Research Synergy: The Graduate School of Public Health, the SDSU Research Foundation, and San Diego State University

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Abstract: *The evolution of a research university can take many paths. Described here is a case study of the synergy between the establishment and growth of a primarily graduate school and the commitment to developing a research university, all with the assistance of a separately incorporated non-profit research administration entity. The result has been a dramatic advancement of the university as a nationally recognized research institution, benefiting from an emerging field and school focused on applied research and community engagement, and a research support entity that has likewise thrived in its mission. The strategies leading to this success highlight the role of research in institutional advancement and regional recognition, even when operating in the context of a primarily teaching oriented state educational system; the support of a strong research management apparatus was key to producing successful results.*

Keywords: *research university, strategic plan, research management*

Introduction

The evolution of San Diego State University (SDSU) from a state teacher's college to a true research university has followed a remarkable trajectory, accelerating dramatically over the past thirty years. SDSU is Carnegie classified as a research university, high research activity. The Carnegie classification from the Carnegie Foundation for the Advancement of Teaching is a widely used framework for describing institutional characteristics in higher education. In particular, the classification is often utilized to provide a measure of research commitment and productivity in higher education institutions. Many other aspects of these classifications are also utilized in other kinds of studies and interpretations. The classifications and components have been refined and revised numerous times over the years. The Carnegie classification for doctorate granting universities includes three principal classifications: doctoral/research universities, research universities/high research activity, and research universities/very high research activity.

Many universities strive for prominence as primarily either teaching or research institutions. Over the past decades, however, the importance of a dominant research profile has gained wider acceptance. Research support implies excellence, is particularly critical in attracting high-quality faculty and graduate students, and increases visibility to various constituencies and especially to donors. Many primarily teaching institutions have worked hard to increase their research visibility and measurable successes. Traditional research institutions have worked hard to stay on top. And many more institutions have nudged the pendulum closer to research from the teaching end of the continuum.

The establishment and growth of SDSU's Graduate School of Public Health (GSPH) parallels the changing priorities of the university in responding to these national trends, and provides a case study of a strategic move towards research and graduate education. The GSPH's contributions to the community, including educational diversity and an increased supply of healthcare professionals, the conduct of applied research, and community service provides benchmarks against which the mission of SDSU and the university's research apparatus, constrained by California laws governing higher education, can be assessed.

The purpose here is to present a case study of how the creation and development of the GSPH at SDSU paralleled, or perhaps even led, the evolution of the university into a more prominent research institution, facilitated by a separate research management organization, a shift consistent with the promotion of the research role of major universities (Kirwan, 2010). The GSPH was one of the most prominent new academic initiatives within the university created entirely from scratch over the past 35 years. The school is either an instigator or a benefactor, or both, of a significant and intentional redirection of the strategic priorities of the university. The arrival of SDSU's current and eighth president, and the concurrent development and implementation of a new strategic plan, is a further extension, refinement, and reaffirmation of these earlier historical trends. All of this occurred in the context of an educational system that is not oriented toward faculty research, and that required the catalyst of a successful separate research management organization, representing an unusual alliance of forces coalescing towards a common goal.

This case study then is about the convergence of two interconnected stories, one about an educational unit within the university and one about a separate but affiliated research management organization found in some other graduate and research organizations, but not as common in comprehensive universities. This particular model worked effectively in the context presented here. In the interests of creating realistic expectations, however, there is no one universal model to fit all situations (Taylor, 2006). But the model presented here provides insight into one approach and suggests the need to explore many options in the establishment of strategic directions and operational planning when the institutional goal is to expand and support the research enterprise in a teaching environment with limited financial resources.

This case study is based on the author's longitudinal observations from 1981 onward. The author is a cofounder of the GSPH and the principal founder of the healthcare management program. In his role as a faculty member he has been principal investigator on approximately $2.5 million of grants, primarily awarded from the U.S. Health Care Financing Administration (now The Centers for Medicare & Medicaid Services) and the U.S. Centers for Disease Control and Prevention. As a principal investigator, the author has had extensive experience on the grantee side. Over the past eight years the author has been in a purely administrative position in the College of Health and Human Services (CHHS) with duties that have included oversight of all grant and contract activity at this level and college approval authority for proposal submissions. As a result, the author has worked extensively with the San Diego State University Research Foundation (SDSURF) and other components of the university from both the academic researcher and university administration perspectives. All of this experience occurred during the evolution of the university into a significant research institution.

The Academic Setting

The university was founded in 1897 to educate elementary school teachers (Starr & Polkinhornm, 1995). The university became a four-year public state teachers college in 1921. The mission expanded beyond teacher education training in 1935, and San Diego State became part of the newly created California State University (CSU) system in 1960 with the reorganization of higher education in California. Interestingly, according to former University of California (UC) President Richard Atkinson, SDSU was at one time approached to join the UC system but that initiative never materialized (Atkinson, 2012). San Diego State became a university in the early 1970s. Although set in a teaching oriented educational system, SDSU has long strived to be a hybrid of teaching and research, with quality in both arenas (Vincov, 1997).

Throughout its history, the predominance of students graduating from the university have remained in Southern California. The 280,000 alumni include many San Diego city and county elected officials, many senior administrators in business and in the nonprofit sector, and a number of senior executives of well-known national and international corporations. Prominent sports and artistic stars are also included in the alumni ranks. Over the last 30 years, SDSU has evolved into a large and highly diverse entity. The university currently enrolls approximately 33,000 students in 90 bachelor's, 78 master's, and 22 doctoral programs (San Diego State University, 2013a). Graduate student enrollment and program and post-graduate expansion has paralleled expanded faculty research.

By Fall 2013, 56 percent of students were female. By ethnicity, whites comprise about 40 percent of enrollment, Mexican-Americans and other Hispanics approximately 30 percent, African Americans just under four percent, and various Asian ethnicities comprise most of the remainder (San Diego State University, 2013a). The faculty complement includes approximately 710 tenure-track faculty and approximately 650 full-time and part-time lecturers; total faculty and staff employment is nearly ten thousand including auxiliary organizations. The physical campus has grown over the years as well with new facilities worth over $430 million added during the past decade alone. Development activities have also accelerated and the university is currently in the public phase of a $500 million fundraising campaign.

SDSU is comprised of colleges and within each college are departments and schools. School directors and department heads report to the deans of colleges, who in turn report to the Provost, the university's chief academic officer. The Provost, along with the heads of the divisions of Business Services and of Student Affairs, reports to the president. The GSPH is a unit of the CHHS which was created in 1978 to consolidate health related programs. The CHHS includes the Schools of Exercise and Nutritional Sciences, Social Work, Nursing, and Speech, Language, and Hearing Sciences. For Fall 2013, the college enrolled approximately 5,000 students, of whom approximately 1,000 were graduate students. The CHHS functions as the "health sciences center" for the university with an additional goal of promoting research collaboration and teaching efficiencies.

Elliott Hirshman became the eighth president of SDSU in 2011. His goals are to emphasize academic excellence, student success, community engagement, diversity, and

internationalization. His background includes conducting research in experimental psychology and serving as Chief Research Officer for a large East Coast university. President Hirshman, in addition to the provisions of the strategic plan, has already committed both state and non-state (soft) money resources to improving the ability of faculty to obtain grants and contracts, and has supported the hiring of additional faculty in clusters of expertise to build upon the university's existing research areas, a key commitment to continue and expand the trends discussed here.

The Research Foundation

Since 2000, university affiliated entities have administered over $1 billion in grants and contracts. Unlike most research universities, the CSU system maintains separate legal entities for non-state funds. Like many other CSU campuses, administration of extramural support, including grant and contract funds, non-state real estate holdings, and donations is conducted by the SDSURF, an auxiliary 501(c)(3) organization. The sole stated core mission of the SDSURF is to administer the university's grants and contracts, and to provide space for research programs. The SDSURF was established in 1943 and currently administers approximately one thousand projects with annual revenue exceeding $150 million. Approximately 160 support staff and 2,500 project employees work for the SDSURF. SDSURF staff provide the usual array of research support functions including grant and budget development, grants administration, managing physical facilities encompassing over one million square feet of commercially leased and owned research project space, technology transfer, legal services, risk management, audit, and administration of most university endowment funds, and manages accounts for San Diego's public radio station which is located on the SDSU campus. The SDSURF is a fully integrated operating entity with its own financial and human resources management and leadership.

The SDSURF operates under provisions of the California education act, Code of Regulations Title V, and other relevant regulations, operating agreements, federal and state tax authority as a federal Exempt Organization, and CSU Executive Orders. All such auxiliary organizations are under the ultimate responsibility of the university president. Authority for the establishment of auxiliary organizations recognizes that under California law certain state institutions need functional ability to conduct activities that do not fall within the authorization for state side operations. Recognize also that campuses of University of California and of the California community colleges are operated under their own separate state and administrative authorities and different rules apply. Complex regulations apply to the transfer of funds between auxiliary organizations and the university. SDSURF resources can ultimately benefit the university on a fiscal basis. Much university entrepreneurship operates under the authority of the SDSURF, separate from the state, primarily instructional, side of the university. This platform provides a very sympathetic approach to such efforts.

Faculty conducting research manage their extramural funded projects through the SDSURF rather than through the university itself. Grant and contract supported faculty who are paid on their research projects may receive supplemental pay from this "second" employer. Mechanisms exist to "buy-down" state teaching obligations. The university also maintains an additional

501(c)(3) entity, the Campanile Foundation, for managing donations and for development and capital campaign activities.

The university and the SDSURF have extensive governance and administrative connections. The Board of Directors of the SDSURF includes university officials and selects the chief executive officer. Another close connection involves the SDSURF and the university's Office of Graduate and Research Affairs (OGRA), which is headed by a Vice President for Research and Graduate Dean who is heavily involved in policymaking decisions regarding the SDSURF and its resources. The SDSURF's mission is closely aligned with that of the university, and especially of the OGRA. The SDSURF generates specific support for faculty research and investments in new university initiatives. Ultimately, the OGRA, its Dean, the deans of colleges, the Provost, and the President determine the research direction for the university. The SDSURF carries out these directions but generally does not initiate policy development with regard to research priorities and institutional spending.

The SDSURF also provides a connection between university researchers and industry. This tie-in has been beneficial in terms of both specific project support and university development efforts. The SDSURF's technology transfer office facilitates translation of research into proprietary products and provides revenue streams from faculty research activity.

The School of Public Health

The origins of the GSPH trace back to the late 1970s when the university retained John J. Hanlon, M.D. to prepare a vision for its health and social services programs. Dr. Hanlon was a retired Assistant Surgeon General of the United States Public Health Service and one of the fathers of modern public health. Dr. Hanlon recommended the establishment of the GSPH to provide a new focus for the university's community commitment and to ignite research activity. His proposal was warmly received by university President Thomas B. Day, a physics researcher himself. President Day gets the credit for both moving the university's strategic thinking toward a research agenda and for supporting the development of the GSPH. The graduate research dean at the time also played a key supporting role. In his oral history for the university, Dr. Day reports that he felt that the establishment of the GSPH was a very successful operation. He noted that he had to protect funds for the new school at the same time he was cutting back elsewhere, and that was a difficult situation (Resnick, 2006). The Chancellor of the CSU, Glenn S. Dumke, concurred with the establishment of the GSPH and of the CHHS as an administrative superstructure to focus the health related programs and research of the university.

The GSPH began faculty and administrative staffing recruitment in 1979, first hiring a school director followed by division heads for programs in health services administration, maternal and child health, occupational and environmental health, and epidemiology and biostatistics. The next year, the program in health promotion was initiated. Faculty recruitment occurred fairly rapidly to staff up the new divisions and programs.

Although the initial concept of the school was graduate only education, when the state fiscal crisis of the early 1990s occurred an undergraduate unit related to public health was folded into the school and became the basis for a now popular major. The initial strategic plan for the school centered around accreditation by the Council for Education in Public Health (CEPH), the specialty accrediting body in public health, obtaining university resources, and the development of a broad and strong research agenda by the newly hired faculty. From the outset, research was expected to be a high priority and a productive result of university's investment in this new endeavor. The school was fully accredited in 1985. The program in healthcare management received its first accreditation in 1982 from the Accrediting Commission on Health Services Administration, now the Commission on Accreditation of Healthcare Management Education.

Although SDSU had already established a research orientation among its younger faculty, and an interest in the healthcare arena, there was significant opposition to the creation of the new school. This opposition focused primarily on the potential diversion of resources, and especially of faculty positions, that might occur at the expense of other units in the university. In a generally always constrained fiscal situation, this is a fairly rational attitude. Support and pressure from the university president and the graduate dean, and from sympathetic faculty, eventually led to GSPH approval and acceptance on campus. Subsequent success in attracting extramural support through the SDSURF, especially for research projects and cross disciplinary collaboration among campus units, contributed significantly to gaining political support for the school.

One strategy used in the initial stages of the school's creation to gain rapid national recognition and a jump in securing research dollars was to attract a mix of older, very established faculty and leadership, and younger people. The more established faculty provided name recognition and credibility. In this group, for example, was the former dean of the University of Pittsburgh School of Public Health, a specialist in environmental epidemiology. Another early faculty member with international fame was an infectious disease specialist who edited six editions of the definitive book on communicable disease, a handbook that has been published since 1915. There was some risk in this approach in that attracting individuals who might want to semi-retire rather than work hard would dilute the productivity of new faculty positions. As things turned out, the new "older" people were productive as measured by extramural funding (SDSURF, 2014) and publications (GSPH, 1984). So the strategy was ultimately quite successful, and facilitated attracting other faculty and research funding. This strategy might have also helped divert some of the opposition to the school, given the intimidation factor associated with new faculty with international fame.

Acquisition of physical space is usually challenging in universities. State provided facilities located on campus have generally been at a premium owing to the many competing needs of the campus community and limitations on availability of capital expenditure funding for building construction and renovation. The GSPH began in a very small building at the edge of campus and has since grown into larger space in some of the oldest and most historic buildings on campus, totaling around 10,000 square feet. The school currently conducts its extramurally funded research activities in approximately 53,000 square feet of off-campus

space provided directly or rented by the SDSURF, a significant advantage in having a non-state resource for research space which allows more flexibility and perhaps more rapid responses to needs. These research facilities are scattered around San Diego County, including physical locations in the South Bay, and also space in Imperial County for projects operating there. Wet labs for instruction and research are provided on campus and are utilized mostly by the Division of Environmental Health. Equipment has generally been generously provided over the years through various state funds and supplemented by research funding. State funds for equipment are primarily justifiable for teaching purposes, but once installed equipment can also serve a secondary research use, especially when students are involved in faculty research. For example, the SDSURF generally does not provide wet lab facilities so this is an area that typically falls into the state support side even when partially used for faculty and student research. Parenthetically, the SDSURF has helped to finance some on-campus construction directed toward research and administrative use.

Research and Doctoral Education

Conceptualization of the GSPH recognized the key role of research and doctoral education in a primarily graduate entity. Faculty recruitment and incentives were biased in favor of promoting a broad research agenda. The GSPH has a number of large research centers, which focus on specific research areas and are led by key principal investigators. In the fields forming the basis of public health, research is primarily an applied enterprise so that many of the research endeavors require working with community groups and organizations, and the study of population-based issues. This research orientation facilitated a more direct involvement in the community than might be typical in basic research fields.

The growth of research is best exemplified by grant and contract revenue generated by faculty. Grant and contract revenue includes all extramural funding ranging from graduate student training to wet laboratory bench research. Table 1 presents contract revenue from 1987 through 2013, all of which has been channeled through the SDSURF, for SDSU, the CHHS, and the GSPH.

Years	SDSU	CHHS	GSPH	GSPH as a percent of SDSU
1987-1990	$119,517,304	$15,809,037	$11,013,233	9.2
1990-2000	$872,064,717	$193,761,877	$149,722,811	17.2
2000-2010	$1,302,447,439	$379,180,773	$184,571,300	14.2
2010-2012	$272,612,916	$85,719,963	$50,683,497	18.6
2012-2013	$115,708,473	$34,833,140	$20,182,441	17.4
1987-2013	$2,682,350,849	$709,304,790	$416,173,282	15.5

Sources: Data derived from an internal report, "Summary of Grant and Contract Awards," San Diego State University Foundation through 1998, and "PI Profile, Proposals and Awards," the internal data system of the San Diego State University Research Foundation.

Table 1. Extramural Grant and Contract Funding through the SDSURF, SDSU, CHHS, GSPH, 1987-2013

More critically evaluative is the revenue per full-time equivalent tenure track faculty member that, for the CHHS in many years, has exceeded that of any other college within the university, and all other CSU campuses. For example, for the 2012-2013 fiscal year, the CHHS had extramural grant and contract awards of $442,999 per position as compared to the College of Sciences' $267,802. For fiscal year 2012-2013, GSPH faculty were five of the top seven recipients of extramural support for all of SDSU, including the top two, and were the top two recipients of indirect funds as well. The GSPH has consistently accounted for half or more of the CHHS's extramural revenue, and an average of fifteen percent of SDSU grants and contracts over twenty-six years with roughly just over four percent of SDSU full time state tenure track faculty lines. The indirect attributable to these projects, in turn, provided significant support for SDSURF operations and facilities during this time period. In recent years the CHHS has accounted for 20-25 percent of SDSURF indirect operational and facilities support.

With regard to doctoral education, a topic closely aligned with research, the CHHS offers four Ph.D. programs, three of which are in the GSPH (epidemiology, health behavior, global health). Doctoral education typically feeds on faculty research and both agendas cross-pollinate each other. The doctoral program initiatives were also driven by accreditation requirements. It is worth noting that the evolving field of public health offers opportunities for doctoral level professionals to assume both academic and applied workplace positions such as in public health agencies and in industry.

Doctoral programs have been a natural area for growth. SDSU has long prided itself on the number and quality of its doctoral programs. The evolution of doctoral education in the GSPH paralleled that in the university and provided a further avenue of support for the university's evolving ambitions. California law requires that CSU campuses offer Ph.D. education jointly with another university. The natural combination of the GSPH and the medical school at the University of California, San Diego (UCSD), Carnegie classified research university (very high research activity), particularly its Department of Family and Preventive Medicine, led to extensive collaboration with multiple foci. The core basis for this collaboration has been the joint doctoral programs. Other collaboration involves research activity and a preventive medicine residency program. UCSD research is administered on a traditional basis, although UCSD also operates a 501(c)(3) foundation, primarily for development and endowment management.

The three doctoral programs within the GSPH are well established. Graduates receive the Ph.D. degree issued by the University of California and the California State University jointly. Graduates of all three programs have quite successfully obtained employment. Doctoral students have played a key role in many of the research projects undertaken by faculty and are extensively involved in research at both SDSU and UCSD. They may be employed as teaching assistants on the state side or as researchers on funded projects through the SDSURF. Doctoral education is highly dependent on the existence of a successful research program. Beyond doctoral programs, the principal focus of GSPH education has always been on the master's degrees, particularly the Master of Public Health.

In addition to joint doctoral programs for the Ph.D. degree, the CSU has sought authority for independent professional doctoral degrees. These degrees are practice, rather than research, oriented. The first of these degrees at SDSU has been the Ed.D. in education. The CSU system has gained independent authority to offer the Doctor of Nursing Practice (D.N.P.) and the Doctor of Physical Therapy (D.P.T.). The CHHS now offers the D.P.T. degree in the School of Exercise and Nutritional Sciences. The further expansion of independent doctoral degrees is a highly politicized issue subject to debate and decision-making by the state legislature. The University of California has historically sought to limit doctoral education within the CSU. Whether the CSU will further expand independent doctoral education, including most controversially the Ph.D., has yet to be determined. This issue is part of the eventual re-examination and potential restructuring of Title 5.

Diversity and Research Priorities

Diversity has long been a priority at SDSU. Diversity means access to education and professional careers for students from traditionally underserved backgrounds, producing professionals to serve populations and communities lacking such resources, and contributing to the improvement of lives in all regions of the nation through applied research. Demographic trends over the past fifty years, if not longer, especially as regards immigration, have produced highly diverse populations in California and throughout the United States and the world.

SDSU is a highly diverse university with nearly 60 percent of students designated as nonwhite and recognition as a Hispanic-Serving Institution. The CHHS and the GSPH are both highly diverse as well. Approximately 80 percent of the college's student body is female, and 60 percent is nonwhite. The diverse student body includes many first time college students, and families with economic and cultural disadvantages. Numbers for the GSPH are similar. The programs offered by the college target large diverse populations and underserved regions. This is particularly true for the schools of social work and public health. Much of the research agenda in public health is focused on historically minority populations, border health, health disparities, and environmental health concerns, especially along the U.S.-Mexico boundary.

The GSPH encourages diversity content in its educational programs as well. For example, all GSPH undergraduate students must complete an international experience (Daly, Baker, & Williams, 2013). The CHHS may be the first and only college of health and human services in the United States with such a requirement for all students at the undergraduate level. Many courses include content relevant to cultural competency, health disparities, disease patterns, and populations at risk, and build on the diversity-focused research conducted by faculty through the SDSURF.

Community Engagement and Applied Research

The university is noted for its ties to the community. Sixty percent of alumni live in San Diego County. This is especially evident in such fields as education, social work, nursing, and business.

The town and gown distinction dates back to the middle ages and today is often used to reflect the extent to which a university is oriented or integrated into its local communities. Pure research institutions tend to be less community oriented while broader based and more diverse institutions, such as SDSU, are typically much more heavily invested in the community. In the town-gown continuum, SDSU trends toward the town side while UCSD, a very traditional research university, falls on the gown side. Community engagement takes many forms. The GSPH has extensive community involvement through student internship programs at both the undergraduate and graduate levels. Students at the graduate level, conducting master's and doctoral research, frequently utilize community settings for their projects.

Technical expertise is sometimes provided directly by faculty members on a consulting basis, but the GSPH also recognized early on the need for more substantial formal opportunities to work with community organizations. As a result, and with federal and state funding opportunities, the Institute for Public Health (IPH), an applied research center managed through the SDSURF, was established as a community technical assistance and information translation entity within the school. The IPH provides project-based technical assistance and also conducts applied research. In recent years, and with dynamic leadership, the IPH has generated about $30 million of grant and contract activity. The role and status of such units within a research university setting is somewhat controversial in that the work that is typically done is extremely applied and designed to facilitate the operation of community organizations and local governments, rather than to focus on traditional publishable research. Some research universities have spun off these types of units into separate independent research or consulting entities. The SDSURF, owing to the policy focus on research activity being based in the university, is neutral on such entities as long as they generate adequate indirect support for their operations and facilities, which do not receive any state subsidy.

Any comprehensive quantitative measurement of the impact of all of these forms of community engagement in the San Diego region is not available and would be quite difficult to compile. Clearly community involvement has been, and continues to be, substantial, and recognition of the school regionally and nationally for this has occurred. A report prepared for the office of the Chancellor of the CSU estimated the economic impact of each campus. SDSU is estimated as of 2010 to have annual economic impact of over $1 billion on the regional economy and $1.5 billion on the statewide economy (ICF International, 2010). But community engagement can be at least partially measured by numbers of graduates and positions in community organizations. The GSPH has graduated and placed significant numbers of professionals in the healthcare industry in the San Diego region and elsewhere. In addition, many students have received their degrees, especially at the master's level, while working full- or part-time and have utilized their education to advance in their own organizations.

To a lesser extent, community engagement also includes faculty involvement in local healthcare organizations. Faculty have provided advice, technical assistance, and leadership in various ways in the local community, often drawing on their research reputations and experience. Since community service is at least partially rewarded in promotion and tenure decisions, although

not to the extent of research and teaching, there is some incentive to participate in these types of community activities, and, of course, as mentioned previously, community engagement and applied research serve each other's needs, and often these efforts result in research collaboration and grants. All of these aspects of community engagement are also highly consistent with the university's regional focus and current strategy of addressing community needs and of appealing to the San Diego region, in a sense as "San Diego's university."

The Process of Research Enhancement

The political and administrative processes utilized to move the university's research agenda have been alluded to throughout this discussion. Some additional elaboration is warranted to provide a more comprehensive perspective on how this goal was achieved. It is important to recognize that within the CSU system, research is essentially not funded and is not considered a core mission by state law. Therefore, there is little or no provision for infrastructure to support research activities including research management capability, seed money and financial support for faculty project development, faculty time allocation for research endeavors, doctoral student support, and a support structure to reward research success. All of this had to be created to the extent possible over a period of time.

The infrastructure component required the establishment and maintenance of a separate legal entity as described in this case study. State resources and the state operational mechanisms for financial management and other aspects of what would be necessary for grant and contract administration did not exist. Hence the creation of the SDSURF provided this infrastructure.

Second, faculty needed to be incentivized to conduct research and to seek extramural funding. Financial rewards were created within the grant management apparatus to allow additional pay for faculty conducting funded research. Faculty were provided release time from a typically relatively heavy teaching load expectation for research activities based on potential for publishing and for attracting extramural grants and contracts. Limited resources were allocated for seed money for research activities. As the SDSURF increased in size and scope, a greater quantity of resources were available to provide seed money for faculty. Some limited state resources were also available. Again, by way of comparison, within the UC system research is a mandated priority and more extensive resources are available for this purpose.

Of course, the ultimate mechanism for achieving an enhanced research agenda is to attract research oriented faculty for state tenure-track positions. This became a significant priority, eventually allowing for the accumulation of a critical mass of research faculty. This led to accumulations of faculty in specific areas who as a group were highly successful in attracting a large volume of grant and contract funding. These individuals needed to be recruited away from traditional research universities by providing financial and other incentives and an increasing group of like-minded academics to work with. The addition of doctoral programs also provided a point of attraction for many faculty given that doctoral students are a valuable source of researchers on projects.

Discussion and Assessment

A new strategic plan for the university, *Building on Excellence*, was published in 2013 (San Diego State University, 2013b). The plan is intended to cover the five years through 2018. Three primary areas are addressed: student success, research and creative endeavors, and community and communication. The area of student success focuses, among other things, on continuing widely recognized progress achieved in four-year graduation rates; improving the student experience, both educational and social; and transforming the educational experience through the establishment of an honors college, additional financial support, international experiences for students, and educational innovation. The research and creative endeavors goals include increased funding for research activity and support for grant development, support for an expansion of the arts, and an increased focus on applying the research orientation of faculty toward both undergraduate and graduate education and student involvement. Community and communication focuses on engaging alumni and community supporters, enhancing the campus environment, developing activities and relationships to support the San Diego region, and expanding public communications to improve awareness of the university's successes.

One measure of implied status is national rankings. U.S. News & World Report recently named SDSU number 14 on its list of up-and-coming schools (U.S. News & World Report, 2014). The Washington Post recently reported that SDSU increased its overall rankings the most of any university in the country since 2011 (Anderson, 2013). Various programs within the university have achieved notable rankings within their own fields; these include, for example, international business, audiology, rehabilitation counseling, clinical psychology, and the College of Engineering in different listings. Research reputation is clearly an extremely key component of overall reputation for many universities and the expansion of research funding is essential to building name recognition, especially for a large state university. While rankings are highly unreliable and may be of questionable validity, they do have some recognized correlation with measures of quality and appearing on these radar screens is important to national recognition (Sweitzer & Volkwein, 2009).

With regard to those aspects of the strategic plan that focus on research, the university is already committing funding for additional faculty positions in strategically selected fields, and is investing university funds to expand support of research activity. Parenthetically, the current university president's previous role as a vice president for research assures his extensive knowledge of, and experience with, university and faculty research, the single most notable achievement associated with adding the GSPH to the university and the most important facilitating role of the SDSURF.

The GSPH has been a stimulus through faculty campus-wide and inter-institutional collaboration on health services research, epidemiology, and other scientific inquiry. The SDSURF helps to provide collaborative opportunity and breaks down barriers between disciplines and schools and departments since it is an impartial research entity hosting institutes and cross-disciplinary grants. The SDSURF is a neutral party whose interests are simply derived from promoting all funded research opportunities.

The integration and leadership provided by an external nonprofit auxiliary organization also demonstrates that this model can be effective in promoting a strategic research agenda in a state university setting. While not typical of many research universities, the provisions of California law required the use of this approach and the result has been highly successful at SDSU and at other CSU campuses with similar constraints. Having a separate legal entity for the conduct of research has facilitated increased faculty research pay, a higher share of indirect cost allocation to principal investigators, and more extensive collaboration and sharing of resources than might be typical in many research universities. With respect to the issue of indirect allocation to investigators, in particular, this arrangement may be more advantageous than in many other research institutions. Researchers generating full indirect also receive a discretionary allocation of around ten percent of these funds which can be used to promote additional research activity, present results and attend meetings, provide bridge support for staff, and respond to many other needs. By comparison, with state funds, this degree of flexibility is unlikely to exist.

On the other hand, having two separate entities (SDSU and the SDSURF) may complicate presenting a clear consolidated "balance sheet" to outside entities and persons. Since the standard model for research universities is one public or private entity that encompasses all activities, most accrediting bodies and other external organizations, and even individuals, find it difficult to fully comprehend the larger picture when operations and finances are divided among two separate legal entities, one a state institution and the other a nonprofit. As a result, the full impact of the GSPH's extensive teaching and research efforts are less visible. For example, on the state side the GSPH instructional, operational, and equipment budgets are perhaps $3 million per year, but the total budget including research activities approaches $25 million per year. Similarly, total employment on the state side is under 100 faculty and staff, while on the SDSURF side GSPH employment may exceed 500 individuals.

A separate research entity may not be the ideal situation but at the same time provides unique opportunities. The visibility of a separate research entity is probably greater then when submerged into a more traditional structure. Removing research administration functions from the educational side of operations, while complicating the aggregate picture, does better clarify the research effort.

SDSURF provides a mechanism to bypass state bureaucracy and to focus research efforts directly on outcome objectives. Having a highly focused mission with discrete staff and facilities avoids the more broadly based responsibilities of research administrators who serve multiple assignments and superiors. Research administration support can be provided with personnel hired exclusively for this purpose and paid at an appropriate level, independent of any direct consideration for state instructional and support salaries. Similarly, both research faculty and their research and support staff can be paid without the limitation of comparability to state employees on the instructional side. Many research staff working for faculty principal investigators are paid significantly higher salaries as an SDSURF employee then they would be paid as a state employee. And employment and other aspects of conducting the research is not as tied into the state-side bureaucracy and rules and regulations.

The development and growth of both the GSPH and the SDSURF has paralleled SDSU's own maturation. While cause and effect may not be established, the move toward creating a research based university and the expansion of graduate and professional education at SDSU certainly parallels the growth of the GSPH and the expansion of research support from the SDSURF. Creating recognition in the international educational community for academic excellence can be achieved through the expansion of research, faculty publications, and other metrics of contributing to knowledge. Attracting outstanding and well known faculty is often facilitated by successful research programming. Master's, and especially doctoral, students are attracted to institutions that provide a research setting and outstanding faculty.

A common measure of research productivity is publications in academic and professional journals, especially in peer-reviewed journals (Toutkoushian, Porter, Danielson, & Hollis, 2003). By this measure the GSPH faculty have been reasonably productive. For the last completed academic year, for example, 71% of faculty published at least two peer-reviewed publications. Total publications for core faculty during the same year was approximately 100, or an average of approximately 3.3 per faculty member. Many publications include graduate student co-authors and approximately 80% of funded faculty research has student involvement.

Another popular measure of research productivity, particularly in the health sciences, is grant activity sourced from the National Institutes of Health. A rough measure of SDSU success in this arena is reflected by computing the university's standing among all California institutional grant recipients for fiscal year 2013. Although only a rough reflection of actual allocation due to many complex factors such as multiple principal investigators and the ways in which the NIH aggregates data, SDSU still ranks in the top five percent of all institutional recipients by funding dollars (Table 2).

The past has presented many challenges, some of which will likely continue into the future. Salary scales within the CSU for faculty have historically been low in comparison to major research universities and other schools of public health. Cost of living, and especially housing, is high in San Diego. Salary supplementation opportunities through grants and contracts, facilitated by SDSURF mechanisms, as well as external consulting opportunities, provide an avenue for entrepreneurial faculty to improve their financial situation. Funding levels for supplies, physical facilities, graduate student support, and other infrastructure has always been tight as well. These factors are especially notable in comparison to many institutions with high research productivity.

Ultimately, one of the key takeaways from this experience is the question of whether an independent or freestanding research management entity is a stronger advocate and more effective approach to promoting a research agenda then an integrated one that is part of existing departments and more diffuse within the administrative structure. Many institutional research support entities are decentralized within the academic environment rather than existing as a separate research unit. The existence of a separate organizational entity has been highly effective in the situation described here and may suggest that in some other settings a structure similar to this could be beneficial. Each institution is highly unique and operates within numerous complex administrative and regulatory parameters so drawing definitive conclusions is virtually

Institution Name	Number Awards	Total Funding
University of California San Francisco	1174	$501,656,900
University of California	847	$362,004,733
Stanford University	828	$357,812,990
University of California Los Angeles	829	$341,211,533
Scripps Research Institute	335	$198,275,639
University of Southern California	385	$184,275,868
University of California Davis	439	$180,683,527
University of California Irvine	340	$126,433,097
University of California Berkeley	357	$119,785,503
California Institute of Technology	126	$59,559,501
Sanford-Burnham Medical Research Institute	123	$53,588,265
SRI International	84	$42,623,685
Salk Institute for Biological	83	$41,115,822
City of Hope/Beckman Research University	85	$36,942,940
Kaiser Foundation Research Institute	67	$36,647,504
RAND Corporation	85	$34,313,241
University of California Santa Cruz	67	$28,551,095
Cedars-Sinai Medical Center	71	$27,956,249
University of California-Lawrence Berkeley Lab	45	$27,116,291
J. David Gladstone Institutes	46	$26,575,146
San Diego State University	80	$26,533,223
Total Top 22 Institutions	6496	$2,813,662,752
Remaining 369 Institutions	1196	$520,754,615
Grant Total California	4692	$3,334,417,367

Source: Compiled from http://report.nih.gov/award/index.cfm?ot=&fy=2013&state=CA&ic=&fm=
&orgid=&distr=&rfa=&om=n&pid=&view=statedetail

Table 2. National Institutes of Health Awards, Fiscal Year 2013, California Organizations

impossible. However, from a policy perspective suggesting the possibility that this approach should be considered is certainly justified.

Research organizations and universities worldwide are seeking to identify the most effective approaches to providing support to their research activities (Kirkland, 2005). Defining priority areas in which to seek extramural funding and providing a platform for efficiently managing these programs is a universal concern (Marlin, 2009). Most universities that are not totally derived from a teaching mission are seeking to assess the extent to which they should support and manage their research endeavors. Empirical evidence clearly supports the importance of appropriate managerial structure and support for these efforts, as well as the need for visible leadership and clearly defined missions (Schutzenmeister, 2010). Establishing priorities and committing to proposal development and submission has even led to the creation of a

highly specialized organization for such professionals, the National Organization of Research Development Professionals. Of course, the Society of Research Administrators International continues to provide leadership for the much larger and broader community of research management professionals. One size does not fit all, but clearly each institution must seek out the most effective and appropriate structures for achieving these research missions. That two separate entities were so effective in the instance of SDSU, and facilitated the growth of the research program, as illustrated by the GSPH, provides one effective model in one combination of circumstances.

The past 30 years of development at SDSU has at least in part been dedicated to expanding the university's research agenda and doctoral education, and achieving national visibility. Many other initiatives have focused on improving the quality of education and of life for undergraduate students. The university's new strategic plan aims to consolidate these accomplishments and to take the institution to the next level. The GSPH and the SDSURF have clearly played important roles in many university successes, and especially in graduate education, and in promoting the research environment, roles that will continue for many years in the future.

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