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Andres C. Salazar

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Andres C. Salazar, PhD  
Professor and PNM Chair in Microsystems, Commercialization and Technology  
Anderson Schools of Management  
School of Engineering  
University of New Mexico  
Albuquerque, NM 87131

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Andres C. Salazar, PhD  
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### **Abstract**

Many public universities have recently found themselves being questioned about the level of activities they support that directly contribute to the economic development of the regions they serve. This confrontation is more apparent in regions where an economic downturn, a lagging economy or a persistent poverty level has created a significant public need for job creation and a long-term strategy for regional economic recovery. The problem is exacerbated as the public university declares a need for additional public subsidy to meet the pressures of increased enrollment, faculty and staff salary competitiveness, plant upkeep and broader and deeper curricula. Although long considered bastions of higher learning and ground-breaking research, public universities find themselves on the defensive in establishing their relevance to the creation of economic wealth for the region's citizenry and the efficiency of how they use taxpayer dollars for that purpose. This paper reviews several successful practices public universities have adopted in playing a larger role in regional economic development. These practices include increased support for technology transfer, establishment of a campus-wide entrepreneurship program, a direct investment role in company creation, and policy and educational infrastructure changes that allow both increased support of small company assistance and faculty leadership, recognition and rewards that encourage efforts in economic development.

### **A. A New Era in Regional Economic Development**

Public universities are being challenged today to play a greater role in economic development of the region they serve. (Arbo, 2003) The phrase "economic development" is associated with a variety of concepts relating to the state of a region's economy. It is commonly linked to activities whose successful conclusion would raise the collective economic wealth of a region. For example, if high unemployment exists in the region, then any activity that would create jobs for the region's citizens would be associated with economic development. Similarly, the activities that would raise the average wage of the region's employable workers would also be associated with the phrase. It is also worth noting that the phrase is rarely associated with those regions of high economic wealth, the attributes of which are low unemployment, high average family income, home values above the national average, etc. Studies in economic history have shown that wealth creation has passed through phases or eras – exploitation of natural resources, agricultural expansion, the industrial revolution, and now the era of the knowledge worker. Economists have noted that the wealth of a region (or a nation) has depended on the competitive use of resources to deliver goods and services to other regions. If a region

has few or no resources, natural or human, prepared to compete with those of other regions, economic wealth is difficult to create if the region is not self-reliant. This simple concept has led to acceptance of the need for regions to “export” goods and services in order to satisfy the needs of its citizens that require goods and services that cannot be competitively delivered in the region and must be imported from other regions. What are the resources of a region that can help in this economic equation? The public university has always been seen as a regional resource, mainly as a supplier of educational services, a storehouse of knowledge and a fount of innovation to the regional population. In the US, beginning with Bayh-Dole Act of 1980, awareness has mounted of the university as a source of intellectual property to be mined by the region’s industrial and commercial base. But there are other contributions that a public university can make towards a region’s wealth and job creation. This paper examines the possible roles that a public university can play in economic development, citing examples where appropriate and suggesting a process by which a public university can transition to a more active level in the area. The greater the role that the university plays in regional economic development, the greater the change that is likely to occur in course offerings, faculty reward systems, pedagogy, and public university infrastructure.(Klein & Associates, 1998)

### **B. The Challenge of Economic Development at a Public University.**

The cases in which public universities have played a major role in regional economic development have become commonplace – UC at San Diego, North Carolina State, University of Maryland, Georgia Institute of Technology and many others. Notable is also the diversity of the regions and the methodology used to mobilize the resources at the university to accomplish the end goal – revitalization and growth of the economy of the region they individually serve. The motivation for the university to involve itself in regional economic development has also been varied. In some cases, the political leadership of the region recognized first the decline of its traditional industry – tobacco and cotton in Georgia and North Carolina, textiles and machinery in Massachusetts and later in North Carolina, government installations in southern California – and then invested in university resources to revitalize the region’s economy with knowledge industries, namely, high technology, software and computer networking, financial and insurance services, etc. In these specific cases, the public was served and the benefit of a public university was amplified.

While the factors of a region’s economic growth are never under the control of the university administration, the principal contribution of the university in regional economic development is to identify the region’s competitive strengths in light of global market opportunities, mobilize the regional political and economic leadership and then act as a catalyst to forge an economic plan for the region. In fact, it is rare to find an example of a successful regional economic development endeavor that has not had a university as a key player although there is argument that its presence in the region is neither a necessary nor sufficient condition for economic development.(Newlands, 2003) The success stories of those universities who continue to play a major role in economic development have created a national trend and a question that all public universities cannot ignore, namely, what should be their role in regional economic development? This

question is asked whether the political leadership of the region in which they reside has raised the issue or not. The question is also critical whether the public funding percentage for the total university budget has diminished over time or not, a factor sometimes used by university officials to decrease the importance of serving regional needs. (Selingo, 2003) (Zemsky, 2003) Nevertheless, some public universities have gone ahead and established highly visible campus positions responsible for regional economic development activities. For example, the University of Arizona has created an “Office of Economic Development” while the University of Texas at El Paso has the “Institute of Policy and Economic Development (IPED).”

A typical public university has traditionally held fast to the view that its primary responsibility is education, often broad in scope and profound in a few areas of specialty, but whose form and substance is determined internally. The companion responsibility, open research, is conducted by a faculty that has enjoyed the mantle of tenure in order to protect its unfettered access to areas of investigation of its choice. These two objectives have created a dominant, internally-focused culture at a public university and an inherent inertia to stay the course. To be sure, the contributions made in education and in research by the public university environment are many and have proved to be valuable in the economic growth of the country. A university is often a large regional employer as well and an economic force in a community. However, public university budgets are generally seen as ever increasing, even in times of economic downturns. This view has led the public to believe that universities are not motivated to seek efficiencies in labor, plant utilization and methodology. Some of these views have led to widespread belief that the funding for a public university can no longer be justified because it is, de facto, simply a public good. Even its most ardent supporters now endorse accountability and relevance. Basically, despite its many contributions to culture and knowledge in the region, the modern public university cannot continue to exist without the economic prosperity of its core supporters, in this case, taxpayers who set aside land, paid for the buildings and most of its operational costs for many years. This support was, and continues to some degree, as a public subsidy. The role of economic development that a public university can play is connected to, and perhaps fulfills, the need for relevance to the subsidy.

In its deliberation of relevance to the region’s economy, the public university is best served by taking the initiative in the self-examination of its identity, purpose and associated strengths. This initiative helps define its modern mission, take on a more externally focused view and analyze the feedback from the community it serves about the quality of its most important product, namely, preparedness of its graduates for making economic contributions to society, research that creates economic value for society, and leadership in creating economic wealth for the citizens of the region it serves. Some public universities are taking a hard look at themselves in this light. (Klein & Associates, 1998) At the public university level, education can be seen as an enabler to economic wealth on an individual or aggregate basis, often measured in a “return of investment” metric. (Krueger, 2001) In industry, any activity at a company can be justified only if it contributes to bottom line profits. A company asks, “Is what I am doing going to please my customer?” or “Is what I am doing going to increase my profitability?” Similarly, educational and research activities at a public university are being asked to relate to the

increase in economic wealth of the society it serves. The university's many cultural and entertainment contributions to the region in sports, museums, concerts, art, literature and theater presentations are seen as secondary to the higher public need of better paying jobs and career enhancement.

The preparation of students at a public university to become productive members of the region's workforce is an activity often associated with an economic development contribution of a public university. The connection is easily made with the graduates of the "professional" schools – education, medicine, pharmacy, nursing, engineering, architecture, fine arts and business especially if instruction is performed by experienced practitioners of the profession who endorse experiential learning. But compared to requirements for a liberal arts curriculum, courses in these schools (with the possible exception of education) are generally more expensive to initiate, maintain and update in salaries for instruction, equipment and modern laboratories, thus creating an inequity in calculating a return on investment for the student and misaligning the number of graduates to regional needs. The obvious solution would be to charge a tuition level commensurate with the expense of operating the individual school and in responding to market needs. The tradition at most public universities, however, is to continue to charge a student the same tuition regardless of the field of study, thus creating a continuing need for public subsidy in order to make a college education "affordable." Some universities are either limiting matriculation or "spinning off" some of these schools in order to have the latitude to charge more tuition and attempt to reach a "break even" basis for market equilibrium.

### **C. Technology Transfer, Commercialization and Entrepreneurship at the University**

Since the Bayh-Dole Act of 1980 that transferred ownership to universities of intellectual property created by federal funds the one activity that has been notably singled out and associated with economic development at a public university is technology transfer. There are many forms of technology transfer – licensing, joint ventures, research partnerships, etc. The form that creates jobs in the region, enlarges its entrepreneurial pool and retains linkages back to continuing research at a university is the form in which faculty, researchers and students are involved in the creation, growth and retention of companies in the region. In the following is reviewed various aspects of the technology transfer activity at a university.

Licensing revenue was envisioned to be a possible supplementary source of income for colleges with problems in funding, especially public universities. Unfortunately, this source of revenue has never realized its potential even after more than 20 years after the Bayh-Dole Act. (See Figure 2-1, p. 18 in Kalis, 2001) However, a private university, Columbia University in New York, has leveraged its association with medical research facilities and hospitals in the city to help develop intellectual property from which it receives record setting licensing revenues of nearly \$100 million per year. (p. 5, Kalis, 2001)

Besides increasing revenue through additional research grants, some colleges took an aggressive role in developing their intellectual property into commercial products and services. This initiative led to the creation of companies by university-sponsored programs that included campus-wide entrepreneurship activities, the use of endowment funds for investing in start-ups and in business incubation services.(Freid, 2003)(Schmidt, 2002) Since 1980, over 2200 companies have been launched around university-associated technology and the rate of launch has increased in the past few years. Again a private university, MIT, has become a leading university in technology commercialization, has garnered over a 1000 patents, and receives nearly \$20M/yr in licensing revenues and is involved in some way in the launch of at least four companies per year.(p. 3, Kalis) Both Georgia Tech (public) and Rensselaer Polytechnic (private) launched in 1980 university based incubators that are still in existence and prospering today. Not all colleges embraced the idea of technology commercialization. Education and research, after all, were the long time objectives of the institution. However, it became clear over time that these objectives were being achieved in a way even more relevant and valuable to the college's constituents by participating and supporting technology commercialization. First, faculty, in association with the societal needs that commercialization satisfied, could now steer their research to topics more relevant and appreciated today. This led to greater self-satisfaction for those researchers who wished to solve problems of today rather than dwelling in the abstract. In other words, those researchers now saw the "relevance" of their work to an economic value for society. For students, commercialization of technology afforded work relevant to the needs of companies who became employer candidates. Companies saw in the student interns a form of productive and cheap labor. Students received "real" world experience that tied back to topics covered in the classroom. Companies, or more accurately, the commercial or industrial sector could write the homework problems for the students rather than the professor.

Another area in which the university can play a major role in regional economic development is in fostering a campus culture of entrepreneurship. The creation of companies is highly dependent on the availability of entrepreneurs (p. 8 in Mokry, 1988). The definition of "commercial" entrepreneurship connoted here is a classical one – the process of creating a business based on satisfying a societal need with scant resources. At many universities the subject of entrepreneurship is taught at the business school but there has been a movement to disseminate the study to other professional schools such as fine arts, engineering, law and the health science fields. Courses that are taught in the non-business schools often have practicing entrepreneurs as guest lecturers if not instructors. Seminars, workshops and "boot camps" are held under university sponsorship to promote and propagate the knowledge and inspiration for founding companies among students, faculty members and researchers from all fields, not just business. Community involvement is often an important factor in the success of creating an entrepreneurship culture at the public university. Local economic development agencies support mentoring or internship programs for students or faculty. At times these agencies are associated with city, county or state funded business incubators where access to funding for start-ups is also available. UC-San Diego is noted for its CONNECT program that features meetings sponsored by the university that includes students, faculty, researchers,

entrepreneurs, investors and professionals all interested in the creation of companies based on intellectual property that is associated with the university or other research installations in the area. Networking is an activity that a public university can sponsor and thus play a major role in fostering an entrepreneurial culture in the region. Small companies are started by entrepreneurial teams often formed through networking activities. It is known that more jobs have been created by small companies in the US than by any other means, including company re-location, or by employment increases at Fortune 500 companies.

Over time students or faculty members (or a combination of both) at the universities that adopted entrepreneurial programs based on commercialization of their technologies did start their own companies. Research has shown a strong correlation between business creation and university based entrepreneurial programs. Technology commercialization has also been shown to aid in faculty and student recruitment and retention. University based programs that lead to the creation of companies often have other benefits in economic development. An NBIA study released in 1999 of the 275 companies created by university intellectual property over 80% remained in the region. (pp. 7-8, Kalis, 2001) Hence, this activity has led to job creation in the local economy and tax dollars to local governments. Another side benefit is that university graduates have a chance to stay in the region rather than taking a job out-of-state. Incubation of university based start-ups increases the chances for their ultimate success and this function is a key ingredient in the recipe for universities to reap the benefits of technology commercialization. Incubators form a different activity within the university and must be treated as businesses with a bottom line – self-sustainability and success of its clients. University supplied services such as building space, business training, student and faculty interns, financial assistance often factor in the success of a campus-based incubator. Despite these impressive results, university-based incubation is not a common phenomenon.

Commercialization of university technology is also an economic development activity that bridges the significant difference between the objectives of industry and the university. Where a commercial enterprise is measured by profitability, it focuses resources toward that goal by exhibiting an urgency to reach customers, satisfy them and be paid for products and services it provides. That behavior encourages taking risks in various company functions, hierarchical decision making, preset reward systems and protection of proprietary information from competition. The university, on the other hand, has a culture of open research and teaching, risk aversion, and decision-making by committees of faculty and administration that, in many cases, requires years to complete. The lack of success in commercializing university technology leads one to believe that research spending by itself does not translate into local economic growth. (Fried, 2003)

Untimely disclosure of a commercializable idea can destroy the possibility of a patent to protect it. Since faculty members are encouraged to publish their research findings as an important step towards promotion, recognition and the ultimate reward – tenure – universities frequently lose the value of idea creation that research dollars enable. The US Patent Office allows a patent application to occur up to a year after disclosure but foreign rights are gone once disclosure occurs.



Industry has had difficulty in adjusting to the absence of the sense of urgency in developing a commercializable idea with university personnel who are on the academic clock. Deadlines or project management generally are not part of the university vocabulary. Further, industry's needs form the commercializability aspect of the research. This implies a link between the university research and needs from the commercial world. Companies are willing to pay money for research that is based on their needs. The opposite is also true. Companies do not pay for research nor license technology not directly linked to the needs of the development of their products and services. That is possibly why some universities have failed in tech transfer programs. Their research was not conceived nor developed with a specific industry's needs. The non-involvement of industry from the very beginning of university research will almost surely lead to non-interest of any discovery brought to its attention after the fact. Some states are passing legislation that would enable universities to allow companies to use university facilities more easily, thus over-riding laws that inhibit public subsidy of industry, or the "anti-donation" regulations. (Schmidt, 2002)

#### **D. Conclusions & Steps Towards Successful Economic Development**

A set of best practices has emerged from the success that a few public universities have realized by playing a major role in regional economic development. First, university governance has to recognize the value of engaging in proactive regional economic development. A strategic plan with timelines and project management oversight should be developed for engagement that modifies curricula, pedagogy, faculty and staff reward systems, policy, operational support and financing. (Klein & Associates, 1998) Second, top administrators have to glibly articulate their support of programs, positions and management changes that lead to the benefits of conducting economic development activities at the university. Just as a President attends a football game to show support of athletic programs, attendance at economic development activities can be just as relevant. Third, students, faculty and staff have to be convinced that they are involved and will benefit from a more economically engaged university. Fourth, a feedback mechanism must be put in place to update the university's education and research machine as to its relevance to meeting regional needs in workforce development and business and industrial requirements for innovation in materials, services and processes for global competitiveness of the region.

#### **Leadership.**

A proactive program in economic development goes a long way towards showing that a public university is taking the program seriously. Credibility is key. Lip service will not do it. A comprehensive program involving a campus wide initiative with accompanying training, communications and reward systems will begin the process towards convincing the university constituents that economic development is part of the new university culture. The Board of Regents must allocate funding for programs that enable this new culture to take hold. These programs can be set up so that self-sufficiency is reached within a short period of time – 2 or 3 years not 10 years – through revenues derived from tech transfer royalties, fees for service and training, and entrepreneurship grants from private and public sources committed to supporting the university's involvement in

regional economic development. The establishment of an office, institute or a center dedicated to managing regional economic development programs at the university would be a start in enabling a new culture. The appointment of an endowed chair dedicated to leadership in economic development provides high visibility to other university constituents. The table below outlines what duties the appointee might have and qualifications applicants for the chair would need to have.

**Table 1**  
**Chair of Economic Development at a Public University:**

Duties:

1. Chair the initial strategic plan for regional and state economic development activities at the university;
2. Coordinate economic development activities within the university colleges, schools and centers in compliance with a comprehensive and strategic plan of the university's role in regional economic development;
3. Act as Advisor to the University President, Cabinet and Board of Regents in matters of regional and state economic development;
4. Act as liaison to the state Office of Economic Development, EDA and other federal, state and city agencies on matters of economic development involving university activities;
5. Chair the Council for Economic Development at the university (consists of appointed members of faculty from every school and college at the university and aids in Duty No. 2)
6. Solicit grants and funds for supporting state or regional focused economic development activities within the university;
7. Encourage, support and reward work of university faculty, researchers, students and staff towards the diversification and strengthening of the economic sectors of the region;
8. Organize an annual conference on the economic development of the region in coordination with the other public research universities;
9. Establish and serve as Chief Editor for the *Journal of Regional Economic Development*, published quarterly by the university Press, soliciting quality articles on economic development activities and research conducted by regional organizations, foundations and university personnel.
10. Organize and establish community outreach programs for promoting, supporting and contributing to the economic development of the region;
11. Board member in the university sponsored business incubator;
12. Board member of tech transfer office at university; Member of Rewards Committee for "Best University Patent of the Year;"
13. Establish Alumni business mentor program for entrepreneurial teams in incubator
14. Establish Student internship program in incubator companies and in participating community based companies;
15. Establish seed funding contest for business plans by university faculty or student led companies;

Qualifications:

Education: PhD in economics, business, or technology field;

Research: Refereed publications in journals of applied technology, management science or industrial applications;

Experience: At least 10 years of industrial or commercial entrepreneurial experience in a managerial or executive role; Participation in economic development activities in a regional, state or national level.

### Faculty

University faculty members have traditionally been subject to reward systems at the public university that basically encourage publishable research and quality teaching – in that order. Service to the community is often encouraged but is rarely taken seriously in evaluating a faculty candidate for tenure. After successful completion of faculty duties over 3-7 years, tenure is awarded the faculty member and oversight for the level of research and teaching becomes one of “monitoring” rather than detailed annual evaluation. Despite what administrators or other university officials may desire from faculty, until the reward systems (including perhaps some aspects of tenure) are changed, faculty behavior modification will not occur. Few universities reward faculty for engaging in activities that are associated with economic development – assisting small businesses, creating companies, company board membership, community development and planning, economic policy development for a city, county or region, etc. Until faculty members see that there is a payoff for them for such activities, it is unlikely that many will participate in them.

### Policies.

In addition, public universities normally require faculty members to devote 80% of their time to academic work during the nine month academic year – thus essentially leaving one day a week for non-academic work. This presents a problem to that faculty member who has entrepreneurial aspirations and requires more time for his/her business creation interests. Universities also impose a restriction on the use of university resources – buildings, equipment, students for the benefit of non-academic projects, especially those involving for-profit entities. These restrictions limit or stifle altogether academic-business relationships vital to proper workforce development, community input to educational practices and course content and research directions in response to societal needs. New policies for faculty and student participation in the technology commercialization process must also be formulated and placed into service.

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