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Embracing a 3-Dimensional Economic Future

By Laurence P. Gottlieb

THE STORY OF HUDSON VALLEY 3D PRINTING

During one of the worst economic downturns in American history, the Hudson Valley Economic Development Corp. (HVEDC) uncovered a series of regional "hidden" clusters comprised of individual companies unaware of each other's regional proximity. By forming these companies into larger groups and infusing them with considerable resources, HVEDC accelerated short-term growth and established a stronger base upon which to build a long-term, sustainable ecosystem. The HVEDC team conducted an analysis of the 3D printing industry and found that while the technology was primed for faster adoption by manufacturers, there was a lack of regional advanced knowledge regarding the technology's practical application and few skilled 3D design and fabrication practitioners. This article tells the story of Hudson Valley 3D Printing, an IEDC Gold Award-winning initiative from HVEDC to maximize the regional deployment of this exciting technology.

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3-DIMENSIONAL ECONOMIC FUTURE

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INTRODUCTION

The Hudson Valley Economic Development Corp. (HVEDC) works as a comprehensive economic and marketing resource for businesses that relocate to – or grow within – its rapidly developing region. The Hudson Valley has a highly educated workforce of more than 1 million people and is home to the facilities of more than 100 Fortune 500 companies, many of which specialize in biopharmaceuticals, microelectronics, finance and information technologies. The Hudson Valley encompasses the communities around the Hudson River in the State of New York, a seven-county area including the counties of Westchester, Rockland, Putnam, Orange, Ulster, Dutchess, and Sullivan.

By deploying a series of unique cluster development initiatives during one of the worst economic downturns in American history, HVEDC radically altered its core strategic direction in order to create greater alignment between previously disconnected businesses, entrepreneurs, academicians, government leaders, and non-profit executives – all to benefit the Hudson Valley economy.

From biotechnology to 3D printing to craft beverages, HVEDC started uncovering a series of regional "hidden" clusters comprised of individual companies surviving – if not thriving – during difficult economic times, but seemingly unaware of each other's proximity within the Hudson Valley region. HVEDC leadership surmised that by forming these companies into larger groups, and infusing them with considerable marketing, legal, financial, and strategic resources, we could accelerate short-term growth, while establishing a stronger base upon which to build a long-term, sustainable ecosystem.

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HVEDC's previous cluster initiatives, such as NY BioHud Valley and Hudson Valley Food & Beverage Alliance, focus on critical regional economic drivers and support growth by fostering industry partnerships and improving access to marketing, government, and economic support. NY BioHud Valley highlighted and aggressively marketed the Hudson Valley as the epicenter of the biotech industry in New York. This cluster created a pro-business environment that encouraged collaboration between the industry and regional educational institutions. Companies such as Regeneron Pharmaceuticals

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MORE INFORMATION ON HVEDC

The Hudson Valley Economic Development Corporation (HVEDC) is a comprehensive resource for businesses relocating to (or expanding within) the Hudson Valley, which includes Westchester, Rockland, Putnam, Orange, Ulster, Dutchess, and Sullivan counties. HVEDC offers an array of services to help businesses succeed, such as:

- Regional and state collaboration – Working closely with regional and state economic development professionals to quickly facilitate projects from concept to action.
- Data and statistics – Providing comprehensive market data, including economic indicators, workforce information, industrial and commercial real estate information and other information relevant to business location decisions.
- Site search consultation – Providing the most up-to-date information about buildings and sites available and connecting developers to the right brokers and government contacts.
- Business education and training – The Hudson Valley Economic Development Network creates a bridge between the general public and academia, government, not-for-profit organizations and business in order to inform each other about the needs of the community at large and in turn, enhances economic opportunity in the region.

and Acorda Therapeutics experienced dramatic expansions since the launch of NY BioHud Valley.

Equally, the Hudson Valley Food & Beverage Alliance forges relationships between food and beverage industry leaders and connects entrepreneurs to key economic and promotional resources. Since its creation, the Alliance has run some of the largest industry events in New York, including the annual Hudson Valley Beer, Wine, and Spirits & Cider Summit at The Culinary Institute of America.

HVEDC's model for launching these cluster initiatives always starts with a series of closed-door roundtable discussions with industry thought leaders, business owners, and academicians in order to uncover key challenges preventing faster growth and potential solutions for unlocking the industry's potential. These no-holds-barred discussions are critical for drilling deeper into issues, and ensuring all those involved feel comfortable in expressing real concerns or offering ideas without fear of feeling foolish. In addition, these meetings help HVEDC recruit an "army of the willing" comprised of individuals and institutions that help carry out its cluster development mission.

After several discussions within a short period of time, HVEDC develops a strategic attack plan, which consists of an honest assessment of the industry's potential, challenges to growth, and most importantly, only three or four initial, achievable goals that reflect a realistic path to making a positive impact. This simple model allows for greater flexibility to change strategies as time moves forward, and avoids those long, drawn-out analysis periods which often choke-off real change from happening.

THE BIRTH OF AN HV3D NATION

Hudson Valley 3D Printing (HV3D) is the most recent example of HVEDC's successful cluster development strategies having a profound impact on a burgeoning industry. 3D printing is an additive manufacturing process of layer-by-layer printing that produces 3D objects using computer-aided design (CAD) software. 3D printers melt various substances (plastics, metals, etc.) before extruding and layering these materials onto a printing surface to form a 3D object. The opposite of additive manufacturing is the traditional manufacturing process, which involves subtracting material to make an object from a block of material.

HV3D grew out of the success of earlier cluster initiatives such as the award-winning NY BioHud Valley and the Hudson Valley Food & Beverage Alliance, which strengthened and expanded key areas of the regional economy. In its search to identify a new area for the Hudson Valley's manufacturing growth, the HVEDC team conducted an analysis of the 3D printing industry. The team found that while the technology was primed for faster adoption by manufacturers and related contractors and consultants, there was both a lack of regional advanced academic knowledge regarding the practical application of the technology and few highly skilled 3D design and fabrication practitioners.

With the resources and relationships to capitalize on this potential area of growth, HVEDC focused on adding HV3D to its list of successful cluster development initiatives.

Together, the success of these cluster initiatives served as a model and the foundation of HV3D. Taking from past achievements and pulled data, HVEDC recognized the vital role that education plays in the expansion of technological industries, as well as the importance of generating valuable partnerships with key regional leaders. Therefore, during the development of HV3D, Laurence P. Gottlieb, president and CEO of HVEDC, closely collaborated with State University of New York at New

The Hudson Valley Advanced Manufacturing Center at SUNY New Paltz, made possible by HVEDC's HV3D initiative, designed and printed a "robohand" for a local 6-year-old who has no fingers on his left hand. What started as an economic development initiative has truly emerged as a life-changing movement.

Paltz President Donald P. Christian to discuss how to address trends and meet needs in 3D printing technology. These early conversations were the cornerstone of what would later become a community of experts, investors, academics, and entrepreneurs working to strengthen the Hudson Valley's presence within the multi-billion-dollar 3D printing industry.

CREATING A ROADMAP OF GOALS

Through the organizations' primary discussions, HVEDC and SUNY New Paltz outlined goals for what they hoped the HV3D initiative would achieve for the Hudson Valley. The organizations discussed their mutual goals of developing an advanced manufacturing center and a corresponding curriculum at SUNY, which would be used to elevate learning for regional students. HVEDC and SUNY New Paltz sought to increase advanced manufacturing learning not only at universities but also at the community college and secondary education levels. This broad expansion would ensure that new generations learned the skills necessary to lead and shape the future of 3D printing technology in the Hudson Valley – if not throughout New York and the nation.

Both organizations also aimed to develop an advanced manufacturing center that could be a beneficial resource for local business owners. HVEDC held ongoing discussions with local entrepreneurs in diverse areas of business to better understand how the development of the HV3D initiative could strengthen and grow their businesses. It was found that, although 3D design and fabrication services could assist regional businesses, many entrepreneurs experienced difficulties locating manufacturing centers and properly trained technicians that could meet their needs.

Understanding that the technological needs of businesses are rapidly growing, HVEDC laid the groundwork for HV3D and the creation of the Hudson Valley Advanced Manufacturing Center (HVAMC) and MakerBot 3D Printing Innovation Center. MakerBot is the industry's leading manufacturer of desktop 3D printers for professional, educational, and home use. The objective of HV3D was – and remains – to democratize the technology and knowledge surrounding digital design and fabrication, thereby, unleashing the full potential of 3D technology for the benefit of all in the Hudson Valley. Through these preliminary discussions and information gathering sessions, HVEDC set specific benchmarks for creating a unique, advanced solution to propel the region's economy and workforce in the direction of the future.

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RECRUITING AN ARMY OF THE WILLING

After creating the roadmap that would drive the initiative, HVEDC sought out key partners that would have a long-term and substantial interest in developing the HV3D cluster. HVEDC identified SUNY New Paltz as an integral part of launching the HV3D initiative. The SUNY New Paltz campus not only had a mutual understanding of the impact HV3D would have on the region, but also featured an ideal blend of arts and sciences that emphasized the inclusive nature of the project. The campus prepared to launch its Digital Design & Fabrication certification program as a collaboration between the college's schools of Fine and Performing Arts and Science and Engineering. The program would provide an introduction to additive manufacturing, social/cultural/technological design thinking, mechatronics, and programming.

Other essential partners of the HV3D initiative's efforts included Hudson River Ventures (a small business investment fund focused on the Hudson Valley) and its president, Sean Eldridge, who invested in initial equipment for the HVAMC; Central Hudson Gas & Electric, which also invested funds for HVAMC equipment; MakerBot, which chose SUNY New Paltz for the nation's first MakerBot Innovation Center; and New York State Electric and Gas Corporation, which provided funds for the initiative's expansion.

Other important partners in the HV3D's development and launch included Stratasys, which helped to launch the cluster's kick-off event; 3D Systems, which acted as a technical and equipment partner to SUNY New Paltz; and all other SUNY campuses within the Hudson Valley region, which have all engaged in HV3D activities. Stratasys is a manufacturer of 3D printers and 3D production systems for office-based rapid prototyping and direct digital manufacturing solutions (and is the parent company of MakerBot). 3D Systems provides advanced and comprehensive 3D digital design and fabrication solutions globally, including 3D printers, print materials, and cloud-sourced custom parts (and is a top competitor to Stratasys).

HVEDC President and CEO Laurence P. Gottlieb speaks to the crowd at the HV3D launch event in May 2013.

LAUNCHING HV3D AND ITS RIPPLE EFFECT

The creation of the HV3D initiative spanned two years of development and partnership-building work. Its launch in 2013 was the cumulative result of many players' efforts and took a dedicated team of partners.

HVEDC launched the HV3D industry cluster initiative at its breakfast series, "The Next Big Thing: 3D Printing" event alongside project partners Stratasys and SUNY New Paltz. A $1 million investment was announced at the event to create the HVAMC on the SUNY New Paltz campus. Additionally, Central Hudson Gas & Electric matched a founding grant of $250,000 from Eldridge of Hudson River Ventures. At the launch event, Hudson River Ventures also committed up to $500,000 for investments in local companies that incorporate 3D printing.

Through the development of the HVAMC, 3D printing equipment quickly became accessible to the Hudson Valley region. This groundbreaking step in HV3D assisted students and businesses with 3D projects and initiated the education of a more highly skilled workforce.

Following the launch of the HV3D initiative, access to 3D printing technology in the region has experienced significant growth. In 2014, the nation's first MakerBot 3D Printing Innovation Center was created at SUNY New Paltz through a relationship HVEDC initiated and fostered with MakerBot founder Bre Pettis. At a ribbon-cutting ceremony, Pettis – who is often called the "Steve Jobs of 3D printing" – noted it was a historic moment in the global development of 3D printing. HVEDC's relationship with MakerBot supported the center's development and provided students and regional residents with access to the technology, training classes, and on-site assistance with printers.

Further, during a visit to the SUNY New Paltz campus, New York Gov. Andrew Cuomo announced a $10 million grant presented to the college in order to build the region's first Engineering Innovation Hub, an extension to the existing HVAMC, which houses the current 3D printing equipment and classroom facilities. The Hub will provide instructional and research space, and address a critical shortage of the industry's mechanical engineers. The Hub will also partner with community colleges to link 3D printing and engineering programs to advanced manufacturing and technologically innovative companies. SUNY New Paltz was also awarded an $850,000 state grant, as well as a separate $1 million state grant, to increase access to printing laboratories and strengthen training within the region's workforce.

Relationships forged between HVEDC and its HV3D partners have had a lasting and significant effect on the Hudson Valley. These major allies in the industry have not only increased recognition and economic strength for the region, but solidified the area as a technological hub with a highly skilled workforce. Partners such as MakerBot, 3D Systems, and The Culinary Institute of America have made monumental strides alongside HVEDC to spearhead new regional efforts in the field of 3D printing.

The HV3D initiative has had a significant impact on local students who can use the HVAMC and 3D printing to gain early access and training within the industry. As part of the cluster initiative's continuous expansion, SUNY New Paltz announced plans to place 3D printers in community colleges throughout the Hudson Valley region. These schools will also provide technical and curriculum support to enrolled students, who after earning their associates degree may choose to continue their technical training at the SUNY New Paltz campus. In addition, HVEDC invested in several 3D printers for regional high schools, so that students may be exposed to this critical technology and accelerate their training from a younger age.

The Hudson Valley has also seen scores of businesses and community members take advantage of HV3D initiatives since its launch. Projects conducted on the 3D printers include the creation of a functional prosthetic hand for a 6-year-old boy, as well as a prosthetic leg for a sheep at a local animal sanctuary. The printers are also used for businesses' marketing efforts. In September

HV3D's "army of the willing" celebrates the grand opening of the nation's first MakerBot Innovation Center at SUNY New Paltz in February 2014. (From left to right: Denise VanBuren, Central Hudson Gas & Electric Corp.; Paul Kassel, SUNY New Paltz; Laurence P. Gottlieb, HVEDC; Donald P. Christian, SUNY New Paltz; Bre Pettis, MakerBot; Sean Eldridge, Hudson River Ventures; Dan Freedman, SUNY New Paltz; and Anthony Campagiorni, Central Hudson Gas & Electric Corp.)

Photo credit: State University of New York at New Paltz

3D printed syringe.

2014, an equestrian show featured a jump (an obstacle jumped by a horse) that was made via a 3D printer to look like a large syringe holding the veterinary surgical aid product Dormosedan Gel. These displays of the potential for 3D printing are only a small representation of the social and economic potential that the continued integration of HV3D can have on the Hudson Valley.

LOOKING TOWARD THE FUTURE

HVEDC's HV3D initiative has been recognized on several occasions since its launch. In 2015, HVEDC received a Business Facilities Economic Development Award for its groundbreaking work in advancing access to 3D printing technologies. Most recently, HVEDC was selected by the International Economic Development Council as a Gold Award recipient in the category of Regionalism and Cross-Border Collaboration for population centers greater than 500,000.

Since its launch, HV3D has evolved faster and expanded farther than originally intended, and has benefited a spectrum of entrepreneurial, educational, and institutional clients throughout the Hudson Valley, New York State and, in some instances, across the U.S. HV3D has created 205 full-time jobs.

One of the initiative's most powerful aspects is that the program model can be replicated. Colleges and universities from around the country are already visiting the SUNY New Paltz campus to learn more about how the initiative was executed and how it may be implemented in their area.

HV3D has the potential to influence how students learn, how businesses lead, and how everyday people utilize technology. As HVEDC's Gottlieb remarked when considering the potential impact of HV3D throughout the Hudson Valley community and beyond, "You don't want to train people how to use a copy machine; you want to train them to write novels that will be copied on those machines."

SUNY New Paltz President Donald P. Christian welcomes the crowd of students and community members to the seminar led by MakerBot Founder Bre Pettis in February 2014.