

Breaking the Waves: Innovating at the Intersections of Economic Development

Economic Development Quarterly
2018, Vol. 32(3) 183–194
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sagepub.com/journalsPermissions.nav
DOI: 10.1177/0891242418783848
journals.sagepub.com/home/edq



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Abstract

State and local economic development is often conceptualized as a series of successive waves, with each wave representing distinct policy priorities. In this study, we rework the standard wave metaphor to recognize the gains for regional economies when practitioners reach across established boundaries to work together to create a strategy mix. We present a case from North Carolina biosciences to demonstrate the contribution to regional industrial specialization when specialists combine their respective knowledge of entrepreneurship and industrial recruitment and coordinate development practice. More than an adjustment to tightening budget constraints or intensifying political demand, strategy mixing allows practitioners to extend and capture greater gains from state support for innovation. This case study provides an illustrative example for how other regions can advance innovative industry by bringing seemingly distinct development tools and targets into closer alignment.

Keywords

business recruitment, entrepreneurship, strategy mixing, policy portfolio, bioscience

Creative ideas often emerge when diverse interests and areas of expertise intersect. Yet when it comes to economic development in the United States, there is strong tendency to reinforce entrenched professional boundaries and competing organizational priorities. This is particularly true for the economic development subfields of industrial recruitment and entrepreneurial promotion, which are often portrayed with dueling objectives and different theoretical justifications, along with competing economic targets. Within economic development scholarship, there is a tendency to reinforce these boundaries—either by studying entrepreneurship or recruitment independently from each other, or as is often the case, treating industrial recruitment as inferior. Yet, if the objective is to promote long-run shared prosperity through expanded access to high quality, good paying jobs, then both strategies might be gainfully employed in a complementary and reinforcing manner.

This study argues that solutions to contemporary economic challenges in the United States—especially deepening concern over the loss of quality job opportunities and innovative capacity—could be enhanced if we recast entrepreneurship and business recruitment as complementary policies and recognize the potential to improve economic development practice through their interaction. Adapting a concept from Flanagan, Uyerra, and Laranja (2011), we call for a reconceptualization of state and local economic development as a strategy mix—a blending of established areas of practice that help reinforce institutional interdependency, and with the added effect of refining and better aligning regional policy objectives. This reconceptualization has implications for

how we study and theorize state and local economic development. It also offers the potential to inspire practitioners to innovate in everyday practice.

We develop this idea through an illustrative case study in biosciences, demonstrating innovations in state and local economic development practice resulting from the mixture of industrial recruitment and entrepreneurial development. At the core of this case is North Carolina's Biotechnology Center (Biotech Center), the first state-funded bioscience economic development agency in the United States. Since 2011, the Biotech Center has combined expertise working with firms at the opposite ends of the bioscience spectrum—early-stage entrepreneurial start-ups and recruited branch divisions of large, multinational corporations—to create novel strategies and tools for engaging, financing, and assessing new economic development targets. With this blended approach, the Biotech Center not only extends support for firms throughout its development trajectory but also institutionalizes channels for aligning the needs of “home-grown” bioscience firms to those of the communities in which they reside. At first glance, this mixing could be cynically described as simple extensions of “old school” recruitment, with incentives now increasingly demanded by earlier-stage firms and willingly provided by

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job-hungry state and local governments. But we argue this approach is well situated to support America's evolving "industrial policy" to capture and retain a greater share of the "rewards" that are generated through ongoing state and federal support for innovation.

In this regard, our case contributes to an emergent literature on the "entrepreneurial state" (Mazzucato, 2014). Still, within this literature there is disproportionate focus on national agencies and initiatives, thus obscuring the locus of innovative activity within subnational jurisdictions. The need for policy experimentation in support of industrial activity is often greatest and most immediate at the local level, where there are dense networks of state and local institutions supporting both entrepreneurship and industrial recruitment. There is room for research to explore policy intersections at that scale to better understand efforts to further extend and enhance public investment in innovation. Before demonstrating this through the North Carolina case, we first consider the emergent economic and governance challenges that motivate practitioners to experiment with novel forms of strategy mixing in support of national and local innovation. We review the theoretical threads that have dominated the literature, moving from the metaphors of waves and layers to portfolios. We then introduce the concept of strategy mix and demonstrate its implementation with our specific case.

Economic Development as a Strategy Mix

Over the decades, economic development agencies throughout the United States have expanded their capacity, not only extending boundaries but also taking on a more complex set of responsibilities and activities. To capture the evolving nature of our field, scholars often conceptualize economic development as a series of successive "waves" or "orientations," each representing a distinct phase, with different policy priorities, economic targets, and motivating theoretical logics (Blakely & Leigh, 2009; Glasmeier, 2000; Ross & Friedman, 1990).

Some scholars have used the "waves" framing to claim a superior advantage for new orientations, arguing that the returns to state and local economic development funding would be optimized if the policies associated with prior waves were pushed to the side and allowed to fade away. This has been especially true for industrial recruitment, which has justifiably been criticized by economic development scholars over the decades (Eisinger, 1988; Markusen & Neese, 2007; Rubin, 1988). Yet in practice, a policy continuity is commonplace, with older traditions focused on industrial recruitment coexisting with newer orientations that support entrepreneurship and innovation (Hanley & Douglass, 2014). Recent research also indicates resurgent use of industrial recruitment in the wake of the Great Recession (Warner & Zheng, 2013; Zheng & Warner, 2010),

leading to a concern that this renewed emphasis on attracting outside firms could crowd out other contemporary uses of public funding.

Andrew Isserman (1993) created conceptual space for the coexistence of multiple strategies by emphasizing that American economic development is best "viewed as *layers* [italics added] of . . . policy, not as alternatives" (p. 89). But while layering offers room for different strategies to coexist in place and time, it maintains a similar normative tilt to the applied metaphor of waves. Layering also implies an underlying tension that acts to reinforce the concept of strategy separation. Scholars often emphasize this tension by presenting industrial recruitment as a form of "exogenous" development that siphons scarce resources away from locally developed businesses, technologies, or educational uses (Glasmeier, 2000; Hanley & Douglass, 2014; Olberding, 2002; Plosila, 2004). Nor is the association of layering with policy conflict or discord isolated to U.S. economic development—studies of American politics have long used the analogy of a "layered cake" to describe conflict-ridden approaches to federalism that pit state actions against the national interest.

A second, more agnostic conceptualization of economic development is that of a managed portfolio—not in a narrow sense of diversified business investments, but as a bundled set of diverse and complementary strategies that state and local economic development practitioners have at their disposal. In contrast to layering, the portfolio approach is not concerned with rating or ranking strategies. Rather the emphasis is on managing uncertainty and mitigating economic risk, recognizing that economic developers often need multiple strategies and projects to better respond to emergent economic opportunities or threats. As with layering, older economic development strategies persist with time. But within the portfolio context, these traditional strategies retain equal value within an expanding economic development toolkit—playing their part in maintaining or reinforcing development objectives within the overall economy.

The portfolio framework is gaining traction within American economic development scholarship (Alpaugh, 2008; Feser & Lugar, 2003; Goetz, Deller, & Harris, 2009; Malizia, 1986; Markusen & Schrock, 2008; Rodrik, 2014). Portfolio approaches have been well documented that concurrently promote economic and workforce development objectives (Lowe, 2007; Zheng & Warner, 2010). But with respect to dual management of industrial recruitment and entrepreneurial development, the concept has been more consistently applied to studies of national and regional economic development in Asia, Europe, and the Middle East. In her groundbreaking book *Asia's Next Giant*, Alice Amsden (1989) described a sophisticated bundle of complementary strategies devised by government agencies in South Korea. Korean economic developers unabashedly recruited foreign companies through targeted policies,

while simultaneously administering robust programs to develop homegrown businesses. Taiwan followed a similar path, allowing it to build specialized technological and industrial strengths through government-mandated local sourcing requirements—but ultimately predicated on successful recruitment of prominent foreign manufacturers with a wide global reach (Amsden & Chu, 2003; Lowe & Kenney, 1999). These combined efforts would help elevate Taiwan as a global leader in computer peripherals and eventually semiconductor fabrication (Breznitz, 2007).

Recent international cases shed further light on strategy complementarities, yet also challenge an earlier held assumption that this coordinated approach is a necessary “catch-up” device that works best for developing or “late-comer” nations seeking to “copy” and emulate well-established technologies (Amsden, 1989). Breznitz and Murphree’s (2011) in-depth study of China, for example, illustrates the use of related combinations to also push out the technological frontier, using a mix of targeted recruitment and locally focused innovation policies to drive technological advances by bringing back teams of foreign-trained nationals and their affiliated business interests. Andy Pike and colleagues have documented similar efforts in Western Europe, pointing especially to the work of U.K. economic developers in recruiting large-sized multinationals to boost “indigenous” entrepreneurial capacity through locally coordinated logistics and supply chain management systems (Pike, Rodríguez-Pose, & Tomaney, 2006). In each of these cases, national and subnational planning agencies adopt industrial recruitment as a necessary development strategy, reinforcing an overarching objective of achieving industrial strength.

Of course, we know from the world of business finance that portfolios can underperform and even collapse. This suggests that there is room to better understand the conditions that lead to what Markusen and Schrock (2008) call a “unified economic development portfolio” (p. 207). Better managed portfolios strive to reduce underlying conflicts or tensions between distinct strategy areas, including reducing interstrategy competition for scarce resources or political attention (Malizia, 1994; Stark, 2011). In other words, portfolio approaches are effective because they balance a set of policy alternatives or trade-offs.

But an economic development portfolio can also increase value through tighter coupling and integration of strategies that coexist within the same bundle. As strategies are enacted together within an existing portfolio they can lose some of their distinctive edge, meaning they are no longer “individual, standardized and interchangeable policy instruments” (Flanagan et al., 2011, p. 708). Rather they become interlaced, with practitioners experimenting with novel combinations in response to changing local conditions and opportunities. In this adaptive institutional context, it is not only important to unpack the microprocesses and micropolitics of the strategy combinations that emerge but to also explore the conditions under which

tighter coupling offers greater economic development advantages compared with maintaining or reinforcing strategy separation and independence.

What is Gained With a Strategy Mix?

While the concept of a “policy mix” has been explored in relation to macroeconomics policy and more recently, to regional innovation systems (Flanagan et al., 2011; Kivimaa & Kern, 2016; Lanahan & Feldman, 2015), we see value in extending its application to mainstream economic development. A policy mix captures complex interactions with multiple organizations and actors, leveraging different levels of government and distributing responsibility. We introduce the term *strategy mix* to consider how state and local economic development might be conceptualized as a creative process of defining community objectives, sharing existing knowledge, and working toward common ground. A strategy mix combines fragments of established strategy elements to extend support to new economic development targets or objectives.

So how might economic development practice improve with strategy mixing? In the wake of the Great Recession and coupled with ongoing restructuring and political uncertainty, U.S. economic development practitioners face substantial economic and labor market challenges (Stiglitz, 2016). There is great need in many communities for strategy innovation. Practitioners are also expected to solve complex economic problems with fewer resources at their disposal. Strategy mixing offers a means to address hardening budget constraints by working together to do more with less. Admittedly, this has the potential to encourage austerity measures, including reducing the number of practitioners needed to push the economy on multiple fronts. However, we believe that a more promising outcome is for practitioners to transcend established professional boundaries to better coordinate and sequence economic support. In this regard, strategy mixing is not about reducing overall levels of public investment. Rather it implies opportunities for cross-training both within and across economic development functions and agencies.

Strategy mixing also offers the potential to drive policy coherence by encouraging practitioners to create an integrated economic development agenda (Kivimaa & Kern, 2016). We believe that this is particularly relevant for practitioners who support entrepreneurial and industrial recruitment—essentially book-ended strategies that are traditionally practiced in separation or initially motivated by contrasting theoretical frameworks. Strategy mixing offers the potential to bring these, and other seemingly distinct strategies, into closer alignment by encouraging practitioners to work together to advance a unifying objective. This, in turn, can provide a powerful tempering device as well, pushing practitioners to not simply justify their actions to elected officials or the public, but uphold accountability standards established within their own professional networks (Weber, 2007). As such, strategy mixing can help buffer

against excessive incentive use or a related myopic focus on attracting large corporations that offer immediate employment impacts (Sullivan, 2002).

But there is a related contribution with strategy mixing that we feel is particularly relevant to a contemporary push to advance national innovation. In recent years, a number of studies have pointed to the essential role of federal agencies in supporting innovative and transformative technologies. Examples now abound in U.S. biotechnology, clean technology, information technology, and artificial intelligence, including essential technologies needed to run modern-day smart phones and related digital media (Mazzucato, 2014; Rodrik, 2014). For these innovative technologies, government agencies have not limited their role to addressing obvious market failures nor have they allowed the market and the private sector to dictate. Government has contributed to technology “visioning,” articulating a technological need, reducing risk, and guiding private firms to invest in specific technologies and related entrepreneurial activities (Mazzucato, 2014). And government agencies have done this with an eye toward long-term policy objectives, including the need to advance environmental standards, and promote medical breakthroughs and national security.

Some scholars have presented this federal role as a form of technology portfolio management, recognizing that while it is difficult to “pick winners,” government agencies can increase gains through a set of related technology investments, thus buffering against any individual failure (Rodrik, 2014). But we see an opportunity to also recognize efforts by state and local governments to use novel forms of strategy mixing to augment regional innovative capacity by enhancing the public return from continued federal and state support of technology development. The decentralized nature of economic development strategy in the United States (Block, 2008; Schrank & Whitford, 2009) means that state and local economic development agencies are especially well positioned to shepherd federally funded technologies from inception to market and, in the process, extend and capture more of the gains from public investment in innovative technologies (Feldman & Lowe, 2017; Lazonick & Mazzucato, 2013).

We also acknowledge, however, that strategy mixing can come with a certain amount of risk, including the potential for a more established strategy to simply overpower or cannibalize another. This risk is potentially magnified for a mix that includes industrial recruitment, especially given the tendency for elected officials to overstate its power to elevate their political standing (Imbroscio, 1997; Markusen & Nesse, 2007; Rubin, 1988). However, we believe that this threat also necessitates greater attention to cases where strategy mixing constitutes enhanced forms of economic development. We now turn to an illustrative case study involving bioscience industry development in North Carolina to demonstrate this potential.

Extended Case Methodology

Our ongoing research on North Carolina biosciences and the state’s Biotech Center represents a form of “extended case study” (Burawoy, 1998). We have developed our understanding of the Biotech Center over the past decade, drawing on a rich array of archival materials, including detailed strategy documents, annual reports, and a vast collection of archived newspaper clippings, press releases, and editorials, dating back to the late 1970s when the North Carolina Board of Science and Technology initially proposed creation of a dedicated biotechnology center. We have digitized and coded much of this information. In addition, we have conducted close to 20 semistructured interviews with practitioners and executives at the Biotech Center, including retired staff and former executives. This includes follow-up interviews and e-mail exchanges with key practitioners at annual or biannual intervals, a technique that enables us to capture shifts in strategy orientation over time and place those within the context of North Carolina’s changing political economy. We developed detailed summaries of these interviews to identify gaps in information or inconsistent statements, which we then resolve through additional archival analysis and when necessary, subsequent rounds of interviews. Over the past decade, we have also attended numerous strategy meetings and public events sponsored by the Biotech Center, giving us an opportunity to further hone our analysis.

We have had the advantage of being close to this evolving case study and in frequent contact with central actors and decision makers at the Biotech Center since 2005. In this regard, our knowledge of strategy development at the center represents a form of what Bent Flyvbjerg (2006) describes as context-dependent expertise. As he explains, expertise acquired through in-depth case study “is important for the development of a nuanced view of reality, including the view that human behavior cannot be meaningfully understood as simply the rule governed acts found at the lowest levels of the learning process.” As he also notes, “great distance to the object of study and lack of feedback easily lead to a stultified learning process, which in research can lead to ritual academic blind alleys, where the effect and usefulness of research becomes unclear and untested” (Flyvbjerg, 2006, p. 223).

The Case of North Carolina Biosciences

Core to this story is the North Carolina Biotechnology Center (Biotech Center). As the nation’s first state-funded bioscience agency, the Biotech Center has long pursued simultaneous activities in support of entrepreneurial development and industrial recruitment (Feldman & Lowe, 2011; Lowe, 2014). Established in 1981, the center’s initial focus was institutional capacity building and, more specifically, strengthening North Carolina’s public and private universities and research institutes. By the end of the 1980s, the center became more

intentional in its support of business development. In the intervening years, it has greatly expanded its programmatic support to include a range of financing tools and business services designed to meet the diverse and ever-changing needs of bioscience companies in North Carolina. In fiscal year 2013, almost \$3 million (26% of the Biotech Center's annual award budget of \$10.7 million) was allocated to business financing in the form of loans and fellowships (North Carolina Biotechnology Center, 2014). According to one of its vice presidents, the Biotech Center positions itself as a "one-stop" shop, "providing a *continuum* of resources for firms to grow" (B. Bullock, 2013, interview with authors). Before describing the center's recent experiments with strategy mixing, it is useful to first reflect on its established areas of expertise and what each team brings to the mix.

Entrepreneurial Support

Support for bioscience entrepreneurship involves assessing risk and, more specifically, evaluating the commercialization potential of prerevenue technologies. Over the decades, the Biotech Center has embraced this role. In its first years of existence, the Biotech Center offered a limited amount of direct financing in the form of research grants to a select number of entrepreneurial firms through its institutional granting initiatives. By the decade end, the center had scaled up its support for entrepreneurial ventures, creating the dedicated Economic and Corporate Development Division, described in the 1988 annual report as assisting "North Carolina's entrepreneurs and companies in addressing these opportunities" and to encourage "their growth and development." The new division extended earlier efforts to promote technology commercialization through information sharing, networking, and grant making as well as offered an additional funding mechanism in the form of low-interest loans to support basic research and early commercialization activities. In 1989, the first year the Biotech Center provided small business loans, it provided a total of \$360,000 to three entrepreneurial start-ups.

The Biotech Center's loan program has subsequently expanded, replacing entirely any direct grant support to private businesses. Through the Business and Technology Development Group, the Biotech Center now supports three types of business loans, ranging from Company Inception Loans that provide up to \$50,000 to newly formed businesses, to Strategic Growth Loans that offer a match to angel or venture capital investments for entrepreneurial firms that have cleared the technical proof-of-concept phase. Between 1989 and 2011, the Biotech Center offered close to 160 loans to 110 distinct business establishments totaling more than \$18 million (North Carolina Biotechnology Center, 2014). Approximately 30% of firms in the Biotech Center's loan portfolio have received more than one loan type (P. Ginsberg, 2013, interview with authors). Loans are initially approved

with the expectation of repayment within 3 years. However, Biotech Center loans are often extended for a second 3-year period if companies provide evidence of progress.

A team of six full-time Biotech Center staff reviews loan applications. Team members have prior experience with financial due diligence, some as previous employees of bioscience research or investment firms. External experts in relevant scientific or technology fields also review loan requests above \$75,000. The approval process starts with a meeting or phone exchange with a team member from the Biotech Center to determine whether a firm is eligible to submit a preapplication. At this phase, the company is required to outline its management, technology, proposed project, and budget. As part of a recently added eligibility requirement, companies requesting loans must first provide evidence that at least one member of the executive team resides in North Carolina and devotes the majority of his or her time to the applying company, a condition instituted in response to Biotech Center staff members' concerns that early-stage companies had lower commercialization success when all members of the executive team were juggling other work demands and were not fully committed to the applying company.

Submissions that advance to full applications are assessed on many criteria, including proof of concept behind the technology, market opportunity, level of competition and barriers to entry (including intellectual property), impact on North Carolina and North Carolinians, strength and commitment of the management team, importance of the loan funding to the growth of the program, and likelihood of successful product development. In fiscal year 2013, the Biotech Center received 79 loan inquiries but approved only 18 loans (P. Ginsberg, 2013, interview with authors). This selectivity has resulted in high returns on investment. Notes Peter Ginsberg, vice president of the division that manages the loan program, "For every dollar that we have loaned to companies, those companies have subsequently attracted \$118 in external funding from venture capital firms, big pharma, foundation, angel investors, federal grants, or IPOs" (interview with authors). In addition, companies receiving loan support have launched 30 distinct life science products. The center also values job creation, which is included in program performance metrics.

Other U.S. state and regional agencies have established loan programs in support of early-stage bioscience companies. However, the North Carolina Biotech Center maintains one of the most extensive state-funded bioscience loan programs in terms of lending capacity and a high degree of coupling with technical and networking assistance. Members of the Business and Technology Division work closely to help firms secure external financing, efforts that include organizing regular trips to meet with venture capitalists outside North Carolina and angel investor meetings during which life science companies based in the state make presentations to investment groups. The Biotech Center also helps make connections to other strategic partners such as multinational

life science companies. According to a recent Biotech Center report, “In fiscal year 2013 alone, loan evaluation team members were responsible for 316 company–investor introductions, 85 foundation introductions and 161 partner introductions” (North Carolina Biotechnology Center, 2014). Interestingly, the Biotech Center extends this type of assistance to firms that do not apply for loans, as well as those initially turned down for loans. According to Ginsberg, “We say no more often than we say yes. However, if a company does not get approved for a loan, we will help that company attain certain milestones so that the company in the future might receive one” (P. Ginsberg, 2013, interview with authors). The ultimate goal is to support entrepreneurial firms in a variety of ways to improve their chances of future financing and ultimately long-term success.

Industrial Recruitment

While entrepreneurial supports have primarily centered on technology commercialization, the Biotech Center’s foray into industry recruitment was initially driven by an explicit desire to promote large-scale job creation. In the 1980s and 1990s, particular emphasis was placed on creating jobs for individuals with 4-year academic or advanced degrees. In this regard, the Biotech Center’s early support for industrial recruitment aligned most closely with the state government’s ongoing efforts to lure prominent multinationals to keep scientific and engineering talent in North Carolina (Link, 1995). Over time, however, the Biotech Center has expanded its industrial recruitment efforts to extend employment opportunities to a more diverse set of North Carolina residents, including less educated job seekers displaced from traditional manufacturing industries, like textiles and furniture (Lowe, 2007; Lowe, Goldstein, & Donegan, 2011).

Prior to 2001, industrial recruitment efforts involving the Biotech Center were mostly ad hoc and reactive insofar as Biotech Center staff stepped in *after* receiving requests for information or assistance from out-of-state bioscience firms or from economic developers in the state’s Department of Commerce. Under this arrangement, the Biotech Center’s main task was assembling teams of knowledgeable scientists who could speak to the quality of the local talent pool and strength of institutional supports for bioscience research and development. Rarely did the Biotech Center take a proactive stance. It avoided actively marketing the state by reaching out to firms, a task that had long been the professional terrain of North Carolina’s Department of Commerce.

In 2001, however, the Biotech Center, in partnership with the Department of Commerce, created an in-house recruitment position. The department recognized the value of harnessing the Biotech Center’s deep knowledge of bioscience industry development for marketing and recruiting purposes. By establishing a dedicated recruiter position, the Biotech Center could identify and engage bioscience firms well before

they needed to establish manufacturing facilities. The Biotech Center embraced this new focus and as part of its 2004 strategic plan ranked industrial recruitment in biopharmaceutical manufacturing as a top-priority target, alongside continued support for bioscience firm formation. In 2007, the Biotech Center made additional resources available to support recruitment-oriented activities, resulting in the formation of an industrial development team whose primary responsibility remains business retention and recruitment.

The Biotech Center’s approach to bioscience recruitment is categorized as strategic and tempered (Lowe, 2014). Biotech Center staff ensure this by drawing heavily on national and international bioscience networks to gather and update information on bioscience firms that may be in need of new manufacturing facilities. The center also ensures that key institutions are up-front partners during the high-stakes and time-sensitive deal-making phase of industry recruitment, including representatives from state universities and community colleges that help reinforce bioscience workforce skills and talents (over cash-equivalent incentives) as North Carolina’s top locational draw. But a third step is equally notable: The center provides an educational resource for communities interested in recruiting bioscience manufacturing firms. Biotech Center representatives meet regularly with local economic development practitioners throughout the state and help them understand the specific needs of biomanufacturers. Such outreach efforts are iterative and ongoing, and they ultimately ensure that practitioners at the substate level remain focused on promoting regional labor market and institutional strengths, and avoid the temptation to compete based on state or local incentive offers.

Between 2008 and 2014, the industrial development team worked on 31 successful recruitment and retention projects, generating a net gain of 2,300 jobs for North Carolina. A sizable share of these projects has involved large-scale, multinational biopharmaceutical manufacturers, among them Novartis, Merck, and Novozymes. They have also, however, cast a wider net to recruit smaller, midstage firms that display high growth potential.

Strategy Mixing

An initial opportunity to combine in-house expertise in industrial recruitment and entrepreneurial development came about when two early-stage firms from outside North Carolina expressed interest in finding new locations to support company expansion. The first to make this move was Heat Biologics, a University of Miami spin-off, focused on immunotherapeutics for lung and bladder cancer. In 2010, company executives looked favorably on North Carolina given the state’s deep scientific talent pool and extensive clinical trial infrastructure. Their interest in the state provided an early test case for internal collaboration between members of the Biotech Center’s industrial recruitment and entrepreneurial teams.

As a prerevenue firm incubated outside North Carolina, Heat Biologics did not fit a standard model for either team. Because Heat Biologics was out of state, the industrial recruitment team was its first point of contact, providing company executives with labor market data and information on regional support institutions. Still, while members of that team had long been accustomed to making this marketing pitch to multinational and laterstage biopharmaceutical firms, they knew much less about the specifics of the Biotech Center's entrepreneurial support programs and the extent of technical and networking assistance available for similar clinical-stage firms. Members of the entrepreneurial team, including other staff with expertise in cancer vaccines, were therefore invited to participate in the recruitment process. Meetings and informational exchanges were closely coordinated and often involved representatives from both teams.

This initial collaboration paid off. Heat Biologics opted to relocate its management team to North Carolina in July 2011 and its research operations by 2014. Company leaders selected the Research Triangle over other well-established bioscience regions in New York, Massachusetts, and California. As Heat Biologics CEO Jeff Wolf explained, "We wanted something in somewhat close proximity to where the research is in Miami. We were looking at talent. We were looking at cost of living. We were looking at a place . . . we could recruit people to" (Dalesio, 2013). Members of both the entrepreneurial and recruitment teams worked together to help the company secure temporary work space for the company CEO at the Biotech Center's Research Triangle Park facility and subsequently helped the firm negotiate its first lease at a commercial building on the Durham–Chapel Hill border. Shortly after moving to North Carolina, Heat Biologics applied for and received a \$250,000 loan from the Biotech Center to cover clinical trial expenses. Subsequent bank and venture funding enabled Heat Biologics to pay off the loan within 1 year.

The Biotech Center's entrepreneurship recruitment partnership was further deepened through a 2011 recruitment deal involving Sequenom, a midstage molecular diagnostics firm based in San Diego, California. In this particular case, the company was not looking to relocate existing facilities, but rather sought to establish an East Coast diagnostics facility to support its launch of an alternative blood test for Down syndrome. The Sequenom recruitment soon revealed constraints within established statewide incentive-granting protocol. In turn, this provided an opportunity for members of the two Biotech Center teams to devise an alternative incentive performance requirement for prerevenue firms. Under North Carolina's Jobs Development and Investment Grant program, state incentives for recruitment are granted on a case-by-case basis, though usually go to firms with established revenue streams. Sequenom, however, was at the pre-revenue stage when it began considering North Carolina for its new facility, complicating the evaluation efforts of staff at

the Department of Commerce (North Carolina's incentive-granting authority until 2014). Furthermore, the company's diagnostic tool did not require the U.S. Food and Drug Administration approval, which removed a default metric for evaluating potential market success.

Given the long-standing relationship between recruiters at the Department of Commerce and at the Biotech Center, staff from commerce asked the Biotech Center's recruitment team for advice as they considered options for granting incentives to Sequenom. The Biotech Center's recruitment team, in turn, sought assistance from their colleagues on the entrepreneurial team for evaluating the terms of the deal. According to Bill Bullock, vice president of the Biotech Center's recruitment division, members of both the recruitment and entrepreneurial teams joined forces to "work with the state to provide them with an evaluation of what we thought the risk-benefit of this project was [and] even . . . refine existing [incentive] programs to accommodate some of the risk of the project" (B. Bullock, 2013, interview with authors). The end result was a novel arrangement that focused attention away from revenue generation and toward market capitalization—more specifically, assessing total financing in the bank relative to the company's annual burn rate (the amount of its cash reserves from various investors used each year). In their exchanges with commerce, members of the entrepreneurial team especially stressed the significance of Sequenom's large cash reserve (\$220 million). Based on the presence of this reserve and staff members' determination of the high market demand for a noninvasive blood test that identifies Down syndrome, the entrepreneurial team recommended that commerce award the firm an incentive for the proposed diagnostic facility. Team members also advised adding a nonstandard clawback mechanism to the contract to mitigate potential loss of state revenue: Until profitable, Sequenom should be required to keep sufficient cash reserve to cover at least 2 years' worth of "burn rate." If the cash reserve were to drop below this amount, Sequenom would no longer qualify for state or local incentives. As a result of this customized recruitment effort, Sequenom selected Durham over Dallas, Texas, for the new facility.

At first glance, the quick succession of these recruitment deals suggests a linear progression in economic development—a fast moving relay race that implies the inevitable hand-off from entrepreneurial support organizations to traditional recruiters as innovative firms mature, and with state funding agencies at the ready to motivate and capitalize on firm mobility. But a closer look at the events following these two recruitment deals reveals a more innovative and adaptive process of strategy coordination and mixing.

Since working together to recruit Heat Biologics and Sequenom, members of both teams have turned their attention to developing in-house economic development support for midstage life science firms and especially to help North

Carolina communities retain homegrown entrepreneurial establishments. Motivation for this comes from the fact that economic developers in other states—particularly those with more robust venture capital markets—are increasingly luring midstage firms away from North Carolina with promises of additional financing. Roughly a dozen clinical-stage bioscience firms, many incubated by North Carolina universities and with early-stage support from the Biotech Center, left North Carolina between 2005 and 2014. As Bullock (2013) notes,

It is incredibly hard work to take a piece of science and create a company, and nurture it along, get it started and then to grow. But if you (the Biotech Center) get them to 12 [employees], which is incredibly difficult, and then they want to grow from 12 to 50, you have to find a way to capture that growth. If not, you are not getting an adequate (public) return on investment. (Interview with authors)

Echoes Ginsberg (2013),

Wouldn't it be a waste if a (North Carolina) company was about to go from 10 to 75 people and they do that somewhere else? Without [the knowledge of the industrial recruitment] group, there would be no mechanism to keep them here once we (the Biotech Center) have done all the dirty work. . . And that is the phase where they start looking very attractive to other states. (Interview with authors)

With this poaching problem in mind, the teams proposed a new in-house incentive program in 2012. But as members of the entrepreneurial and recruitment-retention teams also acknowledged, this required lengthy internal debate and deliberation. According to Bill Bullock (2013),

There are a lot of opinions on incentives. . . Did the Biotech Center want to even have the perception that we were now giving them? There was a philosophical difference, where I don't think anyone has any philosophical issue with us offering loans to start-up companies. (Interview with authors)

Members of the entrepreneurial and recruitment-retention teams worked together with other senior staff to craft a program that would address these underlying concerns, ultimately proposing a new kind of recruitment-retention tool that reinforced the Biotech Center's long-standing tradition of community outreach.

The result is the Biotech Center's Economic Development Award, which was launched in 2013 as a modest grant—up to \$100,000—to support company retention and recruitment, but with the community as the main “conduit.” In essence, local economic development practitioners apply to the Biotech Center for this grant and, if approved, sit down with Biotech Staff and company executives to draft a contractual incentive agreement. The Biotech Center helps facilitate this three-way exchange. As Bullock explains,

The ultimate thinking was that [granting incentives] is not a bad thing to do, but let's be very responsible in how we structure it. . . . We got to a conclusion that the way we want this to work would be better if we gave it to a community rather than (directly) to a company. And this was more in line historically with what we at the center have always done. (Interview with authors)

In making this “incentive” program community-focused, members of both teams wanted to create a channel for further engaging local economic development practitioners in a learning exchange to help them better understand the complexities of the bioscience industry. As Bullock relates, this approach enables staff at the Biotech Center to “educate (local practitioners) about what the science is, what the business model is, to help them answer the question, ‘Should we (the community) support this?’” (interview with authors).

Interestingly this modest grant has recently proven effective for also engaging state practitioners, generating additional value from the evolving collaboration between the entrepreneurial and recruitment teams. Although not the original intent, the Economic Development Award has enabled the Biotech Center to adjust to recent statewide changes to economic development planning. One important change relates to a decision in late 2014 to move responsibility for statewide industrial recruitment to a new nonprofit organization called the Economic Development Partnership. Because of this shifting governance, sector support institutions, like the Biotech Center, have needed to reestablish themselves as valuable economic development partners, including engaging new decision makers and nonprofit staff who have little prior work experience in North Carolina. In this changing institutional context, the Economic Development Award (EDA) program has helped staff at the Biotech Center maintain their connection to more traditionally oriented economic development networks. As Bullock notes, the EDA program, as a traditional-looking incentive grant program, is easily understood by all recruiters, even those new to the state: “They can say ‘oh the Biotech Center has (incentive) money—ok then we want you (the center) to participate (in recruitment or retention).’” Bullock went on to stress,

It is a way back *into* our own ecosystem. It allows us to have a place at the table and have many more conversations. . . . Conversations, that then allow us to have a say of how we might use that money

and ultimately in support of technology-based economic development.

To date, the Biotech Center has signed letters of intent with close to a half dozen North Carolina communities to help retain midstage bioscience firms. The Biotech Center has recently initiated an interim review of the EDA incentive program and with the goal of making it a more effective tool

for community practitioners. Going forward, one objective is to increase the share of awards that actually pay out; in other words, that advance from the initial letter-of-intent stage to a signed, enforceable incentive agreement between a company, a community, and the Biotech Center and with a clear deadline for when that must occur. At one level, a lower than anticipated payout means less financial liability for the Biotech Center; the flip side to this cost savings, however, is the incentive program is not being fully leveraged to support technology or community development. To address this shortcoming, the entrepreneurial and industrial development teams plan to formalize their internal review process, creating a rotating group of reviewers and with it a clearer set of procedures for institutionalizing due diligence—"the option to say no, more than yes." But equally, the goal is to create a more enduring resource for helping local practitioners structure agreements with companies to secure greater benefits for their community, including the possibility to use these funds to strengthen workforce development commitments or guide investments toward shared, community-enhancing investments in public infrastructure.

Admittedly, the Biotech Center's experimentation with strategy mixing is still in an early stage and not yet at a place where we can conduct a full and comprehensive evaluation. It is also vulnerable to setbacks, given ongoing threats of budget cuts related to the state's divisive political environment. Nevertheless, we offer this case as an example of what can happen when practitioners are encouraged to cross traditional professional divides and focus their efforts on forging intertwined economic development objectives. In this regard, we hope this case motivates further investigation and inquiry of experiments with strategy mixing in other localities and states.

Transferable Lessons

To summarize, the North Carolina Biotechnology Center has combined its deep expertise of industrial recruitment and entrepreneurship to better anchor and support high-growth entrepreneurial firms and innovative technologies that receive early rounds of government support. In the process, Biotech Center staff have repurposed established economic development tools to ensure that up-front technology investments by state government agencies continue to benefit local entrepreneurs, their employees, investors, and state residents alike. Additionally, with this strategy mixing they are enhancing the regions' innovation infrastructure, broadening the network of local and nonlocal firms that depend on its existence, in turn securing a new generation of advocates to push for further rounds of institutional investment and development.

At first glance, it might be difficult to envision transferable lessons from this stand-alone case study. After all, the North Carolina Biotech Center has several unique organizational features that differentiate it from most other state-level economic

development agencies: It is a state-funded not-for-profit, which has sustained a single industry focus over the course of many decades and as such benefits from an organizational legacy on which to reflect and build. But these fixed attributes should not overshadow a set of actionable lessons that this case offers for economic development practitioners and leaders within other organizational and institutional settings.

First and foremost, this case underscores the importance of creating spaces for shared dialog and deliberation among a diverse group of economic development practitioners. Having more voices in the conversation enhances opportunities for strategy mixing (Zhang, Warner, & Homsy, 2017). Of course, the Biotech Center has the added advantage of managing multiple functions under a single roof, thus increasing the frequency with which various specialists interact and engage. But there are other means to foster similar exchanges. Some local economic development agencies in North Carolina and beyond have simply merged existing departments or agencies, putting once-independent specialists and resources under the same organizational branch. In a related move designed to break established institutional silos, the North Carolina Department of Commerce drew inspiration from the Biotech Center to establish a series of sector teams in the late 2000s. While a subsequent and more conservative administration eventually dropped these teams, they were notable in their time for bringing together a diverse set of experts from distinct economic, educational, and planning institutions around the state. Admittedly, they were first formed to enhance industrial recruitment in non-woven textiles, aerospace, and life sciences. But team members pushed to broaden their scope and responsibility to also influence public investments in workforce development and technological innovation.

Second and related, this case speaks to the importance of creating conditions that move strategy development well beyond the early phases of experimentation. In this respect, the Biotech Center case demonstrates that it is not enough to simply encourage practitioners to cooperate and interact. There must also be a structure in place that sustains policy development by encouraging practitioners to critically and honestly assess strategy alternatives and introduce incremental changes to enhance implementation. Within the Biotech Center, there is a long-standing tradition of launching new strategies under the guidance of a formal task force or internal study group. The goal here is to provide continuous feedback, and to also help lead staff develop and defend a proof of concept. Over the years, the center has shown it is fully prepared to retire programs that are ineffective or outdated. Related to this, the center rarely takes external requests for support at face value (Feldman & Lowe, 2017). Rather, when outside organizations turn to the center for help (as the North Carolina Department of Commerce did with the Sequenom deal in 2011), this triggers a process of institutional "sense-making"—one that ultimately allows

center staff to determine whether the request represents an emergent economic development opportunity in need of further institutional analysis and evaluation.

This gets to a third and final transferable lesson. The Biotech Center does not stop when its actions generate gains for private sector businesses. Rather, it pushes benefits on multiple fronts and as part of its broader public mission to provide long-term economic and societal benefits to North Carolina residents. This means the Biotech Center is not satisfied in addressing the needs of a single “client” or “customer”—illustrated above with the decision to launch a community, rather than business-oriented, incentive program. Center staff also work to align the needs of multiple stakeholders, meaning they are prepared to identify and resolve potential sources of conflict that often emerge at the interface of public and private value (Campbell, 1996; W. W. Clark & Bradshaw, 2004).

An Ending Metaphor

Metaphors have long been used to celebrate and inspire improvements to economic policy and practice (Bingham & Mier, 1993; Schön, 1993). They can also act as conceptual blinders, limiting our ability to fully appreciate innovation at the intersections of established areas of practice. Over the decades, the metaphor of waves has helped numerous students and scholars differentiate between and compare strategies and tools. In the U.S. context, scholars have embraced the term *wave* to signify dramatic shifts in policy priorities—most notably, a refocusing from industrial recruitment toward initiatives and partnerships that promote homegrown technologies and innovative enterprises (Blakely & Leigh, 2009; Glasmeier, 2000; Hanley & Douglass, 2014; Olberding, 2002; Plosila, 2004; Ross & Friedman, 1990). Additional waves have been added over the decades, each signaling a significant departure from a previous phase (Fitzgerald & Leigh, 2002).

In this study, we challenge the conventional use of the wave metaphor, not by suggesting additional policy distinctions or layers, but by recognizing potential gains for regional economies when practitioners reach across established professional boundaries to work together to create an innovative strategy mix. Rather than retire the concept of waves from our field, we draw inspiration from the physical sciences to suggest an amended use. In that disciplinary context, waves are not portrayed as independent entities but as intersecting spaces, in turn making it difficult to determine where one wave begins and another ends. Physical scientists present waves as fluid entities containing transient particles and elements that move across porous and flexible boundaries. The materials that make up one wave contribute to and are recombined to form the next. We believe that this better reflects contemporary state and local economic development as it makes room for blended policy approaches that combine multiple areas of professional expertise and experience.

In this study, we offer an illustrative example from North Carolina’s bioscience industry to demonstrate the contribution to regional industrial specialization when specialists from different economic development subfields combine their respective knowledge and link up and coordinate development practice and priorities. Our case study reveals strong historic support by the North Carolina Biotech Center for homegrown technologies and entrepreneurship in addition to activities focused on attracting and retaining large multinational biopharmaceutical firms. In the late 2000s, the Biotech Center took steps to more tightly integrate these two activities, reflecting a broad state mandate to align innovation and job creation goals. The result is more than just a simple balancing act within an established strategy portfolio. It involves mutual reinforcement whereby economic development practitioners are jointly drawing lessons, insights, and resources from separately defined strategy targets to support firms at all stages of technology development. In the process, the Biotech Center has also enhanced its outreach to state and local practitioners, helping them also recognize the value in supporting traditionally underserved technologies and firms, including homegrown establishments that are scaling or early-stage firms started elsewhere, but whose growth depends on access to a more robust innovation infrastructure.

The Biotech Center case offers lessons for other places wishing to strengthen support for innovative industry through strategy mixing. But more than an adjustment to tightening budget constraints or intensifying political pressures, this mixing has allowed practitioners in North Carolina to capture greater gains from ongoing public investment in innovative technologies and infrastructure. We therefore observe in North Carolina the possibility for other regions to deepen their technological capacity and industry specialization through active processes of strategy mixing and, more specifically, through efforts that intentionally combine resources and expertise in support of both entrepreneurship and industrial recruitment. In this regard, this case study provides a potential model for how other regions might advance support for innovative industry by bringing seemingly distinct development tools and targets into closer alignment.

Of course, this interlacing is not limited to industrial recruitment and entrepreneurial support. Contemporary economic and environmental challenges, including rising income inequality and evidence of hastened climate change, suggest opportunities for strategy mixes that include other areas of economic development (Carley, Lawrence, Brown, Nourafshan, & Benami, 2011; Pender, Weber, & Brown, 2014; Piketty, 2017). As one example, efforts are well underway to enhance industrial recruitment through closer coupling with workforce and community development, achieving a form of “progressive regionalism” that expands economic opportunity through job access and greater socioeconomic inclusion (J. Clark & Christopherson, 2009; also see Fitzgerald, 2004; Lowe & Wolf-Powers, 2017; Schrock, 2013; Warner & Zheng, 2013).

Equally, practitioners in Massachusetts and North Carolina are pushing a closer linkage between established programs in manufacturing extension and technology entrepreneurship—this includes adapting the traditional extension model to enable existing manufacturers to better connect to high-tech entrepreneurial start-ups by offering customized prototyping services and related product development and testing support. In providing these examples, we neither suggest that all strategy blends are inherently good nor offer automatic improvement to established practice and expertise. Rather, our central purpose is to draw attention to the interstices of economic development practices and encourage further analysis of practitioner-led efforts to work collaboratively in support of policy innovation and improvement.

Acknowledgments

We thank Bjorn Asheim, George Erickcek, Allison Forbes, Henry Yeung, and three anonymous reviewers for their insightful comments.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: We received generous support for this project from the UNC Office of Economic and Business Development and the Odum Institute for Social Science Research, as well as the Science of Science and Innovation Policy Program at the National Science Foundation.

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