

cation in all of their many types translates into wide societal support for the costs of super research universities, even if only a small proportion of Americans attend one of the highly selective research institutions.

The super research university model is an expensive one to pursue, requiring a wealthy society. Private money now makes up substantial funding in the United States. Many super research universities are privately controlled. While these factors certainly have enhanced the development of the super research university model, they are not its root cause. Instead, the origin of the super research university is related to how American society has generated widespread societal support for higher education, and included in this are elite research universities. In other words, formal education in the United States has been an early leader in the movement toward mass higher education and all the factors that such an idea includes. Instead of assuming that mass access to higher education and the model of the super research university are mutually exclusive zero-sum forces, what the American case illustrates is that in reality these two trends support one another. ■

Professors of Practice and the Entrepreneurial University

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The university is undergoing a cultural transformation to play a significant role in knowledge-based society. Universities have different missions. The teaching university is based on education and dedication to human capital development. The research university combines production of knowledge with teaching in a creative tension that has proven more productive than separating these activities. The entrepreneurial university encompasses teaching, research, and service for society. In the course of the "second academic revolution," following the academic revolution that integrated research with teaching, the university is raising economic and social

development, its third mission, to the same level as its previous missions.

Entrepreneurial universities have arisen from strikingly different academic foundations, with the first revolution, research, at times occurring simultaneously with the second revolution of economic and social development. An entrepreneurial mode is typically an overlay on a research university, but it can also be a strategy for development from a teaching

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university, with the phases accomplished simultaneously or even in reverse order to the usual progression. For example, the State University of Rio de Janeiro Friburgo campus began with a PhD program in information technology, accompanied by an incubator, in an innovative academic and regional development strategy.

Infused with entrepreneurial attitudes and strategic vision, the university collaborates with other actors to bridge the gap between discovery and application. In fact, university-industry interaction is often conducted across boundaries, utilizing a variety of linkage mechanisms and arms-length relationships. However, traditional modes of university-industry relations, such as a lump sum payment in exchange for first review of intellectual property rights (e.g., Novartis/Scripps) are problematic due to the tendency for company priorities to shift and the early-stage nature of academic findings with commercial potential that typically requires a translational research process. As a way to address these problems, some universities have utilized the concept of "Professors of Practice" to enhance the academic spin-off process.

PROFESSOR OF PRACTICE

Founded in the mid-19th century, the Massachusetts Institute of Technology (MIT) was the first entrepreneurial university. For its development it drew upon various streams of academic formats invented in or imported to the United States during the early and mid-19th century for the purpose of establishing a close relationship between the university, technology, and the economy, initially in agriculture and then in industry. During the late 19th century, when MIT was an engineering teaching college, independent consulting engineers were invited into the university as professors to jump-start research.

A similar phenomenon may be currently identified in universities that are utilizing a "Professor of Practice" (PoP) model to further the mission of economic and social development. Typically, the model is a distinguished practitioner who is invited into the university. A PoP with a half-time appointment in

the university and a half-time commitment as a venture capitalist may be found in the Haas Business School, University of California, Berkeley, as head of an Entrepreneurship Center. The PoP manages a “stable of adjuncts,” full-time business people who teach individual specialized courses in the Haas entrepreneurship specialty within the MBA program.

PoP is used to cover various formats, but the basic usage in the United States denotes that category of nontenure faculty whose primary duty is to teach. This role is similar to that of the adjunct professorship and the research professor, who also have limited and specific duties. At MIT, the term is reserved for distinguished practitioners who have had a world-class impact on fields important to MIT's academic programs and are committed to enhancing those programs.

EXPANDING THE PoP MODEL

In principle, the PoP model can be used to combine internal and external roles in any of the three main missions of the university.

CONCLUSION

In principle, the PoP model can be used to combine internal and external roles in any of the three main missions of the university. PoPs may be extended across the university and from senior to junior positions. For example, the English Department could draw in a PhD from the publishing industry to help start a university press. The concept can also be applied to faculty members engaging in start-up activity in a serious but not full-time capacity, obviating the choice of leaving the university completely.

As some faculty members move from a regular full-time professorship to a half-time PoP, they will complement those coming in to the university, creating a two-way flow between university and industry. In practice, any university has the potential to assist economic and social development, irrespective of level and previous mission. However, only an entrepreneurial university, with professors recruited from academic and nonacademic venues, has the capacity to complete a virtuous circulation of academic development and societal engagement. ■

The northeast United Kingdom, a source of the original industrial revolution, is determined to reverse its fate as a declining industrial region. Facing a situation similar to MIT and New England in the early 20th century, Newcastle University has initiated a “science city” project to renew its region through knowledge-based economic development, focusing on four themes: aging and health, energy and environment, molecular engineering, and stem-cell and regenerative medicine. The implementation plan seeks to redevelop a former industrial site with laboratories for firms and university research groups.

To jump-start attraction of high-tech firms to the region, Newcastle University has turned the PoP concept on its head, from a teaching to a research model. An initial set of four chairs—half supported by the university and half by One Northeast, the regional development agency—has been created. The chairs are designed to attract PhD high-tech firm founders, in the science city theme areas. They are expected to have developed ideas for research that are too advanced to be pursued in their firm but that could be the basis for a university research group, to attract external funds. The optimum expectation is that all or part of a PoP's firm might follow them to Newcastle.

Within the university, the PoP is expected to serve as a role model for faculty members contemplating initiating a start-up and as a link between the university's business school and science departments. These faculty are expected to work closely with the science city theme leaders, making significant contributions in developing translational activities and associated education programs.

Europe's Agenda on Global Competition

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Globalization and growing worldwide competitiveness are increasingly shaping policies and setting the agenda for the future of European higher education. These responses are formulated and implemented at European, national, regional, and institutional levels. Examining policies and efforts undertaken at the European level reveals the need for a greater political commitment to achieve the intended 3 percent gross domestic product (GDP) target for R&D expenditure and the 2 percent GDP target for higher education expenditure, mainly by stimulating private investments in these areas.

COMPLEMENTARY ENGINES FOR ACTION

In the late 1990s, awareness of global competition rose, leading to various initiatives. In 1998, the ministers of 4 countries (the United Kingdom, Germany, France, and Italy) called for the harmonization of degree structures, triggering the Bologna