities offered face-to-face CE programmes ranging from a few days to a few weeks. On successful completion of a programme, typically, a certificate of completion is issued. With the emergence of Internet-based education and the massive open online course, increasingly more CE programmes are being offered through the Internet. These allow a person to take

courses from his/her home or office. Many universities, as well as businesses, are offering programmes through such platforms, and these are the major growth area for CE (Cervero 2000).

5.3.2 Community Outreach

Community outreach is a generic term to include all activities that a university may undertake to engage with the society and community around it to help them. Which type of outreach activities a research university engages in is contextual and depends on the needs of the surrounding community and society. Helping local business development has been discussed earlier; here, we discuss other types of activities.

As universities are in the business of education and admit students graduating from schools, one natural outreach programme that many have is engaging with local schools, which may be in the form of arranging visits to labs, showing demos, helping in organizing contests, and so forth. Another common activity is the promotion of science and scientific thought. Another engagement is organizing various cultural activities, sports and other programmes, such as lectures, workshops, and so forth, available to the local community. Some universities may also make some of their facilities available to the local community for events.

A different type of social outreach programme in which some universities engage is the short-term social immersion programmes. In these programmes, students of a university go and live in a community very different from their own and experience the cultural and social differences. In developed countries, such immersion programmes are often arranged in other countries. A key goal of these programmes is to provide students with a global and different experience (Gates 2014). While many view such programmes as improving their job prospects, for many others, it has a far deeper impact, even on the professions they pursue.

Immersion programmes can also help provide a better understanding of the challenges and problems being faced in the social

context; students coming with no bias or preconceived notions for an immersion programme can see issues and problems differently, throwing new light on them. Some immersion programmes are designed specifically for this purpose. For example, in the rural immersion programme at the Indian Institute of Management, Udaipur, students spend a week in a village with the goal of studying a specific aspect deeply. They interact with local people through some local organization working in the village and survey them to understand better their context and the challenges they are facing. Their reports provide an understanding of and information about local challenges that can lead to interventions by local organizations or governments for resolving them.

Similarly, IIIT-Delhi conducts a programme in which students can spend their summer studying some social entity or community (referred to as domain) to develop a thorough knowledge of the functioning of that domain and to identify a few issues in which intervention through technology can help the domain. Examples of domains include a vegetable market, hawkers' occupation, milk distribution, garbage collection, a local government clinic or a primary health care facility, and so forth. Students work in groups in these domains during the summer term. They are expected to be highly interactive observers to understand the workings and identify problems within the domain. They are also encouraged to study the relevant literature on the domain. Once a set of problems has been identified, students are expected to take them up as projects in regular semesters.

5.3.3 An Example

As part of its undergraduate programme, IIIT-Delhi requires all its undergraduate students to pursue two credits for community work (CW). This aspect was included right from the inception to ensure that the education also supports the 'socially relevant' aspect of the mission of the institute. Most students usually choose to pursue their CW credits with some non-governmental organizations (NGOs). Reports from earlier students showed that

most chose to work with NGOs working in the field of education for the young. (The NEP of the Government of India encourages universities to develop in their students a sense of community service for the benefit of society through active programmes organized by the universities [NEP 2019].)

The institute decided to contribute to the growth of government school children as part of its social outreach mission. The general situation in India is that children from poor families go to government schools, while those who can afford it send their children to private schools. Often, government school children do not get exposure to opportunities beyond schools and, due to their socio-economic condition and the peer group in the school, end up with low aspirations and confidence. The institute decided to hold a 1-month summer camp for children from these schools. The goal of the summer camp was to help build their confidence and aspirations and develop some life skills; providing remedial classes for subjects taught in the school was not a goal. The objective of the camp was to focus on developing:

- Communication skills and personality
- Self-confidence and aspirations
- Problem-solving skills
- Computer and Internet skills

Student volunteers run the camp, most of whom also use it to complete their CW credit requirements. A few coordinators are students with experience from previous summer camps. The camp objectives are achieved through a set of structured sessions, as well as through informal interactions between volunteers and children. Innovative approaches are employed to engage the school children so that they can learn better.

For the programme, the institute has partnered with a few government schools within a radius of a few kilometres of the institute. The partnerships were established through a few meetings with school principals and visits to the schools. The target group is students from sixth to eighth grades, as it was felt that

exposure at this stage can have more impact (as from the ninth grade onwards, there is a pressure of board exams).

The delivery approach was also designed to suit the goals. A general tendency in academia is to convert any programme into a lecture-based format. It was clarified from the start that the goals of this programme are different and so this format is not to be used as the primary instrument. Some approaches used for the delivery are as follows:

- Interactive sessions with small groups are led by a few volunteers. (Groups of about 30 are formed, and six volunteers are assigned to a group.) Each volunteer covers a different activity.
- One topic is covered in a day, supplemented with some co-curricular activities. Each day, one particular goal is taken and all the sessions are geared towards that.
- No textbooks. The programme is completely based on experience and activity and motivates the children to think and reflect.

Coordinators, who have been volunteers in a previous summer camp, train the volunteers before the start of the programme. Modules are designed afresh every year by the volunteers after referring to the feedback received from the previous years and inculcating fresh ideas. At the end of the summer camp, some lessons learnt are captured, and materials for various sessions are archived for future years. As the coordinators of the next year are volunteers from this year (or the year before), there is some transmission of experience and knowledge through this method also.

Every year, about 150 children from about half-dozen schools attend the camp. The response and impact of this programme have been tremendous. School children love it, as the method of teaching is not classroom-based; their enthusiasm is reflected in the response they give to their mentors during the closing ceremony when volunteers are given their certificates. From the interactions, it is clear that they gain a lot from the camp; many of

them may not have seen modern facilities, and interacting deeply over weeks with students of a premier institute also provides them with role models. It is not an exaggeration to say that this camp is possibly a life-changing event for many of them.

Although the camp is designed as a way to contribute back to society, it is clear that it also benefits the volunteers. For many of them, it is a once-in-a-lifetime opportunity. It opens their eyes to the fact that they are very fortunate to have what they have—a fact they probably did not appreciate before the camp. Most of them get a deep sense of satisfaction from their contributions towards helping underprivileged children. For some of them, participating in the camp is one of the high points of their stay in the institute.

It is worth noting that this direct action has no adverse impact on the regular academic activities of teaching and research, as it involves no faculty time. This approach of leveraging student talent for societal outreach is not common. Such societal outreach programmes, which can harness student power, have a huge potential for universities to contribute to society without adversely impacting their education and research missions.

5.4 SUMMARY

In this chapter, we have discussed the TM of universities. The TM is about making an impact on society through economic development and through direct societal engagements. Reasons for universities to engage with the TM include a need to generate new resources, the changing nature of academic research and innovation and expectations from society and governments of a more direct impact of university's research and academic activities. Universities have responded to this challenge, with many of them vigorously pursuing this mission. In this chapter, we briefly discussed two main aspects of the TM: contributing to economic growth through innovation, entrepreneurship and technology transfer and directly engaging with society for its welfare.

Regarding contributing to economic growth, we briefly discussed four key aspects: facilitating entrepreneurship among students and faculty, enhancing industry–academia collaboration, facilitating technology transfer and participating in regional economic development. For each of these, we briefly discussed what the objectives were and what approaches some universities were taking. In India, entrepreneurship among students and faculty is being promoted actively, with support from the government. Industry–academia collaboration is also something most universities pursue, though it has had a limited success in most universities for a host of reasons. Most research universities have evolved mechanisms for protecting intellectual property and for technology transfer. The regional economic development role of universities is a more recent thought—some attempt is being made to create clusters of research universities and other organizations to help development in the city.

For direct engagement with society, we briefly discussed two aspects: continuing education (CE) and community outreach. CE is in much demand due to the rapidly changing technology, which needs education of the current workforce in these changes. Universities are well positioned to help with this, given that they operate at the cutting edge of technology. They are partnering with professional bodies to deliver more relevant CE and, in the process, raising resources for themselves, as well as improving their engagement with professionals. As regards community outreach, we discussed a few different approaches being followed. We gave one example of how students in IIIT-Delhi are conducting a transformative summer camp for school children from economically weaker backgrounds.

REFERENCES

Ankarah, Samuel, and Omar Al-Tabbaa. 2005. 'University-industry Collaboration: A Systematic Review.' *Journal of Management* 31: 387–408.

Berman, Elizabeth P. 2012. *Creating the Market University—How Academic Science Became an Economic Engine*. Princeton, NJ: Princeton University Press.

Bramwell, A., and D. A. Wolfe. 2008. 'Universities and Regional Economic Development: The Entrepreneurial University of Waterloo.' *Research Policy* 37 (8): 1175–87.

Brown, R. 2016. 'Mission Impossible? Entrepreneurial Universities and Peripheral Regional Innovation Systems.' *Industry and Innovation* 23 (2): 1–17.

Cervero, Ronald M. 2000. 'Trends and Issues in Continuing Professional Education.' *New Directions for Adult and Continuing Education* 2000 (86): 3–12.

Clark, Burton R. 1998. *Creating Entrepreneurial Universities: Organizational Pathways of Transformation*. New York, NY: Emerald Group Publishing.

Drucker, J., and H. Goldstein. 2007. 'Assessing the Regional Economic Development Impacts of Universities: A Review of Current Approaches.' *International Regional Science Review* 30 (1): 20–46.

Etzkowitz, Henry. 2001. 'The Second Academic Revolution and the Rise of Entrepreneurial Science.' *IEEE Technology and Society Magazine* 20 (2): 18–29.

Etzkowitz, Henry, and Loet Leydesdorff. 2000. 'The Dynamics of Innovation: From National Systems and "Mode 2" to Triple Helix of University-industry-government Relations.' *Research Policy* 29 (2): 109–23.

Etzkowitz, Henry, Andrew Webster, Christiane Gebhardt, Branca Regina Cantisano Terra. 2000. 'The Future of the University and the University of the Future: Evolution of Ivory Tower to Entrepreneurial Paradigm.' *Research Policy* 29 (2): 313–30.

Gates, Lisa. 2014. 'The Impact of International Internships and Short-Term Immersion Programs.' *New Directions for Student Services* (146). DOI: 10.1002/ss.2008

Laredo, Philippe. 2007. 'Revisiting the Third Mission of Universities: Towards a Renewed Categorization of University Activities.' *Higher Education Policy* 20: 441–56.

MIT. *REAP (Regional Entrepreneurship Accelerator Program)*. http://reap.mit.edu.

Murray, Fiona. 2004. 'The Role of Academic Inventors in Entrepreneurial Firms: Sharing the Laboratory Life.' *Research Policy* 33 (4): 643–59.

NACIE. 2013. *The Innovative and Entrepreneurial University: Higher Education, Innovation and Entrepreneurship in Focus*. US Department of Commerce, National Advisory Council on Innovation and Entrepreneurship Report, NACIE, Washington, DC.

NEP. 2019. *Draft National Education Policy, 2019*. New Delhi: Government of India.

Pinheiro, Romulo, Paticio V. Langa, and Attila Pausits. 2015. 'One and Two Equals Three? The Third Mission of Higher Education Institutions.' *European Journal of Higher Education* 5 (3): 233–49.

Roessler, Isabel, Sindy Duong, and Cor-Denis Hachmeister. 2015. *Teaching, Research, and More?! Achievements of Universities of Applied Sciences with Regard to Society* (CHE Working Paper No 183). Gütersloh: CHE.

Scanlan, Craig L. 1985. 'Practicing with Purpose: Goals of Continuing Professional Education.' In *Problems and Prospects in Continuing Professional Education*, edited by R. M. Cervero, and C. L. Scanlan. San Francisco, CA: Jossey-Bass.

Zomer, Arend, and Paul Benneworth. 2011. 'The Rise of the University's Third Mission.' In *Reform of Higher Education in Europe*, edited by J. Enders et al. Rotterdam: Sense Publishers.