

BY ROSS DEVOL

The sources of local prosperity – the things that distinguish vibrant local economies from less successful ones – are changing. Localities that ignore these changes do so at their peril. In the old economics of place, physical assets – proximity to raw materials, transportation infrastructure and the like – determined economic success. In the new economics of place, what counts is a mix of tangible and intangible resources – everything from weather to culture to the crime rate – that makes it possible to maintain high-end human capital in productive networks.

Knowledge-driven innovation is critical to wealth and income creation in this new economics of place. Indeed, the degree to which a region's knowledge assets are harnessed and converted into successful innovations, products and services will determine its economic future. Thus, strikingly different attributes – among them research and development infrastructure, access to risk capital and cultural tolerance for entrepreneurship – are keys to regional success.

Because knowledge is generated and shared more efficiently in close proximity, economic activity based on new knowledge has a high propensity to cluster geographically. In leading clusters, fewer innovations will escape to other regions – or at least they will do so at a slower rate.

But the New Economy is based upon more than high-tech industries. Places that can attract and retain firms proficient at deploying information technology (in addition to

producing it) will be at a competitive advantage. These technologies are moving us from a vertically oriented, command-and-control hierarchy to flexible networks organized by entrepreneurs, with collaboration as the centerpiece. Because speed is vital in the New Economy, structures that impede rapid decision-making are rendered obsolete.

RESEARCH & DEVELOPMENT, AND INNOVATION ASSETS

The new raw materials of technology-based economic development are research and development, and innovation capacities. The research and development infrastructure of a region is critical to building new industry clusters from breakthrough technologies and to sustaining the vibrancy of existing industry clusters. A new cluster can be formed by importing firms that have commercialized technology elsewhere, but regions in which basic research and development activities take place have distinct advantages in building a cluster that sticks.

Research laboratories – private, govern-

ROSS DEVOL is director of regional and demographic studies at the Milken Institute.

ment and university-based – are important drivers of economic development. Investments in research and development strengthen local research competency and attract further investments by the private and public sectors in a process of feedback loops.

Private industry finances and conducts more research and development than all other sectors combined. Places with firms willing to reinject their profits into their innovation pipeline will likely remain engines of economic development. And despite the widely acclaimed successes of university-based research and development centers like Silicon Valley and Raleigh-Durham, our research suggests that industry research and development is more important for sustained income and wealth creation than university-based research and development is.

Don't misunderstand: federally funded research and development can be an important development asset. Over the past half-century, the federal government has enhanced the position of the well-known technology clusters. These facilities were often located where they are for strategic, national security, and political reasons. But their placement was often critical to the rise of fabulously successful technology clusters, like Silicon Valley.

University research has generally focused on fundamental knowledge and scientific discovery. However, the presence of academic research facilities has a short-term payoff, too, because it serves as a magnet for business. Moreover, universities are increasingly responding to the new economic environment by conducting applied research for private sponsors. Indeed, for maximum economic leverage, the culture at university and government research facilities must be open to the prospect of commercial application. Localities in which academics are encouraged

RESEARCH, DEVELOPMENT AND INNOVATION INDEX

STATE	FEDERAL R&D	INDUSTRIAL R&D	ACADEMIC R&D	PATENTS	R&D COMPOSITE
MA	94	98	98	96	96.5
CT	80	84	82	90	84.0
CA	86	88	72	86	83.0
CO	84	82	84	82	83.0
RI	88	96	78	56	79.5
NH	76	86	64	88	78.5
NM	98	76	86	48	77.0
MD	100	46	100	58	76.0
WA	70	94	62	70	74.0
UT	54	68	88	72	70.5
ND	34	14	52	18	29.5
WY	28	2	56	20	26.5
SC	10	30	24	30	23.5
WV	50	26	4	8	22.0
OK	6	20	26	32	21.0
LA	14	8	36	22	20.0
KY	2	24	22	26	18.5
MS	42	10	16	2	17.5
ME	16	18	6	16	14.0
AR	4	12	8	6	7.5
SD	8	4	2	12	6.5

to license their research and to move freely between the nonprofit and the private sectors will be ahead of the game.

HUMAN-CAPITAL CAPACITY

A locality's most important source of competitive advantage is the knowledge embedded in its people. In the past, firms and industry agglomerations attracted people; in the New Economy, concentrations of talent are attracting firms.

Not so long ago, labor was seen as an expense to be minimized and certainly not as a reservoir of exploitable human capital. Even today, the balance sheets of most corporations show labor solely as an expense. Yet as Gary Becker, the University of Chicago Nobel laureate, reckons, roughly three-quarters of the American capital stock now consists of knowledge – much of it embodied in workers. And by no coincidence, many technology firms have market caps that amount to 10 to 20 times the value of their physical assets.

A successful enterprise must endeavor to continually create and utilize knowledge to

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sustain competitive advantage. Localities with firms that understand these subtle dynamics are well positioned to exploit human capital for economic development. This change is so fundamental that it calls into question some economic truisms. For example, unlike physical capital, intellectual capital may not be subject to the law of diminishing returns. Nor does the value of knowledge necessarily diminish when it is shared; hence, knowledge-based industries typically thrive in an environment of collaboration and may wither in a Darwinian zero-sum-game world.

Two forms of knowledge contribute to economic value and growth: theoretical and tacit. The former is acquired through traditional education. Tacit knowledge, by contrast, is informal and is often created by teams within a firm. It is embedded in the systems, processes, methodologies and technologies within organizations. Innovative activity has a high propensity to cluster spatially because tacit knowledge is largely transferred through informal networks, typically demanding direct and repeated contact.

Several studies have found that workers are more productive when they collaborate with the highly skilled – that the whole is greater than the sum of the parts. In fact, the single factor with the greatest power to explain differences in per capita income between states is the percentage of college graduates. On average, a one-year increase in a metropolitan area's educational level raises wages by 3 to 5 percent.

RISK CAPITAL AND ENTREPRENEURIAL INFRASTRUCTURE

In eras of rapid technology change, entrepreneurial skills play a unique role because new enterprises, having no history and no personal stakes, are better positioned to harness new technology. In the words of the MIT economist, Lester Thurow, “entrepreneurs are central to the process of creative destruction, since they are the individuals who bring the new technologies and the new concepts into active commercial use. They are the change agents of capitalism.”

Existing businesses often hesitate to introduce new products for fear of cannibalizing their current sales. Big, bureaucratic, firms often do not even recognize the value of their own discoveries and how they could be applied. The effective democratization of capital has supported

New Economy growth. In the old financial order, entrepreneurs with high-risk, high-potential-return projects faced great difficulty in obtaining early-stage funding. But broader access to venture capital has made a big difference. Many of these new firms require large amounts of external financing for an extended period before they can tap traditional debt or equity markets. And private equity from individual investors or highly specialized venture capital firms is filling this void.

Venture capital is also important to later-stage product development. It represents a small share of the overall capital markets, but its true value cannot be measured in dollars. Venture capitalists assist in business-plan

HUMAN CAPITAL INDEX

STATE	BA	MA	PHD	HUMAN CAPITAL COMPOSITE INDEX
MA	100	96	100	98.7
CT	98	98	92	96.0
MD	96	100	90	95.3
CO	94	88	94	92.0
NY	82	94	96	90.7
VT	84	86	80	83.3
CA	86	82	74	80.7
DE	74	76	86	78.7
RI	76	80	78	78.0
IL	68	74	88	76.7
ME	46	40	2	29.3
TN	22	34	22	26.0
ID	28	14	30	24.0
SD	24	8	36	22.7
SC	30	28	6	21.3
KY	8	38	18	21.3
WV	6	12	46	21.3
MS	14	18	10	14.0
NV	12	16	4	10.7
AK	2	2	14	6.0
AR	4	4	8	5.3

development, become board members, lend management skills, suggest strategic partnerships and alliances, assist in expansion plans, and can mobilize key talent where it is needed. Venture capital activity is an excellent way to assess whether financiers have confidence in the new ideas and entrepreneurial infrastructure of a region.

Our framework for regional economic growth explicitly recognizes the role of entrepreneurship in the new economics of place. This framework includes the availability of training, support and early-stage financing.

GLOBALIZATION ATTRIBUTES

Global economic integration is causing profound changes in economic structures of nations, industries, firms – and, most important, places. Technological advances have diminished transportation, telecommunications and computational costs, increasing the ease of global flows of information. In a globalized economy, success turns in part on a firm's ability to meet global quality standards and to tap into a global distribution network.

Information technology and globalization are inexorably intertwined. By reducing the cost of communications, information technology is aiding the globalization of production and capital markets. Globalization spawns competition, boosting innovation and leading to quicker diffusion of new technology through trade and capital investment markets. Many localities will be threatened by global economic integration. Debating free trade versus protectionism in the context of the new economics of place, however, is essentially pointless. A service-dominated economy characterized by constant, rapid information exchange without regard to geography is one in which globalism is deeply, and irrevocably, embedded. As Claude

Smadja of the World Economic Forum notes, the real question is “how to manage the implications of the globalization process and turn it into a historic opportunity for greater wealth creation and distribution.”

Places can link to the global economy by specializing as innovators, producers or networkers. Place-based clusters will have com-

RISK CAPITAL AND ENTREPRENEURIAL INFRASTRUCTURE

STATE	SBIR AWARDS	BUSINESS STARTS	VC INVESTMENT	IPO PROCEEDS	COMPOSITE INDEX
CO	96	94	96	84	92.5
CA	86	90	98	92	91.5
MA	100	64	100	98	90.5
WA	76	80	94	100	87.5
MD	94	66	92	88	85.0
NJ	72	96	80	80	82.0
CT	90	72	88	74	81.0
NY	58	92	76	96	80.5
NH	92	70	90	46	74.5
UT	84	78	84	50	74.0
SD	32	20	66	8	31.5
LA	14	24	30	38	26.5
KY	10	18	46	30	26.0
IN	20	22	38	22	25.5
VT	82	8	4	6	25.0
NE	26	10	22	26	21.0
AR	6	32	14	18	17.5
ND	40	4	6	10	15.0
WV	38	2	16	4	15.0
WY	2	48	2	2	13.5
IA	12	6	10	20	12.0

ponents of each specialty, but be more concentrated in one or the other. Clusters linked to the outside world offer access to the best practices and latest industry developments. Government can assist in establishing and maintaining connections to the global network and by helping cluster members find global partners.

Innovators specialize in ideas, designs and plans for new products and services. They are lightning rods for brainpower, which is directed to knowledge-based industries. Here we are talking about the knowledge, skills, experience and innovation potential to generate valuable intellectual property. Silicon Valley, Boston and Bangalore are all examples

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of innovation-driven localities.

Producer localities' comparative advantage is competence of execution. They excel in products based on an infrastructure and supply

network that supports high-value-added, cost-effective production. Producer locations are places where world-class manufacturers gravitate. Austin, Boise and Cedar Rapids fit the description well.

Network localities specialize in organizing global connections. They serve as places of exchange, linking the culture and knowledge of global business practices. Networkers assist in putting together deals or transport goods and services across borders. Miami, Los Angeles, Hong Kong and Singapore are examples.

Localities must analyze their comparative advantages along innovator, producer and networker dimensions. Places need to carve out niches where they fit well, filling gaps in competence by networking into the global system. For their part, regional economic-development officials must embrace the global-regional cluster network paradigm and implement their strategies accordingly.

SOCIAL CAPITAL NETWORK

Local networks of public and private institutions play a key role in maximizing the rate of return on core New Economy assets. A cluster of interdependent firms and institutions in a locality offers its members advantages in efficiency and flexibility. Well-organized institutional networks – public-private partnerships, trade associations, universities, think

tanks and vocational training programs – assist in connecting the assets of a place to promote economic growth relative to those places without such networks.

How local government and affiliated institutions view their roles in the new economics of place is critical in shaping the rapidly changing economic landscape. Unlike previous waves of cyclical economic change and corporate restructuring, the New Economy allows speedy, fundamental shifts to occur across all sectors of the economy, influencing even demographics and social infrastructure. Success requires proactive participation from local government and nonprofit organizations; passivity will handicap a region in the long-term competitiveness race.

Local government has long been a driving force in regional economic development. In the New Economy, its role has only grown; participation as a planner and promoter of regional economic growth is integral for sustained regional success. Government performs two distinct functions here. First, it must adapt educational institutions to the evolving needs of the local economy. Second, it must lead in retraining the local labor force for knowledge-based industries.

QUALITY-OF-PLACE FACTORS

The shift to New Economy industries frees people and businesses from traditional constraints on mobility. More and more, companies and skilled labor locate where they want – not where they must. As the noted social geographer, Joel Kotkin, points out, knowledge workers are “very sophisticated consumers of place who view the world as a smorgasbord of locales that compete for their affections and attention.”

NEW ECONOMY INDEX

We have developed a New Economy Index for

GLOBALIZATION INDEX

STATE	GLOBALIZATION INDEX
VT	100
WA	98
TX	96
LA	94
MI	92
AZ	90
AK	88
ID	86
CA	84
KY	82
AR	22
MO	20
RI	18
OK	16
ND	14
SD	12
MD	10
MT	8
WY	6
NV	4
HI	2

localities, which incorporates the elements our research suggests matter most in attracting and sustaining New Economy activity. Our initial focus has been on a state index, but we hope to overcome data and methodological limitations that make it more difficult to build a parallel index for metropolitan areas.

The index includes components for research, development and innovation assets, human capital capacity, the risk-capital and entrepreneurial infrastructure, and the globalization attributes of states. We derive the weights for the 12 index components from statistical regressions that measure their relative importance in determining per capita income.

I believe that the index accurately reflects how states are positioned to capture opportunities for growth based upon the new economics of place. The leaders are concentrated in the Northeast, the West and the Pacific Coast. The top five states are Massachusetts, California, Colorado, Connecticut and Maryland. The bottom five are Wyoming, Mississippi, West Virginia, South Dakota and Arkansas. Massachusetts is first, with a composite score of 93.0; it ranked first on four of the 12 measures and second on three. Its worst rank was 19th (on business start-

up rates). Massachusetts leads this ranking thanks to its deep research capabilities, rich pool of human capital and plentiful venture capital.

California's second-place rank is based on its globalization assets, the quality of its patents, its superior venture capital network and its strong entrepreneurial infrastructure. The Golden State placed behind Massachusetts because the average skills of its work force have been diluted by large numbers of relatively uneducated immigrants.

Note the association between the per capita income of the working-age population and the components of our New Economy Index. Overall, the components explain

(in a statistical sense) about 80 percent of the variation in per capita income among the states. **M**

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STATE	MI INDEX	STATE	MI INDEX
MA	93.0	KS	48.0
CA	85.3	OH	47.8
CO	83.5	MO	47.0
CT	82.7	ID	46.8
MD	78.3	HI	46.5
NY	77.0	WI	45.7
WA	75.8	AL	42.0
DE	71.5	TN	41.5
NJ	71.2	AK	40.0
NH	69.7	IN	38.3
UT	69.2	MT	35.3
TX	65.5	NV	33.7
AZ	62.8	IA	32.8
OR	62.2	LA	32.2
VA	61.7	NE	32.2
RI	61.5	OK	30.7
IL	61.3	SC	30.5
MN	60.5	ME	30.2
PA	60.5	KY	27.0
GA	60.2	ND	25.8
NM	59.8	WY	24.7
MI	57.2	MS	24.2
VT	57.2	WV	21.7
NC	56.8	SD	19.3
FL	50.3	AR	11.5

PER CAPITA INCOME OF WORKING-AGE POPULATION

