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Perspective

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Growth Through Innovation: It Starts with R&D

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Why do metropolitan areas need to ensure that their universities, corporations, and independent laboratories conduct abundant, top-flight research and development?

Why would Southern Nevada do well to build up its research capability, particularly in the sciences and engineering?

The answer has to do with what has increasingly emerged as an unavoidable syllogism of economic competitiveness. To put it simply: Prosperity depends on productivity; productivity depends heavily on innovation, and innovation depends heavily on research and development.

The bottom line: A region thin on R&D is not likely to be innovative, and if it is not innovative, it will probably not flourish.

Innovation is the crux. Productivity and regional prosperity result from innovation – the ability to conceive and develop new products, new services, new technologies, new ways of organizing work, and new business models.

Innovation is the X-factor. Innovation is crucial to keeping a firm or a region or a nation in the vanguard. Innovation is essential to capturing and defending market share because it transforms how capital is used. Companies that develop new processes or products can either lower their costs or leapfrog the competition as Apple has with the iPhone, iPod, and iPad. Therefore, innovation plays a central role in generating and retaining high-quality jobs and responding to the challenges and opportunities presented by today's tumultuous, internationalized, increasingly competitive, and fast-moving economy.

Yet, what is it that drives innovation? Many factors do, of course, ranging from a locale's general education levels to the presence

of vibrant clusters of related businesses to the availability of capital and managerial skills. But in virtually every effective large-scale industry, university, government, or non-profit R&D activity represents a key prerequisite and driver of innovation because it yields inventions and adds to the knowledge base of a region's industries.

R&D is in this sense a major economic activity in itself, accounting for hundreds of millions of dollars of economic activity in dozens of U.S. metropolitan areas.

But it more importantly represents a powerful wellspring of regional innovative activity. "Pure" and applied university research helps lay the foundation for profitable future private-sector work. Pursued close to the needs of the marketplace, university, federal, and non-profit R&D may spawn patents and related technical advances that find their way into the private sector. And, of course, corporate development work – which accounts for two-thirds of U.S. R&D investment nationally – represents a top source of incremental product and process advances, not to mention entirely new lines of business.

Equally important, a region's R&D activity serves as an irreplaceable talent magnet and factory. R&D work, in this respect, gathers, trains, and organizes the region's all-important technical cadres.

This is critical because in the new economy the key drivers of growth – high-value technology, professional, manufacturing, and technical-services companies – are staffed heavily by well-trained and forward-looking technical, scientific, and engineering workers. Training or attracting these workers, therefore, must be a top priority for ambitious metropolitan areas, and, as it happens, ongoing



R&D enterprises (whether corporate or academic) are prolific and effective training grounds. In fact, notwithstanding the concern about “brain drain” of newly minted scientists and engineers to other states, the correlation between the number of employed Ph.D. scientists and engineers in a metropolitan area and the production of Ph.D. degrees in science and engineering from universities in a state is remarkably high, as observes the Information Technology and Innovation Foundation.

The logical conclusion: States and regions should invest in building strong R&D complexes because such complexes tend to anchor and generate around them the large, high-caliber science and engineering workforces that increasingly drive growth. Think Seattle. Think Austin. Think New Mexico. In such places, sizable (and eventually successful) university, federal, and non-profit R&D enterprises – assembled patiently over time – have begun to yield not just the human capital of technology-based prosperity, but also true economic diversification and constant innovation and resilience. Las Vegas should choose this path, too.

And yet, some will demur. Some

will complain that the Las Vegas area is simply so thin on its current R&D efforts, so new to the game, and so fiscally constrained for the foreseeable future that it should seek some other route to prosperity than the one that is universally deemed the soundest. Others, likewise, will note that some regions seem to have managed to become centers of high-technology without the presence of a major university research center.

And it's true that Las Vegas does not fare well by traditional measures of R&D intensity: The Las Vegas metropolitan area records only 2.1 patents per 10,000 employees, compared to 7.1 for the largest 100 metros. Equally daunting, the share of employment in research and development in Southern Nevada is less than one-third of that of the average large metro, with just 13 of every 10,000 workers engaged in R&D work, compared to 43 per 10,000 for the nation's large metros. Likewise, it's also true that several cities have performed relatively well on technology-based development without a world-class, university-centered research enterprise. However, the fact remains each of these metros had strong pre-existing high-tech companies or a significant

independent research laboratory that drove local R&D in the absence of a major university. Meanwhile, there exists no reputable theory of regional economic growth that does not place great importance on a well-trained technical workforce and some degree of technical innovation, whether driven by a university, a national lab, or corporate research spending.

And so it is quite clear that as greater Las Vegas seeks to diversify its damaged, consumption-oriented economy with new forays into clean energy, computer game development, data processing, high-tech design, or brain health, it will need to build the infrastructure of innovation and human capital production. This means it will need to build a serious research and development complex.

Remember that syllogism: Prosperity depends on productivity; productivity depends on innovation, and innovation depends in large part on research and development. In keeping with this, the choice is stark but potentially exhilarating. Without expanded R&D activity, Southern Nevada will likely drift; with it, the sky is the limit.