© Journal of Higher Education Outreach and Engagement, Volume 29, Number 4, p. 139, (2025)
 eISSN 2164-8212

Challenges and Opportunities in University Collaborations With Public and Private Sectors

Adesoji O. Adelaja

Abstract

Drawing on the author's experiences in public and private sector needs assessment; university, government, and industry partnerships; and resourcing such partnerships, this article highlights some of the challenges and opportunities facing university-based boundary units and faculty operating in the domains of public policy, business strategy, and economic development. It compares the characteristics and behavior of universities to those of the private and public sectors; presents seven case studies to highlight useful processes and outcomes; and summarizes key lessons that may help guide activities beyond the traditional walls of higher education in building mutually beneficial partnerships. The article concludes with recommendations in such areas as leadership, reward strategies, team building, funding, value creation, communication, and enterprise sustainability.

Keywords: public–private partnerships (PPPs), university collaborations, private sector, public policy, economic development

Universities continue to explore options for more direct contributions to society through strategic collaborations that leverage faculty expertise and broader institutional capacities (Lundy & Ladd, 2020; Tumuti et al., 2013). Many universities prioritize such collaborations (Frølund et al., 2018; Parson, 2013), as potential benefits include additional streams of external funding, enhanced opportunities for professors and graduate students to work on groundbreaking research, vital inputs to keep teaching and learning on the cutting edge, delivering real solutions to global challenges, enhancing public perception that universities are relevant, and justifying public expenditures on universities (Edmondson et al., 2012; Gavazzi & Gee, 2018; Jessani et al., 2020). With the growing competition for students and downward pressures on student enrollment, these collaborations can be a selling point in recruiting students. Similarly, these collaborations can help build public confidence in universities (Gavazzi & Gee, 2018). More specific benefits to faculty may include improved academic, managerial, and leadership skills; sense of community responsibility; and faculty self-confidence and communication skills (Suresan et al., 2019). Furthermore, society often sees universities as ideal providers of knowledge, guidance, technologies, patents, analysis, and ideas that can make a difference in achieving their policy or business objectives (Tumuti et al., 2013).

However, collaborations are not always simple (Edmondson et al., 2012; Lundy & Ladd, 2020). As the cultures, values, processes, accountability principles, and reward systems of universities often differ from those of government and industry, there are potential stumbling blocks to mutually beneficial collaborations (Schoppe & Chylla, 2016). For example, effective collaborations require some degree of prior interaction, dialogue, needs assessment, and joint program development efforts, which are not always a priority for many faculty. Universities also have other compelling objectives (e.g., excellence in other mission areas) that need to be balanced against collaborative exploits (Shogo et al., 2022). Indeed, some stakeholders see the technical services of public universities

as free public goods, especially policymakers, smaller firms, start-up firms, trade associations, industry groups, and others that may lack financial means to support engagement costs (Cuthill et al., 2014; Hazelkorn & Gibson, 2017; MacFarlane, 2019; Marginson, 2011; Nixon, 2020). Finally, faculty members may not always understand the underlying motivations and interests of university administrators in collaboration, as these are not always well expressed (Wuttaphan, 2020).

Henry Etzkowitz popularized the triple helix model of collaboration, which theoretically highlights the systematic economic and social benefits that could emerge from synergies between universities, governments, and the private sector (Etzkowitz, 1999; Etzkowitz & Leydesdorff, 1997). He assumed three silos, the interaction between which can better foster innovation and economic development. More recent practice-related literature on collaborations has identified university and faculty motivations, as well as obstacles and opportunities. However, often missing in the literature are illustrative examples that highlight engaged partners, processes leading to collaboration, potential landmines, and beneficial outcomes. It is important for scholars, universities, and their partners to better understand the context and etiology of actual partnerships. As successful collaborations require the engagement of the public in well-informed ways, deeper clarification of the institutional differences between universities and their partners is important.

Drawing on the author's unique experiences in leading university partnerships, the objective of this article is to fill some of the knowledge gaps in how scholars may engage in public–private partnerships (PPPs), particularly in areas such as public policy, business strategy, and industry development. The next section identifies and compares key characteristics of governments, industry, and universities that may constrain or enhance meaningful PPPs. The article then presents seven case studies from one university to highlight beneficial processes, valuable outcomes and impacts, and key lessons learned to guide academics desiring to venture beyond the traditional walls of higher education and explore PPPs. These case studies offer the basis for recommendations in areas such as leadership, team building, collaboration incentives, resource mobilization, value creation, communication, and enterprise sustainability. Conclusions and recommendations follow.

Characteristics of Governments, Industry, and Universities

The nonacademic world involves cultures and values that may differ from those of academics (Borrell-Damian et al., 2014). Hence, this section highlights some of these differences.

Government (Public Sector)

A key role of government is to manage the delivery of public goods and services to citizens and businesses (see Anomaly, 2015, among others). Unlike private goods and services, public goods and services are not subject to individual ownership or exclusion principles (Drahos, 2004). Typical goods and services that governments deliver include public safety and security, economic stability, political stability, economic progress, and effective policies and programs that promote equity and accountability. Government officials seek to retain their political influence, which, in a democracy, accrues through votes. Resource allocation to public goods and services is decided by representatives elected through an electoral process (votes), which requires free and fair elections (Lindberg, 2004). Given the trust inherent in this arrangement, governments have a duty to ensure public accountability and transparency (Shkabatur, 2013). Ideally, access to public goods and services should reflect the collective will of citizens (Friehe & Baumann, 2021; Gruber, 2010). In a democracy, when this arrangement is not working, the voting process acts as prices do in the product market to facilitate a switch from a nonperforming government or politician to more promising ones. Votes are the primary signaling factor for public goods and services (Besley & Ghatak, 2003), and tax revenues serve as the key financing mechanism (Huber et al., 2011). Success comes when quality performance and delivery reach the largest number of voting citizens.

For a university–government relationship to work, it should make political, economic, efficiency, and effectiveness sense to the government and optimize public interest. The mantra of government is "citizen sovereignty." The operating principles of governments include equity, justice, and fairness. A government tends to demand information that is relevant to its choices

or helps to justify its action. Change is typically slow in government (Schoppe & Chylla, 2016) but can be fast in times of political or economic problems. The processes of governments can be just as rigid as those of universities.

Industry (Private Sector)

The primary role of the private sector is to provide private goods and services to society. Typical private goods and services include food, consumer products, shelter, information, technology services, banking, private education, infrastructure, defense, security, and transportation, with the last three often procured by government (Gruber, 2010). Private goods are divisible, can be owned and enjoyed individually or by groups (Gruber, 2010), are sold in physical and nonphysical markets, and must meet the needs of target groups of consumers to be acceptable and appropriately priced. Quality also matters to the private sector. Whereas votes guide the allocative process in the political arena, in the free-market system, prices send signals to producers about consumer needs or preferences and optimal production and input use. The market system relies on free enterprise and competition. When widely seen as unnecessary and inappropriate, government interventions may be undesirable to the private sector. The private sector tends to value efficiency and productivity, the lack of which implies a risky businesses environment that discourages private sector investments.

In the absence of competitive behavior (e.g., with monopoly or oligopoly power), governments regulate industry behavior, pricing, and product quality. As citizens make their choices, the market's invisible hands operate. Buyers switch from a substandard product to others, driving down the price of the former. The private sector is primarily driven by profits (Holcombe, 1999), but efficiency, productivity, self-interest, lowest possible cost, and consumer acceptance also drive business choices. A key requirement of the private sector in a successful university partnership is that faculty are relevant, competent, efficient, and focused (Borrell-Damian et al., 2014; Schoppe & Chylla, 2016). The private sector's behavior and processes are also well defined. The primary signal comes from prices, which optimize product and input market allocations. Regulators help guide markets, but the market mechanism is typically self-adjusting (invisible hand), guided by principles of efficiency and profits. Change is typically faster in the private sector than in the government and in universities (Schoppe & Chylla, 2016).

"Real world" problems are complex and multifaceted. Therefore, single-discipline research approaches are often not capable of defining or addressing such problems. These problems cannot be fully viewed under a narrow disciplinary lens, as resulting research will provide only snippets of a solution, thereby imposing burdens on stakeholders to synthesize and build linkages among sometimes disparate disciplinary perspectives and research outputs. That is, for businesses to obtain relevant information, real-world problems are better addressed through interdisciplinary insights, not the highly discipline-oriented information typically available from academics. Industry values teamwork, customer relations, professional integrity, trust, and individual recognition (Edmondson et al., 2012).

Universities (Knowledge Sector)

A key role of the university in society is to manage the delivery of knowledge products and services, including undergraduate and graduate education, science and research, and technologies and innovations (Borrell-Damian et al., 2014; Tumuti et al., 2013). Consequently, the products of universities are private and public goods that are often inputs into the private and public sector delivery and performance processes. Universities act like the private sector by providing private goods and services (through prices), students (through tuition), and discovery (through gifts, contracts, and grants), but because innovation and education are high-level objectives of government, universities are also government-like. Governments have created some incentives, processes, and formal structures to tease out relevant products from universities. For example, they fund universities through appropriations (systematic relationship) and grants (transactional relationship). To the private sector, the university is a source of trained personnel (former fee-paying students) and discovery (contracts and grants).

In essence, universities are self-governing private enterprises that are rewarded through tuition, fees, grants, gifts, contracts, intellectual property revenue, and so on (Fuller, 2014; U.S. Department of the Treasury, 2012). Universities have evolved internal management standards and processes that match their clientele,

products, and interests. Professors are evaluated through teaching evaluations, peer-reviewed publications (for research and contributions to knowledge), and grants and contracts (for research and scientific contributions to government, industry, and society). That universities increasingly view external grants as components of scholarship may imply that they increasingly see contributions to government and industry as on par with traditional scholarship. By and large, good universities are chosen by students and granting agencies based on academic rankings and faculty expertise, which act like product prices in industry or votes in government. However, appropriations and grants to universities to produce public goods may convolute the signaling mechanism or incentive structure since the reward system is still largely based on teaching evaluations and peer-reviewed publications. A public university delivers a complex range of products, including outstanding undergraduate, graduate, and professional education (to society); research, innovation, and technology (to industry); and policy insights (to government). This complexity warrants careful evaluation by scholars considering boundary work. Henceforth in this article, the term "boundary" is used to describe research and engagement activities at the nexus between universities and the public or private sector.

Key Gaps, Challenges, Opportunities, and Boundary Considerations

Table 1 summarizes the critical differences and potential conflicts discussed above. For example, whereas universities may value freedom of expression and excellent scholarship, government and industry tend to value political and market effectiveness.

Table 1. Appraisal of Scales Measuring Outcomes, Benefits, and Management in Service-Learning

	Characteristic	University	Government (policy)	Industry (market)
1	Vision	Intellectual success	Political success	Profitability success
2	Mission	Knowledge, ranking	Policy, votes	Market, profit
3	Product, coproduct	Students (public/ private), knowledge	Public goods and services	Private goods and services
4	Process/roles	Knowledge/intellectual	Democratic/political	Exchange/market
5	Recognition	Academic excellence	Performance	Profit
6	Value system	Scientific, scholarship	Political	Economic
7	Interest	Public, private	Public	Self
8	Framework	Self-governance	Visible hand	Invisible hand
9	Sovereignty	Faculty sovereignty	Citizen sovereignty	Consumer sovereignty
10	Reward	Tenure, grades	Power	Profit
11	Guiding principles	Peer review	Equity, justice, & fairness	Efficiency, productivity, & growth
12	Exchange process	Slow	Slow to fast	Fast
13	Timeframe	Immediate & forward-thinking (Discipline)	Immediate & forward-thinking (Policy)	Immediate & forward-thinking (Market)
14	Information	Highly informed on specific topic areas	Adequately informed on relevant topics	Highly informed on relevant markets
15	Research & knowledge	Discipline, students	Constituents, policy	Consumers, market
16	Financing or funding	Public—appropriations & grants Market—tuitions & gifts	Public—taxes, fees, & fines	Markets—sales & profit

Another key difference is the nature of the organization (disciplinary vs. service units). Other areas of difference include information needs, success factors, processes, funding, operating frameworks, and reward system.

Academics cannot afford to gloss over the key issues that emerge f rom these differences. First, industry and government may prefer to receive comprehensive solutions, but academia is organized around specific disciplines. Societal problems do not always come in neat disciplinary packages, which is how universities often provide information. The government prefers information that is relevant to policy, whereas the private sector is generally inclined toward being well informed on relevant markets, products, and services. Academics may find it difficult to generate integrated information from multiple disciplines without interdisciplinary efforts to integrate disciplinary information (Borrell-Damian et al., 2014). This mismatch could be frustrating for all (academics, industry, and government). Although the public and private sectors may appreciate subject matter expertise and intellectualism, they may also have difficulty understanding universities' inability to provide relevant information fast.

Second, universities seem much slower than government or industry (Edmondson et al., 2012; Schoppe & Chylla, 2016). Demanding quick solutions to their problems, stakeholders may not appreciate the more rigid guidelines and bottlenecks in universities. Third, although the typical academic approach (ivory tower reputation) can call for respect as a cultural norm, it may cause discomfort in other sectors. Industry and government officials may expect universities to change their normal modes of action but may see little need to adjust their own behavior. Fourth, government and industry may have limited appreciation of how universities operate. For example, the reward systems of universities are often viewed as internal processes defined by academics, but public and private sector officials do not understand the workings of these systems. Fifth, although universities tend to be forward-thinking in their disciplines, government and industry often have shorter planning horizons, depending on the policy or market issue in question. Reconciling these differences can be difficult. Sixth, although citizen and consumer sovereignty are concepts that governments and industry easily understand, faculty sovereignty may be viewed skeptically, especially since it may connote self-serving behavior and an uncommon sovereignty principle. These concerns, however, should not necessarily be obstacles to collaboration if the university is well structured and deliberate about its boundary activities.

Case Studies

Seven case studies from Rutgers University (RU) in New Jersey (NJ) are chronologically presented to highlight opportunities and challenges faced in establishing university collaborations. For each, the initiative and the motivating problems and needs are defined, followed by early strategies to co-create the initiative, stakeholders and beneficiaries, processes utilized, and the established entity involved. The goals, structure, involved departments, external partners, funding sources, governance structure, and leveraged resources are also discussed, followed by key challenges, influencers, and success factors. Each case study ends with a discussion of outputs and products (academic and public/private), impacts, key sustainability elements, and key lessons learned.

Agricultural Policy Research Group

The Agricultural Policy Research Group (APRG) emerged from persistent rumblings in NJ by stakeholders who complained that RU's Cook College (later College of Agriculture and Natural Resources), which housed the New Jersey Agricultural Experiment Station, including Rutgers Cooperative Research and Rutgers Cooperative Extension, was not performing effectively regarding public policy research and outreach to support the development of agriculture, natural resources, and the food industry. The viability of agriculture had been threatened by droughts, unfavorable prices, and the stringent regulatory environment at the urban fringe. Unfortunately, the stakeholders tended to complain about problems and symptoms, rather than articulate specific policy-related needs. Also, there was limited opportunity for stakeholders to engage academics and articulate policy needs.

In response, the author conducted a survey of the expertise of relevant university researchers and approached the Cook College executive dean and the NJ secretary of agriculture to discuss possible synergies with the government and agriculture-related

industries. In this interaction, key challenges and opportunities were identified. He then held faculty roundtables to translate these challenges into research and outreach opportunities. He implemented two multidisciplinary studies to further assess the agricultural, food, and rural economies; evaluate key challenges and opportunities; and recommend alternatives for consideration by the state. A brief internal grant proposal for $47,000, titled "Sub-sectoral Analysis of the Structure and Performance of New Jersey Agriculture," was expeditiously funded to provide college and experiment station resources. The APRG was created to house the project.

Although the primary client for these products was the NJ Department of Agriculture (NJDA), the project caught the attention of the governor, the NJ Legislature, and the agricultural community, while making the university more relevant. The key units involved (the departments of Human Ecology and Agricultural, Food, and Resource Economics) partnered with administrators with policy interest and experience. The key output, a report titled New Jersey Agriculture: Strategies to Deal With Current Critical Problems, recommended that a "Future of Agriculture: Resources, Missions & Strategies" (FARMS) Commission be established to develop strategies for the future. The resulting commission was a joint venture between the college, the NJ State Board of Agriculture, and the NJDA. The process itself yielded a strategic planning grant, "Research to Support Agricultural Planning and Consensus Building for the Economic Viability and Sustainability of New Jersey Agriculture," the results of which recommended the adoption of an Agricultural Economic Recovery and Development Initiative (AERDI) to revitalize NJ's agricultural and rural economies.

The executive dean deployed an associate dean to assist in coordinating the efforts of the study team, sending a clear signal that this initiative was a high priority. Involved directors of the NJDA met regularly with the university team, which realized early that the initiative should be the start of a more structured university-led partnership, with the public sector involved only in an advisory capacity. The governance structure was simple: As APRG director, the author managed the research and outreach processes while the senior administrator managed the accountability and deliverable process. Invested funds were used to leverage university support via a 20/80 university/government match. To ensure quality but relevant research, the project was designed to allow involved faculty to see strong avenues for publishable work. Project outcomes included over 15 scholarly articles, six research reports, and several presentations to farm and food sector audiences, the state legislature, the State Agricultural Development Committee, and the governor's office. Governor Christine Todd Whitman took personal interest, as the project showed how the university could strengthen state-level policy development.

An outcome of this project was AERDI, through which the NJ Legislature appropriated over $40 million to jump-start the agricultural economy. Recognizing the need for further policy research to guide public decision making about the state's future, over $2 million of the total appropriated funds were slated for continued policy research at the university. In summary, the primary impact was policy change. The primary products were a series of academic journal articles and policy reports addressing areas that the usual academic process would not have covered in the past. The sustainability aspect involved creating the next enterprise, which provided funding for expanded research. A final benefit was the establishment of a multidisciplinary research team that could work in an integrated way to take on other projects.

Key lessons from the APRG experience include the following:

1. Universities should probably pay more attention to issues that are critical to policymakers and industry and seek the concurrence of internal and external leadership on needed work.

2. Key to effective programming is successful translation of stakeholder needs into actionable needs, researchable problems, strategic projects, and specific policy deliverables.

3. University-based policy research units may be easier to establish when the following exist: clear problems, strong needs, organizing leaders, few or no alternatives to the contribution of a university, and the availability of external funders.

4. When these conditions exist, universities are well served to create fertile ground for collaborative and interdisciplinary

research by empowering motivated and capable academics as project leaders.

5. Nonfaculty research staff are critical to the completion of complex public policy projects.
6. To reduce uncertainty and future disappointments, a clear exit strategy is needed from the outset.
7. The potential impact of well-executed boundary activities on the university's reputation as a doer can be immense, if an established policy research unit is well groomed and managed.

Rutgers Ecopolicy Center

Rutgers Ecopolicy Center (Ecopolicy) emerged naturally from the APRG, as it provided policy options on pressing challenges in the agrifood sector and worked with the FARMS Commission to design programs to jump-start the agricultural and rural economies through AERDI. AERDI included the Production of Efficiency Grants, Program Incentive Grants, NJ Farm Training Management Program, and NJ Farm Computerization Program, which needed faculty teams to conduct training, perform program monitoring and evaluation, and explore further ideas for repositioning the rural economy and address agricultural, food industry, and environmental issues. AERDI also funded research to uncover new policy innovations.

Timing can be everything. Before the Ecopolicy Center emerged, an energetic, visionary, entrepreneurial, and innovative new dean/director of research had joined Cook College administration. He understood the work of every faculty, saw the connections between research and industry/government successes, and between the silos within which various disciplines worked, and he understood that faculty, regardless of their status, field, or interest, could be encouraged and empowered to be bold and passionate about their work. He asked the author to develop a concept to boost the inclusion of the social sciences through a new multidisciplinary center and serve as director. The concept of Ecopolicy was developed, with the term "Eco" connoting economy, ecology, ecosystems, and other concepts related to the word "eco."

Working with NJ's secretary of agriculture, his division directors, and prominent stakeholders, the new dean coordinated the identification of several multidisciplinary projects to be addressed by faculty teams. Ecopolicy served as an organizing, coordinating, and empowering unit to promote and support interdisciplinary teams working on these studies. New studies emerged: (a) A Legal and Institutional Review of the "Right to Farm" Act; (b) Economics of the Farmland Assessment Program; (c) Analysis of the Effects of Jersey Fresh Promotion Program Spendings on Revenues and Profits From Fruits and Vegetables; (d) Effectiveness of NJ's Farmland Preservation Program; (e) Analysis of Alternative Income Opportunities for Farmers; (f) Status and Conditions of the Food Manufacturing, Wholesale, Retail and Service Industries; (g) Shellfish and Finfish Industries and Policy Innovation to Spur Economic Development; (h) Technical Assistance to the NJDA in Economic Analysis; and (i) Capacity Building in the NJDA in these areas. The goal was for research to undergird new policy instruments to shape the future of the state's agricultural, food, fisheries, and natural resource industries. Stakeholders had now been expanded to include the presidents of key companies in food manufacturing, wholesale, retail, and service; key commodity groups; the NJ Farm Bureau (NJFB); the State Agricultural Development Committee; and others.

No new funds were needed, as approximately $2 million was available through AERDI. The university turned an old carriage house into Ecopolicy offices. Grant funds supported faculty summer salaries, the recruitment of supporting research fellows, and the salary of a new administrative director who complemented the author's work as research director. Ecopolicy maintained a schedule of regular policy briefings to policymakers and came to be relied on as a go-to place for innovative ideas about future public policies in the green sector of the state.

As the research director, the author oversaw other faculty who managed specific projects while directly managing those in his areas of expertise. The dean deployed staff from his office to assist in managing the Ecopolicy Center. An oversight committee comprising key government officials; policy experts; and executives from the agricultural, food, environmental, natural resources, and fisheries sectors was then assembled. An internal research advisory committee ensured the application of rigorous science. To reduce

transaction costs for faculty and support the missions of academic departments without building a hard-walled center, critical investments were made in nonfaculty staff to support communications, public relations, writing, report and journal article editing, team building, and competitive grant regeneration. Like the APRG, Ecopolicy was designed to be nonpermanent, to exist until it solved the problems it was designed for.

Ecopolicy essentially leveraged a $2 million grant into a collaboratory that delivered much-needed policy reports while creating a fertile ground for a funded data-gathering, integration, management, and analysis hub where faculty could easily set up a workspace to generate academic outputs. Many faculty leveraged Ecopolicy to conduct basic research, as they enjoyed the slate of technical support from Ecopolicy. Over 25 refereed journal articles and 20 reports emerged from Ecopolicy within 3 years. With these, the foundation was already established for the Food Industry Partnership (FIP), which in turn laid the foundation for a more permanent Food Policy Institute. Transferring this capacity to departments to aid their potential for collaboration had been the plan all along, so the end of Ecopolicy came when its projects were completed. By then, Ecopolicy had become knowledgeable concerning the food industry and fisheries industry, as well as in environmental, land use, and growth management, and the university's credibility in these areas was already well-established.

Key lessons from the Ecopolicy Center include the following:

1. Critical functions of interdisciplinary policy centers include coordinating, organizing, and empowering faculty.
2. Space, administrative support, and visionary leadership are critical to the success of boundary research programs, especially when the funding potential is large.
3. Universities need not build formal hard-walled centers to respond to emerging opportunities. They can build programs around the efforts of strong and entrepreneurial faculty. Hence, successful academic entrepreneurs should not be starved of university resources, as such resources can generate excellent returns on investment.
4. Because successful engagements provide learning opportunities for all partners, a successful PPP is a good leverage point for future projects.
5. University talents can be leveraged without compromising academic rigor.
6. Universities should not put their scholarly mission in the background but should also not lose sight of the relevant and valuable outputs that can come from engaged scholars.
7. The problems of the world do not come in neat disciplinary packages. Therefore, efforts are needed in universities to translate disciplinary efforts into societal impacts.

The next two case studies involve private sector partnerships in the field of nutraceuticals.

MenuDirect

In 1997, the MenuDirect Corporation was formed by several food industry executives to develop medical foods for patients with metabolic disorders such as celiac sprue, dysphagia, phenylketonuria (PKU), irritable bowel disease, urea cycle disorder, and maple syrup urine disorder. The science behind medical foods was sound, but research to support market development was limited. Absent significant marketing, most medical food sales were direct to consumer. Medical food costs were high for these communities, but some qualified for medical insurance reimbursement, depending on their state. State adoption of medical food insurance reimbursement policy that put these products on the drug reimbursement list was a game changer in market development. Potential moral hazards associated with university involvement in solving this problem were mitigated by Food and Drug Administration (FDA) support for state legislative adoption, but few states had such legislation.

Faculty saw the research opportunities at the boundaries between agriculture, food, and nutrition, but the broader area of health and wellness seemed fuzzy. Led by Cook College, Rutgers therefore advanced its research presence in nutraceuticals, functional foods, and botanicals/medicinals. Seeing the gap in the areas of policy, marketing, and business development, the author approached the MenuDirect Corporation to jointly fashion a special research course that would allow undergraduate students to build their knowledge base for business and market development in this new and obscure

area of the food industry. Future employment opportunities in this emerging area, along with U.S. Department of Agriculture (USDA) and FDA research funding, were key motivations.

The author developed a semester-long course involving 15 students, to develop intelligence needed for companies like MenuDirect. Guided by the author, students researched medical foods reimbursement legislation across all 50 U.S. states, gathered data on the legislative adoption process and on state characteristics, researched the demand for medical foods and the population of the afflicted community, conducted price sensitivity and affordability analysis, and made several presentations to MenuDirect executives and other companies. MenuDirect executives participated as instructors. A unique win–win opportunity existed to train students in market development while benefiting a company that agreed to a public release of the final research product. Course participants met weekly, with assignments meted out at the end of each week so students could conduct necessary research in preparation for the next week. In one semester, the students gained skills in market research and developing business reports and presentations. Participating students reported that the project opened their eyes and improved their job opportunities. One student continued on in graduate school and used the data obtained from this project to develop a thesis on the roles of causal factors in the endogenous adoption of medical foods legislation. The resulting report showed the efficiency of investing in public education and promoting legislative adoption. Some lawmakers later reported that the project alerted them to the needs of the afflicted community. One of the few existing scholarly publications to date on legislative adoption of insurance reimbursement laws in the United States came out of this project.

Key lessons from this win–win project include the following:

1. Special research partnership courses involving the private sector can be good foundations for new research. These courses can bring industry knowledge into the university learning environment and improve students' job market preparedness.

2. Entrepreneurial faculty should be encouraged to explore private sector needs if doing so complements teaching and scholarship and can lead to future win–win opportunities.

3. Collaborations do not have to involve direct monies or grants, as other benefits may be foundational to future grants.

Jersey Blues

The MenuDirect partnership led to other integrated research–teaching partnerships with Parmalat Inc. (innovative ways to market milk products), Welsh Farms Inc. (home food delivery business opportunities), the food industry (forecast the future of the food market), university administrators (alternative funding mechanisms for university research and extension), and farmers (Jersey Blues blueberry market development project). The latter provided a great opportunity for students and faculty to work on an integrative project where previous knowledge did not exist.

The Jersey Blues partnership was sparked by the product glut in the blueberry market in 1997 and 1998 and the resulting decline in blueberry prices. NJ was one of a few states growing blueberries. RU had become highly successful in delivering research and technology to expand crop yields, durability, disease resistance, and variety, all of which resulted in a more rapidly growing supply of blueberries vis-à-vis demand. NJ's blueberry growers also had strong monopoly-like power through the structure they used to market their products. With falling prices, the president of the North Atlantic Blueberry Association turned to the author with the question "What do we do, as growers are hurting?" It was difficult to convince growers who historically swore by yield-expanding research that excessive yield growth was their problem.

Convinced that the problem was a supply–demand mismatch, the author concluded that research to expand demand was needed, including (a) understanding the nutritional and health prospects of blueberries (nutraceuticals value) through research, and translating research into new products (e.g., albino berries to be marketed as blond-berries); (b) developing new products based on expertise from departments such as Food Science; Nutritional Science; Agricultural, Food, and Resource Economics; the Food Manufacturing Technology (FMT) Facility; Extension specialists and Extension agents; (c) developing market channels and strate-

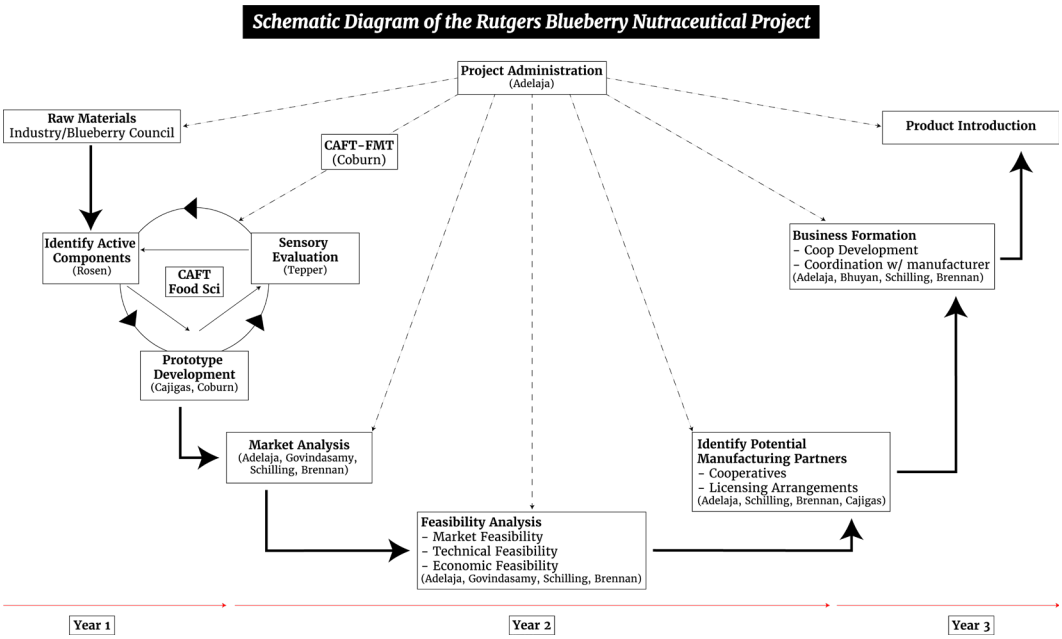
gies for the new products; (d) engaging the industry in transferring capabilities developed; (e) protecting developed intellectual property and business practices and licensing them to the industry; and (f) leveraging university resources against government and industry grants to deliver the proposed project.

The author assembled a team to develop grant proposals for a variety of potential funders. As a result, the USDA Agricultural Marketing Service provided two tranches of funding through its Food Systems Marketing Innovation Program ($50,000 and $55,000), the USDA Rural Business–Cooperative Service provided $95,000, NJ Pinelands Commission provided $30,000, NJ Blueberry Council provided $5,000, and NJ Farm Bureau provided $6,000; further, the research dean and the broader university provided $30,000, for a total of $271,000.

Four research tracks were developed, with the author serving as coordinator and lead: product development (Team A); sensory evaluation (Team B); packaging, manufacturing, and process development (Team C); and branding, marketing, business development, and spinoff (Team D). Team A developed several products in partnership with Team B (blueberry iced tea, juice, and pomace [jam]). Team B involved hundreds of consumers in sensory evaluation and provided consumer preference information on Likert scales (for taste, smoothness, sweetness, flavor, etc.). Team C developed packaging and manufacturing processes for the products, including installing a nutraceutical bottling component to the existing bottling assembly line at the FMT Facility. Team D focused on branding, marketing, and getting the products on supermarket shelves, farm stands, and farmer's markets across the state (see Figure 1 for the structure of the Blueberry Nutraceutical initiative). Blueberry Health Inc. was founded, with the ownership held by the university, associated departments, blueberry growers, and specific investors. A marketing company was hired to manage Blueberry Health Inc. since farmers were not ready to manage this complex entity and the university was still learning how to treat such boundary enterprises.

The benefits of this collaboration are as follows. The university developed a product that helped advance the economic opportunities facing an industry group (i.e., blueberry growers and their processing and marketing cooperative). The industry group received a new product, with patents to protect the technology (i.e., extraction

Figure 1. Rutgers Blueberry Research and Marketing Initiative



technique for protecting nutraceutical properties while processing blueberries). Grant funds were generated to support research and the expansion of sensory evaluation and food processing facilities. Students gained firsthand experiences and were paid for creating and nurturing a start-up company. Faculty from basic science departments were engaged in branding, marketing, and product promotion, which broadened their horizons. Pathbreaking publications were generated in a newly emerging area. The university built new expertise in nutraceutical product development to supplement ongoing scientific work. The endeavor was eventually expanded with new hires in nonthermal processing, natural products chemistry, and nutraceutical market development, boosting the university's reputation as a problem solver.

Key lessons from the Jersey Blues project include the following:

1. The more complex a problem is, the more critical it is to build a multidisciplinary team to address it, especially when funding is available.
2. When the need arises and opportunities exist, the university may need to designate and support a contact faculty person with the interest and ability to put a complex team together.
3. Projects that jointly identify and are responsive to industry needs are more likely to attract industry funding.
4. A structure of subgroups is important to implement complex multidisciplinary projects.
5. Small or start-up companies do not often have one-stop-shopping go-to places to access university expertise. Universities interested in economic development may consider providing such access points or promoting the work of faculty who can.

NJ Food Industry Partnership

The transition between the APRG and Ecopolicy, especially the funding from the NJDA, helped create strong working relationships between the university and the food industry. With departments covering areas such as food packaging, manufacturing, marketing, distribution, and services, it was clear that the university could be a treasure trove of policy innovation and advisory services to government, but industry players and the university needed to be more organized. Working with the research reports from AERDI, which included four status and conditions reports on food manufacturing, wholesale, retail, and service (available at https://foodpolicy.rutgers.edu/research.php?id=2.), the stage was set for harmonizing the needs of these sectors so that they could speak with one voice, not work against each other.

In these status and conditions research projects, which involved focus groups of subsector leaders, practitioners, regulators, and academics, each subsector was asked to rank the challenges facing it. A subsequent report that compared these rankings revealed that the problems facing each subgroup were essentially the same, but the rankings were slightly different. The author's efforts to harmonize industry thinking resulted in the NJ Food Industry Summit, where over 400 industry and government experts met to review the rankings; agree on harmonizing priorities; and brainstorm on what the industry, government, and the university could jointly do to advance their mutual interests. Industry had money, government had regulatory and policymaking capacity, and the university had strong research ability. So, there was agreement that a system which synergized university research around priority policy topics in industry development, state environmental integrity, sustainability, partnership, university advancement, and protection of its commitment to excellence would have a strong chance to attract funding and support from formerly disparate partners to develop a new learning organization. That was the foundation for the Food Policy Institute (FPI).

The NJ Food Industry Partnership and Summit had already created a consortium. To make it more impactful and broadly accepted, it was agreed to expand the concept to the entire U.S. Northeast region. As leader of the initiative, the author challenged the university to commit to funding the FPI if funding from the W.K. Kellogg Foundation could be secured to create a Mid-Atlantic Regional Institute devoted to food sector policy development. The university committed $892,000, which included release time for the author, support for an administrative assistant, space, and furniture acquisition. The NJDA committed $66,000 for foundational studies. The W.K. Kellogg Foundation Food System Professional Education

Initiative provided $10,000 for planning and later $432,000 for early-stage implementation. Several food companies provided seed funding, including Parmalat, Welsh Farms, and Ocean Spray, as well as the NJ Food Council, the NJ Restaurants Association, and Pathmark. The consortium found a recently built but abandoned building owned by a bankrupt company at the boundary of the university and negotiated to acquire it to serve as the home of this new consortium and other university units.

Key lessons learned from the NJ Food Industry Partnership include the following:

1. The university can be a powerful force in catalyzing a consortium of interested stakeholders by focusing their efforts through research to harmonize their interests.
2. Private sector entities are more likely to invest in university-led partnerships when deliverables and benefits are clearly articulated and the added value is evident.
3. Building a permanent institute or center at the nexus between the university, government, and industry requires foundational, strategic, and catalyzing research and outreach.
4. Industry and government can buy into the university's commitment to excellence and be made interested in promoting scholarship.
5. Partners do not always talk to each other. But when the university can serve as the catalyst for dialogue, it can earn respect, support, and even external funding.
6. By harmonizing government and industry interests, universities can leverage major grants to support institution building.

Food Policy Institute

The FPI was uniquely designed to be "all things to all people": a place where (a) academics from multiple units can dock, liaise with industry leaders, and access support for research and grants; (b) students can be engaged in policy, market, and industry research; gain valuable experience; and meet prospective employers; (c) meaningful indirect costs can be generated for the university and associated colleges; (d) faculty from other institutions can collaborate to design and implement funded projects; (e) industry and government leaders can meet, dialogue, and engage with academics; (f) pathbreaking basic research can be conducted on emerging issues in food policy and market development; (g) faculty can be recognized for their boundary activities; and (h) the multiple missions of the university do not necessarily conflict. A "business plan" was developed to achieve these varied objectives, with clear revenue, product, and impact projections. This bold approach, though unusual, excited many stakeholders.

Critical features incorporated into FPI's design included (a) the author, as director, with an industry leader as associate director; (b) a representative advisory board comprised of relevant stakeholders; (c) a scientific advisory board to guide scientific rigor in projects; (d) associated and affiliated faculty and flexible offices for them to dock and get their work done; (e) visiting industry executive in residence and policymaker in residence positions supported by industry and government; (f) visiting scholar positions for faculty from other universities; (g) funding for graduate students and postdoctoral scholars; (h) a communications and marketing team; (i) a finance and administration unit; (j) technical support in grant writing and manuscript preparation; (k) support for report and presentation preparation; and (l) a telecommunication and information technology platform.

The consortium negotiated enhanced indirect cost return, which increased FPI's retention from incoming grant funds by 400%. The argument to the university was that the grant earnings from the FPI would not come anyway without the unique and powerful network it committed to building. To prove the concept, a $2.5 million grant proposal was submitted to the USDA's Initiative for the Future of Agriculture for a comprehensive project on the timely issue of consumer perceptions of biotechnology-derived foods. The FPI consortium and concept were so uniquely powerful that the proposal was able to convey the need for several activities that typical federal grant-providing agencies did not usually fund in research-type projects. The grant was approved. It funded the bells and whistles that the FPI needed, but also the science and analysis needed to help reposition the thinking of U.S. scholars and policymakers about how consumers viewed genetically modified products and in which areas market expansion will be easy. The grant supported a

consumer survey that was foundational to many reports and journal articles. Some 50+ journal articles and reports emanated from this project, and the enhanced indirect cost return helped generate funding from other sources. A communications budget in the grant helped fund FPI's ambitious communication strategy. These actions set the stage for recruiting a leading scholar from Canada to lead the FPI, allowing the author to step down from the director position and focus on other things. The university would not have been able to attract this leading scholar if it had not developed a strong reputation in food policy research.

Key lessons from the FPI experiences are as follows:

1. It is possible and easy to build, out of synergies (not out of compromises), a boundary research unit to deliver impactful products across all the mission areas of the university.
2. University and industry/government interests should not always be seen as a tradeoff.
3. Boundary units that are flexible are more likely to attract external funding.
4. The teaching, research, and outreach missions of the university can be achieved in a win–win fashion through boundary institutes.
5. Special infrastructure is needed by boundary entities to deliver across their missions.

The Food Innovation Center

The Food Innovation Center (FIC) was a natural extension of the FPI and other prior initiatives. The FPI set the stage for a more technology-based university partnership with both farmers and the food industry that would address their technical and market needs beyond their policy interests. Key to the FIC's development were the disparate needs of farmers and the postharvest food industry. Through various state government and university outreach efforts, these partners (farmers and food industry) were already used to working together and trusting each other, rather than the traditional adversarial positions found in many states. Already, the university had demonstrated its leadership and could be trusted to solve more serious problems. The Jersey Blues initiative had already demonstrated the possible cross-departmental integration to achieve meaningful products for farmers and processors. The FPI had demonstrated that despite the disparate disciplinary foci of academic departments, they could be organized around real-life problems and solutions. Stakeholders had become bolder, not only in expectations of impacts, but also in what was possible if all worked together.

As a lesson from previous projects, we knew that to build a resilient PPP between the university and industry, significant problems or needs and strong solution designs need to exist, with the university seen as the prime solution provider. A tipping point that crystallized the FIC was the closure of several food processing plants in southern NJ, including Campbell Soup and Sechler Foods, brought about because the dynamics of food manufacturing and distribution had changed due to changing transportation and distribution economics, as well as the regulatory environment. New transportation economics favored more distant location of food processing plants from high-consumption urban areas, in this case the New York, NJ, and Philadelphia food shed.

The regulatory environment for farmers and processors had become stringent at the urban fringe. The resulting closure of key plants that had employed tens of thousands of employees and sustained NJ agriculture meant that farmers lost large shares of their markets, especially for fruits; vegetables; and cattle, calf, and dairy products. While farmers of agricultural ornamental and nonfood horticultural products thrived due to the growing demand for trees, shrubbery, flowers, and landscape plants at the urban fringe, traditional fruit and vegetable farmers were languishing. Much of the rural economy of South Jersey had therefore nearly collapsed, except for places very near Atlantic City. In Bridgeton and Vineland, as the economy dwindled, swaths of properties were abandoned, leading to depressed real estate values and local tax revenues. The solution the author proposed was to channel the economic, technical, and market development expertise of the university to build an enabling environment in South Jersey. This was the concept behind the Food Innovation Research & Extension (FIRE) Center, a unit of RU and the New Jersey Agricultural Experiment Station, which was later renamed the Food Innovation Center (FIC). Like the FPI, FIRE needed to serve the needs of faculty, university, farmers,

food firms, and, in this case, community economic developers. The FIC was designed to be an incubator where entrepreneurial farmers, small-scale entrepreneurs, and small food companies could access product and process development, processing, market development, and entrepreneurial solutions of the university. Land was needed, as well as a building to house flexible manufacturing equipment, with offices, classrooms, and interactive technology connectivity to the main campus. Bringing the FIC to fruition required a partnership between the state (governor and legislature), the farm community (including farmers, leaders, and farm organizations), the food industry (processors, wholesalers, retailers, and restaurants), the economic development community, and the local community.

The cities of Bridgeton and Vineland were potential candidates for siting the facility. The choice of Bridgeton was essentially based on the mayor's reception to the idea. He basically said, "What do I need to do?" One of the author's mentors on this project was a local farmer, now the late Ray Blew. Although a very successful horticultural farmer who had nothing to gain from the proposed center, he embraced the idea and helped promote it to skeptics in the farm community, who believed that what farmers needed was more research on new plant varieties and were concerned that a new center would take resources away from ongoing programs.

The mayor of Bridgeton provided seed funds and a large tract of land to the FIC. Working together, the county community college was approached, and a partnership was negotiated whereby their faculty could work alongside RU experts in offering assistance to budding entrepreneurs. Farm and food industry leaders lobbied the state legislature and governor's office. The regional economic development community joined the initiative. This initiative was unique in that the vision was not just of university presence through a new generation research and extension station; it was a vision of regional economic transformation based on real needs and a comprehensive design. The university invested in a business plan for the facility since it needed to be operated sustainably. In the end, the FIC became a compelling joint vision of the university, farmers, state policymakers, the food industry, and economic developers.

A strategic and productive move made by the author was to convince a former Campbell Soup executive and later a food industry company founder and president to hand over his company to someone else and join the FIC initiative as director. One of the author's associates, someone with expertise in building initiatives, became the codirector. With support from the city and some stakeholders, stakes were put in the ground by renting a building in downtown Bridgeton. Used furniture gathered from various places on campus was deployed to furnish the building. Necessary equipment—telephones, projectors, printers, and more—came from excess and used properties of campus-based units. Food companies donated equipment too. The opening ceremony was well covered by the media as an occasion that demonstrated the university's commitment to economic development. Months after this opening, the NJ Legislature appropriated major funds to the development of the FIC. The Casino Development and Redevelopment Authority, which was convinced that the entrepreneurial activities of the center would serve their interests 50 miles away, also approved major funds to the FIC. This was how the funding crystallized to build what is now considered the foremost food industry incubator in the nation.

When a grant program was approved by the U.S. Congress to fund food innovation centers nationwide, the FIC took full advantage and applied for a grant. Later, the USDA Rural Development Agency selected the FIC as its partner of the year. Subsequently, the FIC's preeminent position was further solidified when it was named the "Incubator of the Year" by the National Business Incubation Association, which represents an estimated 7,000 business incubator programs worldwide. In 2013, the FIC earned the distinctive designation of a Soft Landings Food Business Incubator for nondomestic companies from the International Business Innovation Association.

Today, 25 years later, the 23,000-square-foot FIC is the model for food business incubation-based economic development. Entrepreneurs and farmers from distant states have looked to the FIC to assist them in developing financing, marketing, site selection, and process support for their businesses, in fields that include the emerging prepared foods and nutraceuticals industry (see http://foodinnovation.rutgers.edu/). As of last observation, the FIC had assisted over

2,000 companies from every county of New Jersey and companies in several surrounding states, as well as international businesses looking to establish facilities in the United States, by supporting them with customized business and technical mentoring and educational training programs. Through the FIC, the university gained a reputation and presence in South Jersey as a leader in economic development, as well as obtaining major funding support for its core mission and boundary missions. Faculty from fields including nutritional science, food science, and economics routinely work on market development projects. The FIC has also been involved in international projects to build similar capacities overseas.

Again, the FIC was managed by a former food industry executive who also had an eye for the importance of teaching and research. The board, like those of FPI and Ecopolicy, reflected joint and active leadership from the university, farm community, food community, and economic development community. But the FIC started with a bold vision of economic development, which leveraged the needs and aspirations of all stakeholders.

Some of the key lessons from the FIC experience are as follows:

1. Economic development is a natural point of expression for university expertise when technology is key to development, as universities will be better leaders in this space.
2. The collective voices of stakeholders can be leveraged in mobilizing new resources.
3. Prior planning prevents poor performance (5 Ps).
4. The key missions of the university can be realized in new ways when creativity is applied in extending such missions to communities.
5. The boundary environment is quite different from the ivory tower. However, the university can maintain its culture if it is tolerant of alternative views and carefully expresses its leadership role.

Suggested Principles of Collaboration

Key lessons, with implications for collaborations that apply to the space of public policy, economic development, and business strategy, are summarized in this section.

1. The benefits from university engagement include opportunities for (a) external funding that could be substantial; (b) professors and graduate students to work on groundbreaking research; (c) undergraduates to expand their horizons, interact with policymakers and private sector executives, and position themselves better for employment; (d) vital inputs to keep teaching and learning on the cutting edge of disciplines; (e) stronger contributions to society by universities; and (f) greater faculty visibility.
2. Because university culture is unique, scholars need to better understand how difficult it is for potential public and private sector partners to engage academics.
3. Universities should encourage collaboration, but institutionalized collaborations should be built around scholars who are interested in, have expertise in, and understand the space.
4. Universities should encourage listening to external stakeholders to discover their problems and needs in order to cocreate mutually beneficial solutions. It is vitally important to precede major collaborative activities with strong needs assessment and the translation of needs into programs that interest the faculty; indeed, universities need stronger infrastructure for hearing external stakeholders and assessing the needs that may underlie collaboration. When the needs are significant, the university is best served by building around key faculty who are proven leaders and can help design a strong program.
5. Strong internal capabilities assessments are recommended for universities so that administrators are better able to match university expertise with public and private sector needs. Accurate assessment of institutional capabilities can help minimize transaction costs, false leads, and the time and effort required to mount successful ventures with external partners.
6. Faculty are at their best when they do what they are good at and love. Asking them to pursue what they are not interested in (or good at) will probably not yield robust impacts. Faculty whose interests cannot accommodate strong external partnership should probably

limit their involvement but can participate alongside others with more relevant interests.

7. When significant opportunity for well-funded and better structured programs is clearly discernible, it is important for administrators to signal strong support for such collaborative efforts.

8. Preliminary grants are useful levers in facilitating team building, proof of concept studies, and the preparation of formidable research responses. Universities are encouraged to consider such grants as building blocks for more comprehensive programing.

9. The university should become formally engaged only when a boundary activity is important for and needed by government or industry. A clear funding source or revenue strategy should also be in place. Any activity that receives no remuneration can be considered as pure outreach, and should probably occur at the discretion of the faculty member, with little or no university support.

10. University support and contributions may be needed to signal university commitment to large programmatic collaborations that bring external funding.

11. Universities should encourage the formation of multidisciplinary teams to address important areas of policy research. The adoption of an enhanced indirect cost return structure will send a strong signal about university interest in collaborative engagements.

12. Nonfaculty research staff (or program associates) are essential interdisciplinary collaborators to address policy and industry problems. Universities need to streamline the process for engaging such staff and design appropriate frameworks for rewarding them.

13. Faculty involved in collaborative research should be encouraged to avoid areas where their fundamental responsibilities are compromised in favor of collaboration. Incorporating effort replacement funds in grants and contracts may enable faculty to do more with more.

14. Faculty should be encouraged to seek opportunities to leverage funded early-career research and outreach into future programs.

15. An exit strategy should probably be developed for every structured collaboration so that partners are clear about the conditions and processes for exit.

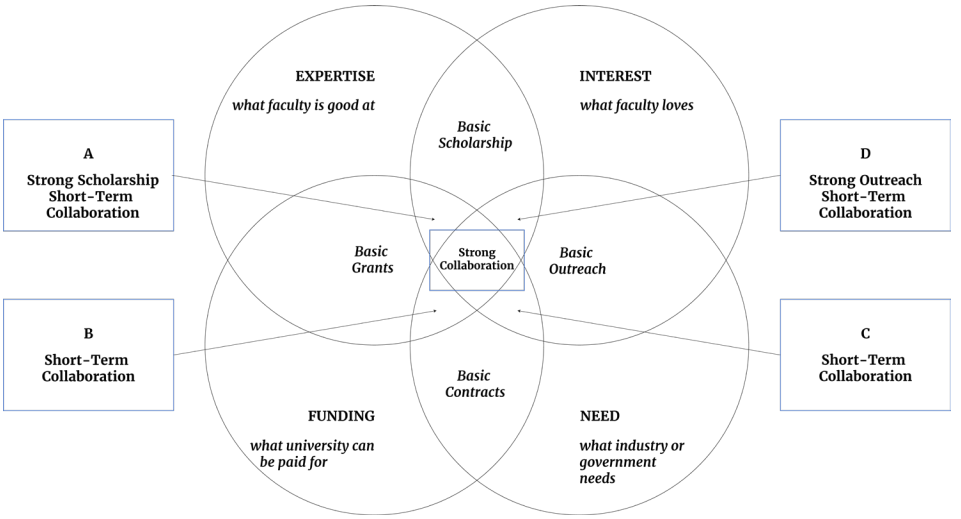
16. Universities can help motivate PPPs by reforming the promotion and tenure processes to be more flexible, providing seed funds and summer salary for pilot projects with strong promise, and encouraging stronger and more impactful classroom instruction.

17. In some cases, university processes are too rigid to allow the flexibilities that are needed for success in collaborative programs with public and private sector stakeholders. Each university is encouraged to establish a task force to review existing processes and recommend revised frameworks to support collaborative work.

Figure 2 provides a typology of possible areas of collaboration to highlight areas with particularly encouraging outlooks for structured long-term sustainable programs. The projects that engender the most collegial relationship with a university and are the most exciting for faculty involve areas faculty are good at (expertise) and love (interest). This space encourages strong scholarship, which is often a necessary condition for strong collaboration with industry or government. When funding exists from a funding agency, but industry or government stakeholders do not perceive a need (e.g., Segment A), short-term collaboration is recommended, which is what a typical large grant would fund. However, when little funding exists, but there is a strong need (e.g., Segment C), short-term service-oriented collaboration is warranted, which is what most traditional outreach and engagement programs do.

The opportunity sweet spot is the center of Figure 2, where expertise, interest, funding, and needs align (i.e., faculty know and love the work, and government and/or industry have an urgent need and are eager to fund the work). Long-term sustainable programs are best deployed when this space exists. The more indispensable the university is, the more it can garner sustainable funding. Operating in this space may require deep insights, prior feasibility analysis, partnership development activities, some rules bending, and accommodating of partners.

Figure 2. Opportunities for Cooperation and Collaboration



Long-term initiatives are built on this type of foundation, and this space warrants strong consideration of structured collaboration, infrastructure investment, and long-term partnerships. At this sweet spot, everybody benefits, and stakeholders understand the need to resource the university to deliver on a joint agenda. Special efforts are needed to nurture such relationships, as the university becomes a strong partner, not a driver.

Summary and Conclusions

The key takeaways from the author's various involvements are that, despite numerous associated challenges, university leadership should enable boundary agents, programs, and units that meet certain criteria to pursue collaborative boundary opportunities, for many reasons. First, if well executed, these opportunities can enhance the relevance and impact of the university while helping to facilitate the development of entrepreneurial culture in higher education. Second, boundary activities can help the university better devote available intellectual prowess toward society's pressing needs while helping attract new resources to the university. Third, boundary entities can leverage the expertise of government and the private sector to enhance university teaching and research programs by bringing real-world expertise into classrooms and laboratories. Fourth, for state-funded universities, boundary entities can help boost the evidence of university contributions to state economic and other development. Fifth, these entities can be effective platforms for building deeper interdisciplinary and multidisciplinary capacity of the university. Sixth, these entities can provide a more effective framework for the spin-off of new ideas, innovations, and technologies that can enhance university resources. Finally, collaborative units can be training grounds for future university leaders who have broader worldviews of the future challenges that will face higher education. To realize these opportunities, universities must, however, be careful to protect their reputation and integrity.

Before institutional assets are deployed to collaborative activities, university assessment of benefits and costs should probably consider the four factors of expertise, interest, fundability, and needs. A promising framework is one where the university builds around personalities who are more amenable to government and industry processes but are guided by relevant university values and principles. An exception is when collaboration is highly technical, the university is strongly needed for scientific or technical expertise, and there are few questions about the potential payoffs. Collaborations based on clear win–win opportunities (with respect to products, revenues, and values) will tend to be more successful. However, this type of collaboration will require personalities that can easily straddle multiple cultures but are grounded in university values. Such personalities are rare in higher education, so it is important to nurture the few that exist. It makes sense for the university to be deliberate in its col-

laborative efforts by selecting areas that are predetermined to offer win–win opportunities and building infrastructure based on key university values and people and that can prosecute such opportunities. It is therefore useful for universities to conduct routine opportunity and talent assessment so they can take advantage of such opportunities.

Industry and government agendas change more frequently than university interests. Universities must therefore be willing to tolerate short-term policy and market engagements with the public and private sectors and be ready to discard those structures when they are no longer relevant. Because of the personality differences, long-term alliances are difficult and are most impactful in areas of huge gaps. The absence of university-based knowledge can be costly to the public and the private sectors, so universities need to be strategic in picking areas of intervention where opportunities to contribute to society are strong. In operating in the boundary, universities may need to implement new processes to accommodate special boundary projects. For example, some approval processes that are standard in universities can be cumbersome to partners who are used to faster action. Finally, where payoffs are imminent, universities may need to establish multidisciplinary teams to explore them, but based on thorough needs and return assessment.

In order not to consume more journal space, this article does not specifically address the personality differences between land-grant universities (who already promote boundary work) and non-land-grants. The former, especially their agricultural research and extension programs, receive supplemental appropriations to deliver more direct programs to their constituents.

Author Note

Funds from the John A. Hannah Distinguished Professor Endowment in Land Policy at MSU supported this research. This paper is designated as document HP2024-HE-101 of the Hannah Professor Land Policy Program. The author is grateful to William "Rod" Sharp for inspiring this paper and takes full responsibility for any errors that may remain. IRB review is not applicable since there are no human subjects involved.

About the Author

Adesoji Adelaja *is the John A. Hannah Distinguished Professor in Land Policy Emeritum at Michigan State University (MSU) and founder and former director of MSU's Land Policy Institute. His research interests focus on public policymaking, specifically domestic and international economic development. He received his PhD in economics from West Virginia University.*

References

Anomaly, J. (2015). Public goods and government action. *Politics, Philosophy & Economics, 14,* 109–128. https://doi.org/10.1177/1470594X13505414

Besley, T., & Ghatak, M. (2003). Incentives, choice and accountability in public service provision. *Oxford Review of Economic Policy, 19*(2), 235–249. https://doi.org/10.1093/oxrep/19.2.235

Borrell-Damian, L., Morais, R., & Smith, J. H. (2014). *University–business collaborative research: Goals, outcomes and new assessment tools.* European University Association. https://www.eua.eu/publications/reports/university-business-collaborative-research-goals-outcomes-and-new-assessment-tools.html

Cuthill, M., O'Shea, E., Wilson, B., & Viljoen, P. (2014). Universities and the public good: A review of knowledge exchange policy and related university practice in Australia. *Australian Universities Review, 56*(2). https://search.informit.org/doi/10.3316/aeipt.204683

Drahos, P. (2004). The regulation of public goods. *Journal of International Economic Law, 7*(2), 321–339. https://doi.org/10.1093/jiel/7.2.321

Edmondson, G., Valigra, L., Kenward, M., & Hudson, R. (2012). *Making industry–university partnerships work: Lessons from successful collaborations.* Science I Business Innovation Board.

Etzkowitz, H. (1999). *The triple helix: MIT and the rise of entrepreneurial science.* Gordon and Breach.

Etzkowitz, H., & Leydesdorff, L. (Eds.). (1997). *Universities and the global knowledge economy: A triple helix of university–industry–government relations.* Cassell Academic.

Friehe, T., & Baumann, F. (2021). Public goods. In A. Marciano & G. B. Ramello (Eds.), *Encyclopedia of law and economics.* Springer. https://doi.org/10.1007/978-1-4614-7883-6_393-2

Frølund, L., Murray, F., & Riedel, M. (2018). Developing successful strategic partnerships with universities. *MIT Sloan Management Review, 59*(2). https://sloanreview.mit.edu/article/developing-successful-strategic-partnerships-with-universities/

Fuller, M. B. (2014). A history of financial aid to students. *Journal of Student Financial Aid, 44*(1), 44–68. https://doi.org/10.55504/0884-9153.1078

Gavazzi, S. M., & Gee, E. G. (2018). *Land-grant universities for the future: Higher education for the common good.* Johns Hopkins University Press.

Gruber, J. (2010). *Public finance and public policy* (3rd ed.). Worth Publishers.

Hazelkorn, H., & Gibson, A. (2017). *Public goods and public policy: What is public good, and who and what decides?* (Centre for Global Higher Education Working Paper 18). Centre for Global Higher Education, University of Oxford. https://doi.org/10.5287/ora-daw-90mznv

Holcombe, R. (1999). Equilibrium versus the invisible hand. *Review of Austrian Economics, 12,* 227–243. https://doi.org/10.1023/A:1007820310502

Huber, J., Shubik, M., & Sunder, S. (2011). *Financing of public goods through taxation in a general equilibrium economy: Theory and experimental evidence* (Cowles Foundation Discussion Paper No. 1830R3). Cowles Foundation for Research in Economics, Yale University. https://cowles.yale.edu/node/139277

Jessani, N., Valmeekanathan, A., Babcock, C. M., & Ling, B. (2020). Academic incentives for enhancing faculty engagement with decision-makers—Considerations and recommendations from one School of Public Health. *Humanities & Social Science Communications, 7,* Article 148. https://doi.org/10.1057/s41599-020-00629-1

Lindberg, S. I. (2004). The democratic qualities of competitive elections: Participation, competition and legitimacy in Africa. *Commonwealth & Comparative Politics, 42,* 61–105. https://doi.org/10.1080/14662040408565569

Lundy, K., & Ladd, H. (2020). *Why collaboration is key to the future of higher education.* EY Parthenon. https://www.ey.com/en_gl/insights/strategy/strategies-for-collaborat-

ing-in-a-new-era-for-higher-education

MacFarlane, K. (2019). How can universities contribute to the common good? *Perspectives: Policy and Practice in Higher Education, 23*(4), 122–131. https://doi.org/10.1080/13603108.2019.1567615

Marginson, S. (2011). Higher education and public good. *Higher Education Quarterly, 65,* 411–433. https://doi.org/10.1111/j.1468-2273.2011.00496.x

Nixon, J. (2020). Higher education and the public good. In P. N. Teixeira & J. C. Shin (Eds.), *The international encyclopedia of higher education systems and institutions.* Springer. https://doi.org/10.1007/978-94-017-8905-9_15

Parson, A. (2013). Evolving partnerships: Academia, pharma, and venture groups adapt to challenging times. *Cell Stem Cell, 12*(1), 12–14. https://doi.org/10.1016/j.stem.2012.11.020

Schoppe, L. A., & Chylla, R. W. (2016). Collaborating with universities and government labs. *Research-Technology Management, 59*(1), 67–71. https://doi.org/10.1080/08956308.2016.1117356

Shkabatur, J. (2013). Transparency with(out) accountability: Open government in the United States. *Yale Law & Policy Review, 31*(1), 79–140. https://yalelawandpolicy.org/transparency-without-accountability-open-government-united-states

Shogo, A., Ogunnaike, O., Udoh., M., Kaki, J., & Daramola, O. (2022). A content analysis of the vision and mission statements of top ten leading universities in Africa. *Cogent Education, 9*(1). https://doi.org/10.1080/2331186X.2022.2143648

Suresan, V., Jnaneswar, A., Swati, S. P., Jha, K., Goutham, B. S., & Kumar, G. (2019). The impact of outreach programs on academics development, personal development and civic responsibilities of dental students in Bhubaneswar city. *Journal of Education and Health Promotion, 8*(1), Article 188. https://doi.org/10.4103/jehp.jehp_56_19

Tumuti, D. W., Wanderi, P. M., & Lang'at-Thoruwa, C. (2013). Benefits of university–industry partnerships: The case of Kenyatta University and Equity Bank. International *Journal of Business and Social Science, 4*(7), 26–33. https://www.ijbssnet.com/journal/index/1955

U.S. Department of the Treasury (with the Department of Education). (2012). *The economics of higher education* (ED544780). https://eric.ed.gov/?id=ED544780

Wuttaphan, N. (2020). Factors affecting faculty engagement: A review literature. *Human Resource and Organization Development Journal, 8*(2). https://www.researchgate.net/publication/344165589_Factors_Affecting_Faculty_Engagement_A_Review_Literature