

Induced Innovation: The Story of Land-Grant Universities

By

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Introduction

While pursuing a graduate degree in the Department of Applied Economics at the University of Minnesota more than three decades ago, I became a disciple of the induced innovation school in economic development theory articulated by Vernon Ruttan, Yujiro Hayami, and Hans Binswanger among others.¹ Though Ruttan et al have written primarily on induced technical and institutional change related to agricultural development, I have found their work useful in reasoning through questions related to induced innovation in education and educational institutions.

To describe “institutional innovation,” I offer a few quotes from Ruttan and refer you to his larger body of work.

Thus the term institutional innovation, or institutional development, will be used to refer to a change (1) in the behavior of a particular organization, (2) in the relationship between such an organization and its environment, or (3) in the rules that govern behavior and relationships in an organization’s environment.

The induced innovation perspective is somewhat more complex in that it considers that changes in cultural endowments, factor endowments, and product demand are also important sources of institutional change.

Collective action leading to the implementation of institutional innovations involves struggles among various vested interest groups.

In this paper, I will argue that the eventual creation of land-grant universities, made possible by the Morrill Act of 1862, was the result of inducements for a major institutional innovation; and if we read the signs correctly, we should be re-innovating land-grant universities to meet 21st century challenges and realities.

Historical Perspective

Allow me to start this argument as a practicing “dilettante historian” and review the conditions and incentives that gave rise to the creation of land-grant universities. While Abraham Lincoln signed the Morrill Act in 1862, the public conversation about the need for a more inclusive

¹ Hayami, Y. and V. W. Ruttan. 1971. *Agricultural Development: An International Perspective*. Baltimore. Johns Hopkins University Press.

Ruttan, V. W. 2001. *Technology, Growth, and Development: An Induced Innovation Perspective*. New York. Oxford Press.

Binswanger, H.; Ruttan, V. W., et al. 1978. *Induced Innovation: Technology, Institutions and Development*. Baltimore. Johns Hopkins University Press.

Ruttan, V.W. 2003. *Social Science Knowledge and Economic Development: An Institutional Design Perspective*. Ann Arbor. University of Michigan Press.

system of higher education had been intermittently engaged for more than eight decades. As early as 1776 John Adams expressed his view that:

Laws for the liberal education of youth, especially for the lower classes of people, are so extremely wise and useful, that, to a humane and generous mind, no expense for this purpose would be thought extravagant. (1776) McCullough, page 103

And again in 1786 Adams argued:

A memorable change must be made in the system of education and knowledge must become so general as to raise the lower ranks of society nearer to the higher. The education of a nation instead of being confined to a few schools and universities for the instruction of the few, must become the national care and expense for the formation of the many. (1786)² McCullough page 364

In his presidential address (Dec. 7, 1796) George Washington asserted:

It will not be doubted, that, with reference either to individual or national welfare, agriculture is of primary importance. In proportion as nations advance in population and other circumstances of maturity, this truth becomes more apparent, and renders the cultivation of the soil more and more an object of public patronage. Institutions for promoting it grow up, supported by the public purse; and to what object can it be dedicated with greater propriety?

In the words of Thomas Jefferson, founder of the University of Virginia:

Let us in education dream of an aristocracy of achievement rising out of a democracy of opportunity. Preach, my dear sir, a crusade against ignorance; establish and improve the law for educating the common people. Let our countrymen know that the people alone can protect us against these evils, and that the tax which will be paid for this purpose is not more than the thousandth of what will be paid...if we leave people in ignorance.

The movement accelerated in the 1830s when Jonathan Baldwin Turner became the champion for the establishment of educational institutions to serve “the working class” and their children. In 1850 he presented his proposal “A Plan of Our State University for the Industrial Class.” One can see much of Turner’s thinking (and writing) in the legislation which would become the Morrill Act—the second attempt to implement Turner’s dream.³

The case for land-grant universities that eventually led Lincoln to make them law rested on several powerful arguments and inducements. **First**, the case rested on social justice. It was not fair that higher education be denied to those who had the misfortune of being born into the lower classes. If “all men were created equal,” then equal access to higher education was a fundamental right.

²McCullough, David, 2001. *John Adams*. New York. Simon and Schuster.

³ The first attempt in 1859 was vetoed by President James Buchanan.

Second, the bimodalism in income and wealth at the time could, in the view of many, eventually lead to dissatisfaction and socio-economic instability. The visible signs of class differences, including the elitism nature of the colleges, could foment unrest and perhaps revolution.

Third, economic development was constrained by a lack of educated, practical leader-managers. As the nation moved into the industrial revolution and expanded westward, it was clear that a better educational, popular and a more accessible system of higher education would be essential.

Thus, economic, political and social pressures stimulated “induced institutional innovation” and the creation of land-grant universities was the response.

So to summarize, institutional innovation, which resulted in laying the foundation for land-grant universities, was induced by (a) the need for a more social-just education system, (b) threats of social unrest and instability, and (c) concerns over constraints in economic development.

As it became clear, continued agricultural development, and in turn, domestic food production, required the application of new, science-based solutions and approaches. Congress in 1887 added a research mission for land-grant universities through the Hatch Act. With the realization that some Americans still were being denied full access to higher education, Congress innovated with the creation of black land-grants (1890) and Native American land-grants (1994).

Waves of poorly educated immigrants through Ellis Island starting in the late 1800s, new technologies for agriculture and the growing income gap between urban workers and rural farmers, among other challenges, called out for land-grants to carry educational programs beyond their campuses. Thus, Congress offered us the Smith-Lever Act of 1914 and the Cooperative Extension Service was born.

Two Nobel Laureates, Theodore W. Schultz and Gary S. Becker, among many others, have presented the analytical case for investments in “human capital,” especially through education as a fundamental building block for economic development.⁴

Land-grants Today

In many ways the challenges and conditions of today parallel those which inspired the original land-grant innovation prior to 1862. There is a growing gap in access to higher education between the “haves and have nots.” A recently published study by the University of California-Los Angeles finds that over the past four decades the incoming university freshmen have increasingly come from upper income families.⁵ In the average median, family income of

⁴ Schultz, Theodore W. 1971. *Investments in Human Capital: The Role of Education and Research*. New York. Free Press.

Schultz, Theodore W. December 1960. “Capital Formation by Education.” *Journal of Political Economy*.

Becker, Gary S. 1993. *A Theoretical and Empirical Analysis with Special Response to Education*. 3rd Edition. University of Chicago Press.

⁵ Pryor, J.H., S. Hurtado, V.B. Saen, J.L. Santo, W.S. Korn. *American Freshmen: Forty-Year Trends 1966-2006*. Higher Education Research Institute. UCLA. 2007.

university freshmen was above the national average family income. Today, that difference has grown to 60 percent.

Colleges and universities now frequently use standardized test scores as a primary admission criteria (or filter). Those who rank colleges and universities, *U.S. News and World Report*, for example, use the “quality” of the inbound student body as a measure of institutions’ “stature.” For this and other reasons, universities chase rankings by chasing higher SAT/ACT students. The widely held view is that those at the top of the rankings are regarded as “elite” institutions.

But by seeking to be “elite,” institutions’ pursuit of higher average SAT/ACT scores has consequences and implications. The high end of the test score is dominated by white and Asian-American, upper income, upper Midwest students ([see tables 1-4](#)). One could argue that rather than seeking to be “elite” many universities are becoming “elitist.” We are leaving too many behind.

The Educational Testing Service (ETS) reports that U.S. high school graduation rates have declined over the past several decades and dropout rates are disproportionately highest among “disadvantaged” minorities.⁶ Among the 30 countries in the Organization for Economic Cooperation and Development (OECD), the U.S. ranks 16th in high school graduation rate. The U.S. has the largest educational achievement gap between white and minority (black and Hispanic) citizens.

The more poorly educated tend to be poorer (with the notable exception of Paris Hilton), and poverty feeds crime. Thus, as education becomes more “elitist,” crime can be expected to rise, and crime is a product of social instability.

Let me share again the well-known example of the young student-athlete from a farming family in Cresco, Iowa, who was denied admission to the University of Minnesota because of his low score on the standardized entrance exam and weak high school preparation in math. I, however, was allowed to enter Minnesota’s “developmental” program under its (then) General College. He went on to earn three degrees from the University of Minnesota; he won the 1970 Nobel Peace Prize, the Congressional Gold Medal, and the World Peace Prize. He is widely regarded as having saved more lives than any individual in human history. Yet, it is unlikely Dr. Norman Borlaug would be denied admission at all or certainly most of the institutions if he were applying today.

Several recent studies have concluded that America’s higher education institutions are failing to produce graduates in sufficient numbers to keep this country competitive in a global economy (National Academy of Sciences, Spellings Commission).⁷ Of particular concern is a growing deficit of professions in the STEM disciplines—science, technology, engineering and math.

⁶ Educational Testing Service. *America’s Perfect Storm: Three Forces Changing Our Nation’s Future*. Princeton, New Jersey. 2007.

⁷ Committee on Prosperity in the Global Economy of the 21st Century, *Rising Above the Gathering Storm: Energizing and Exploring America for a Brighter Future*. 2007. Washington, D.C. National Academy of Sciences.

Land-grants, along with other agencies and institutions, face an urgent research agenda in several critical areas including (a) alternative energy; (b) water availability, quality and allocation; (c) environmental protection with economic growth; (d) applications of new biology to agriculture and medicine; and (e) several others.

And of course, the Kellogg Commission urged land-grants to become “engaged” beyond their campus with both traditional and non-traditional clientele.⁸ The engagement mission is the 21st century adaptation of the 20th century extension mission.

The overarching point here is land-grant universities now have an opportunity to be part of a transformational movement in addressing the critical issues of our time. The circumstances which gave rise to the original institutional innovation are replicated today and induce us to transform ourselves.

Recommendations

So as leaders and innovators among public (land-grant) universities, what should we do? Here are a few first-step recommendations.

First, we must concede we face a serious situation and resolve to collectively confront it. Innovation that leads to real progress cannot occur on an institution-by-institution or state-by-state basis. We must become a system of higher education in the true sense of the term.

Second, we need to proactively seek and assume responsibility for a holistic response. More specifically, higher education must play a central role in overhauling and improving the Pre-K-12 system. Our sister needs our help.

According to the National Center for Higher Education Management Systems (NCHEMS) 68.8 percent of the students in 9th grade in 2001-2002 (about 4 million nationally) actually graduated from high school in 2005 (about 2.8 million). Of those graduating approximately 60 percent were “college ready.” Thus of this cohort perhaps as many as 2.3 million may be left out of higher education. Project this over continual cohorts and we will have created a permanent under class largely incapable of competing in a 21st century economy.

We must raise our standards, but in turn, energetically participate in raising the standards and performance of the PreK-12 education. A major part of this effort and commitment is collectively and substantially increasing the quality of teachers prepared for public education systems across the country.

Third, we must set our own standards for success and stature. The move, led by NASULGC, for the adoption of “voluntary standards of accountability,” could take us a good way down this road. We cannot, however, chase the criteria set by organizations such as *U.S. News and World Report* as a means of determining who we are, what we should be, and how we should do it.

⁸ NASULGC, 1997-2001. *Kellogg Commission on the Future of State and Land-Grant Universities*. Washington, D.C.

Genuine “value-added higher education” recognition as a high calling should attract the rewards associated with it.

Fourth, we need to create new programs and new alliances which ensure access to every motivated student without sacrificing educational rigor and quality. We need to create the ladder not filters. Among other things, this will mean building stronger programmatic bridges with our brethren community colleges. This may mean moving away from the traditional four-year bachelor’s degree and offering more student-centric, flexible, adaptable degree plans.

Fifth, Congress, in concert with state legislatures, must act to creatively fund “venture capital” approaches to institutional innovation just as they did in 1862. A transition to a new era in public higher education will require resources. But innovative higher education leaders will have to be held accountable for generating significant socio-economic returns on these venture capital investments. The CREATE-21 proposal, if adopted, would be a significant step in the right direction.

Sixth, as the “non-traditional” student becomes more the tradition, we must alter our curriculum, our scheduling, our concept of campus, our financial aid, and our approach to teaching-learning. Educational “recycling,” now the providence of the for-profit vendors, has to become part of the core programmatic offerings of public institutions not simply “product add-ons.”

Seventh, land-grants must embrace the commitment to fully engage beyond their campuses. This means taking research-based solutions to pressing problems in the service of all citizens. It also means engaging citizens in the process of setting long-term priorities for the “people’s” universities.

Finally, those of us approaching the twilight of our careers, which have benefited enormously from the higher education created by others, must work diligently to restock and change our faculty resources. The baby boomers will leave a rather large hole as we retire. The next generation of faculty will have to confront new demands in the context of the realities we’ll leave behind. It’s our responsibility to give them every possible means and method to succeed and then get out of their way.

Concluding Comments

We are here at this session because Justin Smith Morrill, Benjamin Wade, Abraham Lincoln, and others felt the strong inducement to innovate. I suggest we should be feeling similar inducements today. Educators of the time, led by the persistent Jonathan Baldwin Turner, helped them shape and implement one of the most profound educational innovations in recent human history.

We have the special opportunity to replicate their contributions in a 21st century context, but the time is now.

And it's important to close with a few words of warning from Ruttan.

Institutions that have been efficient in generating growth in the past may, over time, come to protect the vested interests of some of their members in maintaining the status quo and thus become obstacles to further economic development.

If we do it right, perhaps in 145 years someone will have the honor of presenting the Peter McGrath, Peter McPherson or Jeff Bingaman lecture at the annual NASULGC meeting in 2152.

Tables

Table 1

| Top Ten SAT Scores by State | | | |
|------------------------------------|---------------|-------------|------------------|
| STATE | VERBAL | MATH | COMPOSITE |
| IOWA | 593 | 601 | 1194 |
| NORTH DAKOTA | 590 | 599 | 1189 |
| MINNESOTA | 585 | 598 | 1183 |
| WISCONSIN | 581 | 594 | 1175 |
| KANSAS | 582 | 585 | 1167 |
| SOUTH DAKOTA | 584 | 581 | 1165 |
| ILLINOIS | 564 | 581 | 1145 |
| MISSOURI | 570 | 573 | 1143 |
| UTAH | 570 | 570 | 1142 |
| NEBRASKA | 565 | 571 | 1136 |

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Table 2

Fair Test's 2001 COLLEGE BOUND SENIORS (approx 1.7 million) TEST SCORES

| SAT scores by Ethnic Group | | | |
|---|--------|------|-------|
| | Verbal | Math | Total |
| Ethnic Group | | | |
| Amer. Indian or Alaskan Native * | 481 | 479 | 960 |
| Asian, Asian American, or Pacific Islander | 501 | 566 | 1067 |
| African American or Black | 433 | 426 | 859 |
| Mexican or Mexican American | 451 | 458 | 909 |
| Puerto Rican | 457 | 451 | 908 |
| Other Hispanic or Latino | 460 | 465 | 925 |
| White | 529 | 531 | 1060 |
| Other | 503 | 512 | 1015 |

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Table 3

Fair Test's 2001 COLLEGE BOUND SENIORS (approx 1.7 million) TEST SCORES

| SAT scores by Income Group | | | |
|--|------------|------------|-------------|
| | Verbal | Math | Total |
| Family Income | | | |
| Less than \$10,000/year | 421 | 443 | 864 |
| \$10,000 - \$20,000/year | 442 | 456 | 898 |
| \$20,000 - \$30,000/year | 468 | 474 | 942 |
| \$30,000 - \$40,000/year | 487 | 489 | 976 |
| \$40,000 - \$50,000/year | 501 | 503 | 1004 |
| \$50,000 - \$60,000/year | 509 | 512 | 1011 |
| \$60,000 - \$70,000/year | 516 | 519 | 1035 |
| \$70,000 - \$80,000/year | 522 | 527 | 1049 |
| \$80,000 - \$100,000/year | 534 | 540 | 1074 |
| More than \$100,000/year | 557 | 569 | 1126 |
| ALL TEST-TAKERS | 506 | 514 | 1020 |
| Taken from http://www.fairtest.org/univ/2001SAT%20Scores.html | | | |

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Table 4**Standardized Test (SAT/ACT) Impact on Admission to Selected Land-Grant Universities**

| | | | |
|-------------------|---|----------|-----------|
| Florida | 87.9% of these admitted have SAT scores of 1400 or higher | | |
| | Middle 50% | SAT | 1210-1400 |
| | | ACT | 26-31 |
| Ohio State | 87% of these admitted have ACT scores of 24 or higher | | |
| Penn State | Middle 50% | SAT | 1180-1350 |
| | | ACT | 26-30 |
| Purdue | Middle 50% | SAT | 1020-1250 |
| | | ACT | 23-28 |
| UC-Davis | Average SAT score: | Admitted | 1227 |
| | | Enrolled | 1153 |
| | Average ACT score: | Admitted | 26.1 |
| | | Enrolled | 24 |
| Wisconsin | Middle 50% | SAT | 1180-1350 |
| | | ACT | 26-30 |

*Source: Individual university webpages

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