

Economic Impacts of ACTiVATE[®] at UMBC

Submitted by:

Sage Policy Group, Inc. &
Nearing Group

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bwtech@UMBC Research and Technology Park

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Anirban Basu, Economist

John Duberg, Economist

Sage Policy Group, Inc.

Nearing Group

Economic Impacts of ACTiVATE® at UMBC

Executive Summary

Context and description of the ACTiVATE program

Though the progress of women in recent decades has been vast and impressive, women continue to be underrepresented in the area of entrepreneurship and corporate leadership. Only 25 percent of all CEOs are women and among the Fortune 500 companies only 3 percent are women. Women as entrepreneurs appear to be similarly underrepresented. A 2002 listing of founders of bioscience and medical instrument companies in Maryland is overwhelmingly a list of men, a possible reflection of the reported lack of women starting technically intensive firms.

A similar absence of women is found in the world of venture capital. Only 10 percent of venture capitalists are women. While women own two out of five private companies in the U.S., no more than 5 percent of them obtain venture capital. Research thus indicates that start-ups by women have less capital than those founded by men despite the fact that women's start-ups reportedly fail less frequently.

ACTiVATE represents a response to the underrepresentation of women in the entrepreneurial realm and associated loss of economic potential. Specifically, the University of Maryland Baltimore County (UMBC) designed a program to pair mid-career women with promising technologies with the goal of fostering the creation of new women-owned businesses. The ACTiVATE program was designed as a systematic model for training entrepreneurs and commercializing technology and intellectual property that is routinely and continuously developed by universities and federal laboratories.

An important tenet of the program was that developing entrepreneurial talent was possible from the workforce already in Maryland. Indeed, the absence of a pool of individuals with the tools and desire to create new companies was considered a fundamental barrier to Maryland's ability to commercialize technologies that were being created in the state. Developing entrepreneurs from the existing Maryland workforce was seen as having the added value of increasing the likelihood that the benefits of the program (e.g., new companies, new jobs) would tend to remain within the state's boundaries.

Impact of the program to date

Exhibit E1 reflects the number of companies ACTiVATE participants have formed to date. What is striking about the data is the steady rate of company formation for classes that have been completed. For the classes from 2005 through 2009, each class generated between five and six companies. The class of 2010, which is still in session as of the writing of this report, has already produced one company. In total, the study team was able to identify 29 companies created through ACTiVATE.

Exhibit E1. ACTiVATE companies by year of class

<i>Class</i>	<i>Participants forming companies</i>	<i>Partnerships (1)</i>	<i>Companies created</i>
2005	6		6
2006	6	1	5
2007	6	0.5	5.5
2008	6		6
2009	7	1.5	5.5
2010	1		1
Total 2005-2010	32	3	29

Note. (1) Companies started by two partners generate a 0.5 value for each partner.
Sources: Sage, Nearing

Exhibit E2 reflects the study team’s assessment of the number of jobs created by these companies. For reasons detailed in the body of the report, these estimates are likely to be highly conservative. The Sage-Nearing study team calculates that the current number of direct jobs created by ACTiVATE companies is 77, a number that could rise to 124 over the next year. Once multiplier effects are considered, total current jobs are estimated at 146, a figure that could rise to 234 jobs in 12 months.

Exhibit E2. Multiplier effect of ACTiVATE jobs

	<i>Direct ACTiVATE jobs</i>	<i>Total jobs</i>
Current employment	77	146
Prospective employment in 1 year	124	234

Sources: IMPLAN, Sage, Nearing

Perhaps the most remarkable analytical finding is the very low cost expended per job created through the ACTiVATE program. The cost of the ACTiVATE program in Maryland has been running at approximately \$200,000 per year, including fees paid by participants. Thus, for the first 6 years of the program, the total program cost is approximately \$1.2 million and will increase to \$1.4 million for another year of the program. Given these total costs and the estimate of total jobs created, the program cost per job created can be estimated. Exhibit E3 reflects estimates of these costs both for the direct ACTiVATE jobs now existing and those expected to exist in 1 year. Exhibit E3 also reflects estimates of cost per total jobs created.

Exhibit E3. ACTiVATE program total cost per job created

<i>Program years</i>	<i>Cumulative program cost</i>	<i>Jobs created</i>		<i>Estimated cost per job</i>	
		Direct ACTiVATE jobs	Total jobs	Direct ACTiVATE jobs	Total jobs
2005 - 2010	\$1.2 million	77	146	\$15,600	\$8,200
2005 - 2011	\$1.4 million	124	234	\$11,300	\$6,000

Sources: IMPLAN, Sage, Nearing

As the exhibit shows, the cost per direct ACTiVATE job created to date is \$15,600. If the projected increase in employment for ACTiVATE companies is realized over the next year, the cost per direct ACTiVATE job a year from now will shrink to \$11,300. When the multiplier effect is considered the cost per job for all jobs currently created by the program is \$8,200. This cost would drop to \$6,000 in a year if projections for hiring are realized.

This is a remarkably low cost. One recent benchmark by Scott Shane of Case Western Reserve University for the cost of creating entrepreneurial jobs estimates that the cost per job would range from \$26,000 to \$31,000. The program at UMBC is generating direct ACTiVATE jobs at roughly half that cost.

Current ACTiVATE-related jobs are generating almost \$7 million in annual income, a figure that could increase to \$11 million in a year. This income leads to hundreds of thousands of dollars for state and local government in annual income taxes. Within a year, ACTiVATE could be responsible for over \$700, 000in annual income taxes for Maryland governments.

Exhibit E4: Estimated income tax generation by ACTiVATE-related jobs (thousands of dollars)

Government	Current estimate			Prospective estimate in 1 year		
	Low (1)	Mid-point	High (2)	Low (1)	Mid-point	High (2)
State	\$236	\$281	\$325	\$379	\$450	\$522
Counties	\$152	\$179	\$206	\$244	\$287	\$330
Total	\$388	\$460	\$531	\$623	\$737	\$851

Notes. (1) Low estimate is based on effective state income tax rate of 3.45 percent and a local tax rate of 2.22 percent applied to total compensation.
(2) High estimate is based on marginal state income tax rate of 4.75 percent and a local tax rate of 3.00 percent applied to total compensation.
Sources. Maryland Comptroller, Sage, Nearing

Key Conclusions

In reviewing the achievements of ACTiVATE, a number of major findings emerge:

- ***Entrepreneurs can be created***

ACTiVATE at UMBC is generating more than five new companies from each class. While a significant number of women in the program had prior experience with starting and owning companies, many did not. The most successful graduates so far — Kris Appel and Kimberly Brown — were complete novices who have within a few years created robust small businesses with substantial prospects for growth.

- ***High-quality jobs can be created***

Over two-thirds of the companies started by ACTiVATE women are in biotech/medical applications, information technology or services/consulting. Correspondingly, the great majority

of the jobs and work created by the program are in knowledge-based industries that are likely to experience higher rates of growth and higher rates of compensation than the norm.

- ***The cost of creating entrepreneurs, new companies, and high-quality jobs can be modest***

All of this economic development work can be done inexpensively. At a maximum cost per direct job created of \$15,600, ACTiVATE is a highly cost-effective job creation strategy. It is also almost certain that in the next year this per job cost will decrease substantially.

- ***ACTiVATE at UMBC generates a significant stream of income taxes***

The mid-point estimates for annual income taxes generated by current ACTiVATE-related jobs are \$281,000 for the State of Maryland and \$179,000 for county governments or a total of \$460,000 in state and local income taxes. In a year, annual income tax collections may rise to \$450,000 for the state and \$287,000 for county governments.

- ***There is potential for enhancing the culture for entrepreneurship in Maryland***

Silicon Valley is the prime model for entrepreneurship in the world. The networks of people, density of technology and intellectual property, and other resources create a culture of entrepreneurship that works. Such a culture of entrepreneurship among women may be one of the most important outcomes of the ACTiVATE program. The longer the program operates the more likely it is that this culture of women entrepreneurs will become an established part of the business environment in Maryland.

- ***Women represent a wellspring of entrepreneurial talent***

One of the benefits of ACTiVATE is creating a supportive environment for women who are ambitious but inexperienced as entrepreneurs. This common bond has clearly helped some women gain the confidence they would otherwise have lacked. Additionally, the program creates a safe and supportive setting for testing new skills and stepping outside of traditional comfort zones.

- ***ACTiVATE at UMBC has contributed to Maryland's reputation as a leader in entrepreneurship***

ACTiVATE appears to resonate with many people. The expansion of the program to Texas and the prospects of spreading the program across the country, if not around the world, are based on work done at UMBC. UMBC can legitimately take credit for being a leader in entrepreneurship.

- ***Local conditions can stimulate the entrepreneurship process***

The early experiences of ACTiVATE at Texas State show that the particular conditions and settings for entrepreneurial programs make a substantial difference in how the program is

implemented and the outcomes that can be realized. A number of factors in Texas seem to create a particularly strong entrepreneurial environment that can accelerate the process of business formation that ACTiVATE encourages. Irrespective of these conditions, however, the basic concept of teaching entrepreneurship and wrapping newly-acquired knowledge around new technologies has worked.

- ***Greater program support could generate greater benefits for Maryland***

The ACTiVATE at Texas State program has enjoyed substantially higher levels of funding support than has ACTiVATE at UMBC. This is one of the primary reasons that the experience in Texas has been a program with even greater and quicker creation of companies and jobs. While this is not solely a function of money, the attention of the Texas program's full-time staff and access to funds from various state agencies, including universities, have been major catalysts for this early program success.

Economic Impacts of ACTiVATE® at UMBC

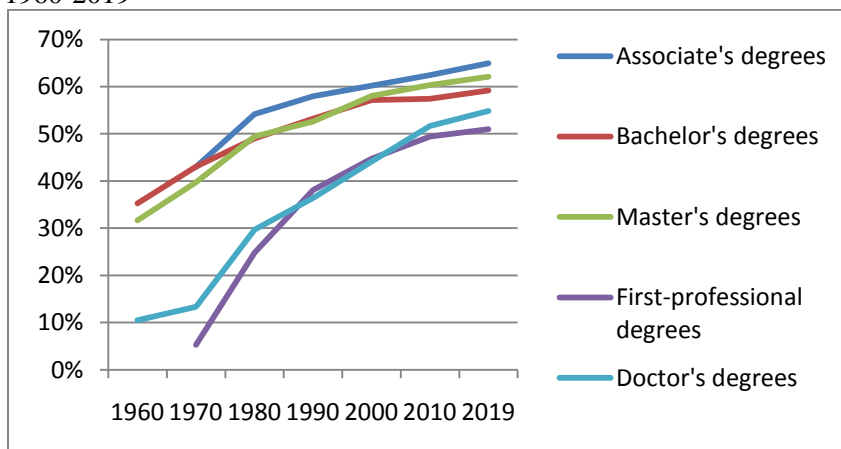
I. Women and entrepreneurship

The Atlantic recently reported upon a phenomenon that has become increasingly apparent to those who follow demographic, educational, and economic changes in the United State – the ascendance of women in virtually all aspects of educational and work life.¹ Data characterizing the progress of women in the U.S. in recent decades suggest that the rise of women has been particularly notable in education. Women now earn 57 percent of all bachelor's degrees and 60 percent of all master's degrees.

In professional degree programs, gateways to the upper echelons of economic life, women are at parity with men, while women are in a slight majority among those receiving doctoral degrees. Certain disciplines – computer science, engineering and the physical sciences – continue to have significant majorities of men in graduate studies, but this also appears to be changing.²

This emergence of women in higher education has occurred over a relatively short period of time. Half a century ago, there were two men receiving bachelor's or master's degrees for every woman reaching that educational level while only one in ten doctor's degrees was conferred on a woman. In 1970, women received only 5 percent of professional degrees conferred. Women began reaching parity with men in the late 1970s and have continued that progress ever since. As Exhibit 1 indicates, projections by the U.S. Department of Education show some leveling off of these trends, but also show women receiving a majority of each type of degree in 2019.

Exhibit 1. Share of higher education degrees earned by women, 1960-2019



Source: National Center for Educational Statistics, Digest of Education Statistics

The consequences of these educational trends can be seen in the workplace. Women constitute 47 percent of the workforce but represent 51 percent of employment in management,

¹ Hanna Rosin, "The end of men," *The Atlantic*, July/August 2010.

² National Center for Educational Statistics, Digest of Education Statistics, <http://nces.ed.gov/programs/digest>

professional, and related occupations, 57 percent in service occupations, and 63 percent of sales and office occupations. This indicates that women are steadily coming to dominate key aspects of the knowledge-based and global economies. Conversely, women constitute only 4 percent of natural resources (farming, fishing, logging), construction, and maintenance occupations and 21 percent of production, transportation, and material moving occupations.³

The transformation of the workplace by the presence of women may be having fundamental, positive impacts. A 2008 study of major U.S. corporations by the Columbia Business School and the University of Maryland found that those firms with women in top management positions performed better, particularly if the firm's strategy was *innovation intensive*. The study argued that improved performance was linked to creativity and collaboration and that firms that can attract and develop female managerial talent may be at a competitive advantage.⁴ On a wider scale, the Organization for Economic Cooperation and Development has measured the economic and political power of women and found a positive correlation between countries where women are empowered and national economic success.⁵

Nevertheless, to date, there are clear limits on the progress women have made in the economy and the workplace. Only 25 percent of all CEOs are women and among the Fortune 500 companies only 3 percent are women.⁶ Of the 15 women CEOs among Fortune 500 companies, five (or one-third) head companies that are generally considered technologically intensive whereas 20 to 25 percent of all Fortune 500 companies would be categorized as technologically intensive. Women are clearly underrepresented as CEOs among the country's largest companies, but, among that small group, a substantial percentage are "high-tech" CEOs.⁷

As is true of women as CEOs, women as entrepreneurs appear to be underrepresented. A 2002 listing of founders of bioscience and medical instrument companies in Maryland is overwhelmingly a list of men.⁸ This may in part be a reflection of the reported tendency of men to found technologically intensive businesses.⁹

A similar absence of women is found in the world of venture capital. Only 10 percent of venture capitalists are women. While women own two out of five private companies in the U.S., no more than 5 percent of them obtain venture capital. The absence of venture capital for women-

³ Bureau of Labor Statistics, "Employed persons by detailed occupation, sex, race, and Hispanic or Latino ethnicity," www.bls.gov/cps/cpsaat11.pdf

⁴ Cristian L. Dezsó and David Gaddis Ross, "'Girl Power': Female Participation in Top Management and Firm Performance," August 2008, [www1.gsb.columbia.edu/mygsb/faculty/research/pubfiles/3063/Girl Power August](http://www1.gsb.columbia.edu/mygsb/faculty/research/pubfiles/3063/Girl%20Power%20August)

⁵ Op. cit., Hanna Rosin.

⁶ OP. cit., Bureau of Labor Statistics and Hanna Rosin

⁷ Fortune 500; Women CEOs, *CNNMoney.com*. Available at <http://money.cnn.com/magazines/fortune/fortune500/2010/womenceos/>

⁸ Marsha R. B. Schechter and Scott R. Peacock, "Founders of Maryland Bioscience and Medical Instrument Companies," Johns Hopkins Institute for Policy Studies, August 2002.

⁹ Erin Kepler and Scott Shane, "Are Male and Female Entrepreneurs Really That Different?" Small Business Research Summary, September 2007 www.sba.gov/advo

owned firms may reflect in part the different types of companies created by women compared to men and the lower capital needs of such companies.¹⁰ Research indicates that start-ups by women have less capital than those founded by men despite the fact that women's start-ups reportedly fail less frequently.¹¹

In the space of a few decades, women have caught up with and frequently surpassed men in many areas of the country's economic life. While this is most notable in higher education where men remain in the majority in just a few disciplines, it is similarly true in occupations. For most work that depends on knowledge, women are clearly present if not in the majority. Given projected trends in education there is little likelihood of a reversal of these changes. The last bastions of men are in the upper echelons of management and corporate leadership (notwithstanding the benefits that women bring to corporate performance) and in the world of entrepreneurship and new company formation.

II. The ACTiVATE Program

In this context, the University of Maryland Baltimore County (UMBC) designed a program to pair mid-career women with promising technologies with the goal of fostering the creation of new women-owned businesses. The ACTiVATE program was designed as a systematic model for training mid-career women and commercializing technology and intellectual property that is routinely and continuously developed by universities (in this case, universities in Maryland, particularly the institutions that constitute the University System of Maryland and Johns Hopkins University) and other centers of innovation and intellectual property.¹²

While the program concentrates on women, the intention was to develop a program that could be applied to other target audiences. Similarly, the focus on Maryland was not intended to limit the future application of the program in other locations.¹³

An important tenet of the program was that developing entrepreneurial talent was possible from the workforce already in Maryland. Indeed, the absence of a pool of individuals with the tools and desire to create new companies was considered a fundamental barrier to Maryland's ability to commercialize technologies that were being created by universities in the state. Developing entrepreneurs from the existing Maryland workforce was seen as having the added value of

¹⁰ Ibid.

¹¹ Jessica Bruder, "We Need More Female Venture Capitalists," June 30, 2010, www.Forbes.com

¹² The University System of Maryland comprises most of the 4-year public universities in the state, including Bowie State University, Coppin State University, Frostburg State University, Salisbury University, Towson University, University of Baltimore, University of Maryland, Baltimore, University of Maryland, Baltimore County, University of Maryland, College Park, and University of Maryland Eastern Shore as well as several related educational and research institutions.

¹³ Most of the discussion of the ACTiVATE program and its activities over its first 4 years is based on the original proposal from UMBC to the National Science Foundation (NSF proposal number 0438617, dated May 17, 2004) and the final report to NSF for the period from October 2008-February 2009, submitted on March 4, 2009 by Stephen Auvil of UMBC, co-principal investigator (Award ID 0438617).

increasing the likelihood that the benefits of the program (e.g., new companies, new jobs) would remain within the state's boundaries.

The basic steps of the program as originally proposed for the first 3 years of operation were as follows:

- Select and screen technologies available from Maryland's research universities;
- Recruit mid-career women interested in starting and running their own companies;
- Develop a program to train women entrepreneurs;
- Use the training program to introduce entrepreneurship to 90 mid-career women;
- Develop 15 to 24 business plans for commercializing technologies during this training;
- Pursue initial funding to support these plans;
- Create six to nine women-run companies; and
- Generate sufficient wealth in these new companies to sustain the program after the initial 3-year funding period.

Given the complexity of the ACTiVATE program, UMBC assembled a unique team of investigators to deal with the different activities required for the program – recruiting, curriculum development and training, technology transfer, and company incubation. This team worked with other agencies and consultants to implement the program. Key collaborators included the following.

- Maryland Technology Development Corporation (TEDCO), a public agency focusing on technology development and commercialization, helped screen candidate technologies, provided funding for the program, and agreed to give priority treatment for any companies created by the program that sought seed financing from TEDCO.
- James Sanders, at the time Director of New Ventures for Honeywell and an adjunct professor of entrepreneurship at the University of Maryland, College Park, helped create the training program and was one of the first instructors.
- Julie Lenzer Kirk, at the time a cashed-out entrepreneur, served as one of the first ACTiVATE instructors and is now the CEO of the Path Forward Center for Innovation and Entrepreneurship.

As the program developed, these collaborations, partnerships, and networks of support expanded to include every technology transfer office at Maryland's public and private research universities as well as major research institutions including the Johns Hopkins University Applied Physics Laboratory, University of Maryland Biotechnology Institute, and NASA's Goddard Space Flight Center. An extensive network of legal, financial/venture capital, accounting, and other firms was developed. Advice was provided by experienced entrepreneurs, technical and business experts, and other professionals.

One measure of the wide scope of these collaborations is the fact that over 60 individuals participated in ACTiVATE as reviewers and speakers in the first 4 years of the program. This group included 10 alumnae of the program itself.

As originally envisioned, technologies were initially identified by UMBC's Office of Technology Development. The Office would select 30 to 40 promising technologies. TEDCO would assess and rank these technologies by their commercial potential and then work to reduce the total number of technologies to 20 to 30. To date, selected technologies have come from Johns Hopkins University, Johns Hopkins University's Applied Physics Laboratory, University of Maryland College Park, University of Maryland Baltimore, University of Maryland Biotechnology Institute, UMBC, NASA Goddard, and the Naval Research Lab.

Each ACTiVATE class forms teams of aspiring entrepreneurs. Typically, each team represents a pairing of women with business and technical expertise. These teams then spend the first half of the class with this initial slate of technologies with each team working with one technology. The goal of this part of the program is to test commercial feasibility and to determine whether the teams have the capacity to identify the commercial relevance of these technologies and develop viable business plans.

In the second half of the program, teams develop business plans for the selected technologies. Teams are also encouraged to create advisory boards and to meet regularly with them. The culmination of the program is each team's presentation of its business plan to a panel of reviewers including entrepreneurs, inventors, and personnel from Maryland government agencies that fund new enterprises.

Over the life of the program, modifications and revisions have been made to the program. The focus of most of these revisions has been in the area of selecting and vetting technologies. In some cases, teams have not believed they can continue to work with the technologies they had assessed in the first phase of the program. When technologies have not passed muster with teams, ACTiVATE program staff have sometimes worked intensively with UMBC's Office of Technology Development and TEDCO to identify new, more promising technologies. Staff has then helped class participants regroup and move forward with newly-identified technologies.

As the program has evolved, the emphasis of the technology selection phase has moved away from a reliance on screening what appear to be promising technologies in advance of the formation of each class. Instead, the program has provided participants with the tools and knowledge that allow them to identify, screen, and vet technologies themselves. For most participants, direct involvement in the selection of technologies reportedly results in stronger commitments from the teams to the selected technologies.

Another evolution in the program has been in the manner of team formation. Initially teams were formed with substantial input from program staff who would pair individuals with

complementary skills. Over time, the program has moved towards a process of teaching participants how to form and how to dissolve partnerships successfully.

Costs of the program have run approximately \$200,000 per year. Funding to date has come from the National Science Foundation (the initial prime funder), TEDCO, and from private companies with a major presence in Maryland — Constellation Energy Group, Inc., Corporate Office Properties Trust, Miles & Stockbridge P.C., SB & Company LLC, Venable LLC, Wachovia Corporation, and Whiteford, Taylor & Preston LLP.

Funding also includes program fees charged to each participant. These fees have increased each year of the program, from \$50 in 2005 to \$3,000 in 2010. For many participants the current fee appears to represent a price point, since many of the participants are in career transitions and have difficulty affording higher fees.

To date, the program has cost approximately \$8,000 per participant accepted into the program. Current program fees of \$3,000 paid by participants cover a significant share of this cost, but also may be the maximum that can be charged before presenting a barrier to affordability. Moreover, ACTiVATE has never assumed that the program can or should charge participants the full cost of the program. As a program aimed at a population - women, including a substantial share of minority women, as discussed in the following section - that has been underrepresented in entrepreneurship, ACTiVATE was developed as an economic development strategy, not a program solely designed for the benefit of the individuals who participate. Thus, participant-paid fees are seen as only a part of the funding resources that should be utilized to underwrite program costs.

Expansion of the program

While UMBC is continuing to offer the ACTiVATE program at its campus, the program has taken major steps towards expansion beginning in the fall of 2009. In October 2009, Texas State University announced the launching of its own ACTiVATE program modeled on the UMBC program. In March 2010, UMBC and the Path Forward Center for Innovation and Entrepreneurship announced an agreement allowing Path Forward to license the program internationally.

Supported by \$4 million in funding from the Texas Emerging Technology Fund, the Texas State-based program has begun with a flourish. By April 2010, six months after its inauguration, some of the 26 women in the program, selected from 100 applicants, had created six new companies. The program was also working with three participants to expand their existing companies with technology identified through the ACTiVATE program. By the spring of 2010, leaders of the Texas program had begun the process of expanding the program to four new sites in the state.¹⁴

¹⁴ Barry Harrell, "Texas State's Activate program aims to create women CEOs in tech fields," April 24, 2010, www.statesman.com

Terry Hazell, the head of the ACTiVATE at Texas State program, who had been an instructor for the UMBC program before relocating to Texas, reported that by August 2010 (10 months into the first year of the program), 14 women in the program had launched companies or other enterprises. Some of the factors that accounted for these more rapidly evolving start-ups were shorter and simpler licensing and technology transfer procedures in Texas, the greater availability of angel investors and other funding sources, and the participants themselves who had substantial executive and entrepreneurial talent before entering the program. The head of ACTiVATE at Texas State indicated that the program had deliberately developed a recruitment process that would find and enroll women with substantial executive leadership and business development experience and capabilities.¹⁵

The ACTiVATE at Texas State program is supported at a substantially higher level than the UMBC program. In addition to major state government support, Hazell indicated that universities were a source of funds and that the program benefits from an extensive network of angel investors in the Austin area where the program is located.

The agreement between UMBC and Path Forward opens the possibility of expansion across the United States and around the world. The leaders of Path Forward are also current instructors/entrepreneurs-in-residence for the ACTiVATE at UMBC program. Indeed, Path Forward's CEO, Julie Lenzer Kirk, is one of the original instructors for the UMBC program. Part of their work at UMBC is geared towards developing and refining a model for the program that can be implemented in other settings. Their work has focused on technology selection and assessment, teaming and instructional innovation.

As noted above, the program has increasingly moved towards teaching methods to identify and vet technologies as opposed to pre-selecting technologies for a given class. The participants are then better able to find technologies on their own, either during the class or after they graduate. A similar shift has taken place in teaming with the classes spending more time on learning how to create and dissolve teams and partnerships. A common goal for both technology and teaming is to maximize the chances that the women in the program will find technologies and partners well suited to their interests and operating styles.

A corollary to the emphasis on learning the processes of technology transfer and teaming is the program's emphasis on "failing fast" and moving on to the next technology or team rather than dwelling on ideas or partners that may not be right for the participants. The extent to which participants are passionate about their chosen technologies and have strong interpersonal chemistry with their partners is seen as critical to their success. More generic instructional materials have increasingly been put online so that in-class and other face-to-face time can be devoted to the specifics of each participant's or team's problems and questions.

¹⁵ Personal communications, Terry Chase Hazell, Texas ACTiVATE, with John Duberg, Nearing Group, August 13, 2010.

As the Path Forward team refines the program at UMBC, they are also marketing the program to prospective sponsors. While Path Forward's leaders intend to ramp up their marketing efforts in the near future, the idea of creating women entrepreneurs resonates with many. Interest has already been expressed by organizations in Michigan, Pennsylvania, Northern Virginia, Florida and San Francisco. There have also been enquiries from Ghana. The Kauffman Foundation, which is devoted to entrepreneurship, has worked with Path Forward in its efforts to establish the program in Michigan. Key factors in expansion are the identification of local champions who can effectively lead the program and funding.

Lessons learned

Over the past 6 years the ACTiVATE program has evolved and changed in several key manners that are worth highlighting.

- *Technology transfer.* The original concept of preselecting and vetting technologies has undergone the most substantial change. While this process continues to work for some women, the clear direction of the program has been to teach women how technology transfer works, rather than transfer the technology for them. This is valuable not only in finding technology during the year women are in the class, but also in giving them the tools to find other technologies long after they have finished the program.
- *Teaming.* Originally, program staff was more actively involved in forming teams from participants. Over time, the realization emerged that such partnerships were difficult to create and that the chances were not necessarily great that good partners would be in the same class. As with technology selection, the program has moved towards teaching the process of teaming rather than establishing teams.
- *Local conditions matter.* The expansion of the program to Texas allows for comparisons of business conditions and other factors that influence the course of events for participants. These factors include the ease with which licensing and other technology transfer processes can be finalized in Texas as compared to Maryland. Licensing technology can contribute to the acquisition of tenure in the Texas state university systems, another boon to prospective entrepreneurs. Additionally, program funding and investment capital were reportedly much easier to obtain. These and other factors help make Texas one of the most supportive states for entrepreneurs according to a national advocacy group, and therefore has achieved results faster than in Maryland.¹⁶ Differences in local conditions will require fine-tuning the program's curriculum with the Path Forward Center acting as a repository and sharing center for those lessons learned and best practices across sites.

¹⁶ "In Case You Missed It... Texas Ranked as a Top State for Entrepreneurs," Office of the Governor, Rick Perry, December 03, 2009 <http://governor.state.tx.us/news/press-release/14000/>

III. Quantitative assessment of the ACTiVATE program

Beginning with the class of 2005, the program has attracted as many as 103 inquiries and typically fields 70 to 80 inquiries for each year's program. From this pool of candidates, 20 to 30 women were accepted for each year's class during the first 6 years. In the first 5 years, a total of 135 women were accepted into the program of whom 94 (70 percent of those accepted) completed the program and graduated. The current class (the sixth of the program) will finish in January 2011.

Since the inception of the program, participants have included 40 women with Ph.D. or M.D. degrees and 40 women with M.B.A. degrees as well as two lawyers, and many with master's degrees. Perhaps more importantly, many women had prior experience with business ownership and entrepreneurship. Data collected by Path Forward found that 26 women (49 percent of those for whom information is available) had owned a business before entering the program.

The program has also been successful in reaching minorities and new immigrants according ethnic and heritage statistics on 148 of the 155 women accepted into the program. While 55 percent of the participants have been Caucasian Americans, 25 percent have been African Americans and 2 percent have been Hispanic Americans. The remaining 18 percent are women who have come to this country from countries in Africa, Asia, Australia, Europe, North America including the Caribbean, and South America.

Class sizes and graduation rates have varied over time as noted in Exhibit 2 with the current class being the smallest to date. The 2007 class had the highest graduation rate at 89 percent while the first class had the lowest graduation rate at 60 percent. With the exception of the current class, class size has been fairly consistent over time, averaging 27 participants in the first 5 years of the program.

Exhibit 2. ACTiVATE classes by year

<i>Class</i>	<i>Accepted</i>	<i>Graduated</i>	<i>Graduates as share of acceptances</i>
2005	30	18	60%
2006	27	18	67%
2007	28	25	89%
2008	25	17	68%
2009	25	16	64%
Total 2005 - 2009	135	94	70%
2010	20		
Total 2005 - 2010	155		

Sources: Sage, Nearing

Creating new companies and new jobs

The principal goal of the program is to encourage the women who participate to create new companies with technology transferred from universities and other centers for research and development. A variation on this goal is to make significant changes and improvements in existing companies that participants own or in which they have leadership positions. The creation or significant transformation of companies is tied to the creation of jobs and associated wages, salaries, and compensation.

With its emphasis on technology transfer, ACTiVATE is focused on high-tech businesses. Given the density of biotechnology, medical science, and information technology resources in Maryland, technology transfer tends to be concentrated in these areas. Biotechnology in particular has been a focus of economic development interest in Maryland. Montgomery County, home to the National Institutes of Health, has developed an economic development strategy around the biosciences that anticipates thousands of new jobs in this area. Part of the interest in biotechnology is the high quality and value of work in this industry. In 2008, over 9,000 private sector bioscience workers were employed in Montgomery County with an average salary of almost \$93,000.¹⁷

To gauge the impact of ACTiVATE, an online survey was conducted for this report. That survey was distributed to 112 past or current participants in the program. Exactly 25 percent of these participants responded. The survey asked about business and job creation, payroll and revenue, other impacts of the program, and the significance of ACTiVATE in the work and career decisions participants have made since entering the program. In addition to this survey, several other data sources were used to assess impacts. Path Forward developed a database of ACTiVATE participants in the spring of 2010 that includes information about business and job creation and other impacts. The program staff at UMBC has maintained databases of

¹⁷ "Biosciences strategy," Department of Economic Development, Montgomery County, MD, December 2009.

information and other records on graduates and their businesses including web sites created for new companies.

In total, some information was available for over 60 participants in the program. This represents over 40 percent of all participants to date and over 50 percent of those who have graduated or are currently enrolled.

It should be stated clearly that assessing the impact of ACTiVATE is not straightforward. Starting a business is complex and failure is not uncommon, though initial failure may precede massive success. Some ACTiVATE participants have entered the program with operating companies that have been changed and improved by virtue of the program, but it is not usually clear if changes and improvements are attributable to ACTiVATE. In the absence of clear attribution, this analysis assumes that the program did not impact those companies. As discussed below, many who have not yet started companies are either pursuing opportunities or waiting for better timing.

Once operational, companies may rely on contractual arrangements for workers (e.g., on a project or commission basis). Employment may be full-time or part-time. For the founders of businesses, compensation may be extremely limited in the early stages of the business. Revenues may be elusive at the start although for a minority of these start-ups grants or investments can provide operational funding.

Given these complexities, this analysis has concentrated on identifying companies that have been created as a result of the program or were preexisting and have been substantially impacted by the program. In the latter case, the focus has been on pre-existing companies whose founders participated in the program (as opposed to employees of such companies).

Exhibit 3 summarizes these ACTiVATE companies by the class of the participants who founded the companies. Most companies were founded by individual ACTiVATE participants. In three cases, two women in the program founded companies as partners. The exhibit indicates the classes where there were partners with each partner representing half a partnership. As some partners were from different classes, the exhibit lists half a partnership in 2007 and 1.5 partnerships in the 2009 class.

Exhibit 3. ACTiVATE companies by year of class

<i>Class</i>	<i>Participants forming companies</i>	<i>Partnerships</i>	<i>Companies created</i>
2005	6		6
2006	6	1	5
2007	6	0.5	5.5
2008	6		6
2009	7	1.5	5.5
2010	1		1
Total 2005-2010	32	3	29
Sources: Sage, Nearing			

What is striking about the data is the steady rate of company formation for classes that have been completed. For the classes from 2005 through 2009, each class generated between five and six companies. The class of 2010, which is still in session as of the writing of this report, has already produced one company.

There appears to be little impact on company formation from the amount of time that has passed since women participated in the program. As will be discussed below, however, a number of program participants report being in the planning stages of starting businesses. If these planning efforts result in new companies, different relationships between time after completing the program and company formation may emerge.

Exhibit 4 summarizes job creation by the ACTiVATE companies. This summary assumes that any operating company is providing a job for its founder(s). Thus, the 29 ACTiVATE companies are assumed to have created 32 jobs for the women who founded these companies. Four of the ACTiVATE companies also report currently having employees in addition to the founders. These four companies have a total of 45 employees. In total these companies have currently created 77 jobs.

Exhibit 4. ACTiVATE job creation by year

<i>Class</i>	<i>Current jobs</i>	<i>Anticipated net jobs added next year</i>	<i>Jobs year from now</i>
2005	13	0	13
2006	23	23	46
2007	26	20	46
2008	6	3	9
2009	7	1	8
2010	2	0	2
Total 2005-2010	77	47	124
Sources: Sage, Nearing			

It should be noted that, as an indication of job creation by ACTiVATE companies, this is likely a conservative number. Because some ACTiVATE companies use contracted workers or independent contractors, rather than direct employees, the number of jobs that depend upon these companies is almost certainly greater than 77. In two instances, companies owned by program graduates had hired 15 workers after these women finished the program. Because these companies were operating before the women entered the program and it is not certain that ACTiVATE played a role in the need for these new jobs, this employment is not included in Exhibit 4. In addition, Sage and Nearing have no information on the post-graduation activities of 43 graduates of the program.

The survey also asked if companies were planning to hire new staff over the next year. Six companies indicated plans to hire a total of 47 workers over the next year including two companies with employees now. If all these hires are made the 29 ACTiVATE companies will have created a total of 124 jobs by the summer of 2011. Eight of these 29 companies will account for all the jobs created beyond those for the companies' founders.

As demonstrated in Exhibit 4, job creation is concentrated in companies associated with the classes of 2006 and 2007. In fact, job creation is concentrated in two companies that account for 37 of the current jobs (not including the founders) and 40 of the projected new jobs over the next year. In either case, these two companies account for over 80 percent of the jobs created by the ACTiVATE companies when the employment of company founders is excluded.

The overall pattern of business and job creation by the ACTiVATE program is that each class has generated five or more new companies, most of which are sole proprietorships or partnerships of the founders. Roughly one in four of these companies (i.e., one or two each year) has generated additional employment and, so far, two have grown to become substantial small businesses with more than 15 employees and substantial prospects of growing to 40 employees each in the foreseeable future. This pattern might be compared to venture capital investments where the expectation is that a minority of investments will result in substantial companies and outsized returns on investment.

The timing of class participation and hiring of workers suggests that it takes about 2 years before any of these new companies can create employment beyond that of the founders. The companies that have begun to grow significantly are from the 2006 and 2007 classes that have had 3 or more years of operating experience. These are also the classes linked to companies that expect to add dozens of jobs in the next 12 months, another indication that more substantial effects of ACTiVATE take several years to emerge.

The nature of the company's business is known for the new companies that have been created as a result of the ACTiVATE program. As shown in Exhibit 5, the most common business focus (41 percent of companies) is biotechnology or medical applications while information

technology and services/consulting account for relatively small shares.

Twenty-eight percent of these new companies do not fall under these general headings. The other types of businesses include electronic research and development, real estate management, science communications, financial services, franchise painting services, tire retailing, recreational services and pet food industry services.

Exhibit 5. Nature of business for ACTiVATE companies

<i>Nature of business</i>	<i>Number of businesses</i>	<i>Share of total</i>
Biotechnology/medical applications	12	41%
Information technology	4	14%
Services/consulting	5	17%
Other	8	28%
Sources: Sage, Nearing		

The surveys of ACTiVATE participants have generated relatively little information on payroll and revenue for the newly created companies. The information that been provided indicates that revenue generation and payrolls are relatively modest for many of these young companies although a handful have begun to generate substantial cash flows and a few are likely generating six-figure incomes for their founders.

In addition to those women who have started companies, there are a significant number of participants who report that they are in the planning stage for creating a business or are actively working to launch a business. At least 17 ACTiVATE participants indicate that they are still pursuing entrepreneurship. For those that indicated a timeframe, half felt they would launch within 12 months and half were unsure of the timing. Another 16 participants said they had not started a business because the timing was not right. In total these 33 women represent a potential for future business creation that could add to the total of ACTiVATE companies already formed.

Other outcomes, other impacts

Business creation is the primary interest of ACTiVATE, but not the only outcome. A minority of survey respondents have indicated that the program changed their career plans, had had little or no impact on their work life, or had had other impacts.

In two cases, participation in the program has encouraged women to change their career paths. Generally these changes relate to focusing on work with a greater connection to technology and economic development. One example is provided in the case studies in the next section of this report.

Participants who indicated alternative outcomes for the program generally praised the program, emphasized the value of the contacts among program staff and participants, and indicated that the program had provided new tools and skills that improved their work and professional

qualifications. In one case ACTiVATE was credited with helping a participant secure new employment; as noted above, 16 women indicated that they were still interested in creating new companies, but not at the present time.

Of those participants who indicated that the program had little or no impact, two were company owners before they entered the program. Another two women decided that entrepreneurship was not desirable. Another woman explained the modest impact as a consequence of her position in a start-up company. She held this position before entering the program and continues that work.

Significance of ACTiVATE at UMBC program

The Sage survey asked how significant the program had been in the business decisions that participants had made. Of those women who had started companies and responded to the question, 90 percent indicated that the program had been very helpful or important in the process of creating a new company, while the remaining 10 percent indicated that ACTiVATE had been somewhat helpful or important. Another respondent indicated that the program had been somewhat helpful or important to her when she made significant changes to the company where she was employed when entering the ACTiVATE program.

The survey also allowed for open-ended responses about ACTiVATE. These are consistently positive even in cases where women chose to turn away from entrepreneurship opportunities. One participant, who had closed down one start-up after experiencing problems with licensing, indicated that the knowledge she gained from the program helped give her the confidence to pursue biotech consulting in China. Others cited the value in learning about technology assessment, securing licenses, and financing and investors. Another frequent comment was the value of contacts and networks that became available through the program. Not only were these contacts valuable during the class, but have also been used by graduates after program completion. One graduate spoke of connecting a woman trying to start a company with an ACTiVATE graduate and of hiring one of the companies started by an ACTiVATE graduate to perform a service needed by her employer.

Economic impacts and costs per job created

The 77 direct jobs that have been created to date in the ACTiVATE program and the future jobs that are likely to be created in the next year will have a multiplier effect on the Maryland economy. Any business will spend money in the local economy for the goods and services it requires to operate. These expenditures range from rent for office space, to purchases of furnishings and equipment, to demand for utilities. The wages associated with these new jobs as well as the jobs directly supported by non-payroll business spending will support other jobs in the economy as these wage earners buy the wide range of goods and services that households require.

One measure of this multiplier effect is the ratio of total jobs created for each direct job in, for example, biotech businesses or consulting businesses. Exhibit 6 provides these ratios for the types of businesses that ACTiVATE participants have created. These ratios are taken from data provided by IMPLAN, a nationally recognized source of econometric information.

Exhibit 6. Ratios of total jobs to direct jobs

<i>Nature of ACTiVATE business</i>	<i>Related IMPLAN sector</i>	<i>Total jobs for each direct job</i>
Information technology	Custom computer programming services	1.78
Services/consulting	Management consulting services	2.19
Biotechnology/medical applications	Scientific research and development services	2.01
Other	Services, generally	1.58
Sources: IMPLAN, Sage, Nearing		

What these numbers indicate is that for each job created by ACTiVATE additional employment will be created because of the spending of these companies or by the consumer spending that results from the new jobs. The ratios of direct ACTiVATE jobs to total jobs typically vary by industry because of the different needs that industries have for goods and services and the variations in compensation and therefore in consumer spending.

As noted in Exhibit 5, over 40 percent of the jobs ACTiVATE has helped create are in biotechnology and related fields. About one-third are in a miscellaneous category while the remainder are spread between information technology and services/consulting. Exhibit 7 shows the total jobs created as a result of the ACTiVATE program currently as well as the prospective jobs that the program is expected to create over the next year. These estimates are based on the ratio of 1.89 total jobs for each ACTiVATE job.

Exhibit 7. Multiplier effect of ACTiVATE jobs

	<i>Direct ACTiVATE jobs</i>	<i>Total jobs</i>
Current employment	77	146
Prospective employment in 1 year	124	234
Sources: IMPLAN, Sage, Nearing		

The cost of the ACTiVATE program in Maryland has been running at approximately \$200,000 per year. Thus, for the first 6 years of the program, the total program cost is approximately \$1.2 million and will increase to \$1.4 million for another year of the program. Given these total costs and the estimate of total jobs created, the program cost per job created can be estimated. Exhibit 8 reflects estimates of these costs both for the direct ACTiVATE jobs now existing and those expected to exist in 1 year. Exhibit 8 also reflects estimates of cost per total jobs created.

Exhibit 8. ACTiVATE total program cost per job created

<i>Program years</i>	<i>Cumulative program cost</i>	<i>Jobs created</i>		<i>Cost per job</i>	
		Direct ACTiVATE jobs	Total jobs	Direct ACTiVATE jobs	Total jobs
2005 – 2010	\$1.2 million	77	146	\$15,600	\$8,200
2005 – 2011	\$1.4 million	124	234	\$11,300	\$6,000

Sources: IMPLAN, Sage, Nearing

As Exhibit 8 shows, the cost per direct ACTiVATE job create to date is \$15,600. If the projected increase in employment for ACTiVATE companies is realized over the next year, the cost per direct ACTiVATE job a year from now will shrink to \$11,300. When the multiplier effect is considered the cost per job for all jobs currently created or supported by the program is \$8,200. This cost would drop to \$6,000 in a year if projections for hiring are realized.

This is a remarkably low cost. How this compares to other efforts to create jobs is not simple. One recent benchmark for the cost of creating jobs is the current federal stimulus plan, which is spending \$92,000 to create a job according to the White House. This figure has been much debated with stimulus opponents claiming that the cost per job is much higher, as much as \$160,000.¹⁸ Regardless of the actual cost, the federal stimulus plan is designed to create jobs by generating new final demand (e.g., by paying for infrastructure projects) or by providing funds to local governments so that layoffs of teachers or firefighters can be avoided.

Government loans to businesses have been a longstanding strategy to create or save jobs. In 2006, the U.S. Department of Agriculture's Business and Industry Guaranteed Loan Program spent \$766 million to save or create an estimated 14,837 jobs at an average cost per job of over \$51,600. Most of the jobs were existing jobs in low-wage industries, reportedly saved by the program.¹⁹

Better benchmarks are efforts to create new businesses and general characteristics of new enterprises. An analysis by Scott Shane of Case Western Reserve University reported in the New York Times estimated that, by providing modest support for those wanting to start companies (i.e., \$9,000 per entrepreneur), a total cost per job created by new establishments would range from \$26,000 to \$31,000. These costs do not include the jobs for the founders of the firms and exclude the costs paid by these founders. This analysis factors in failure rates for start-ups (approximately one-third of start-ups survive after 6 years), the share of new

¹⁸ "\$160,000 Per Stimulus Job? White House Calls That 'Calculator Abuse'," blogs.abcnews.com/politicalpunch/, October 30, 2009

¹⁹ "The cost of creating a job," Washington Post, December 5, 2007 www.washingtonpost.com

establishments that have employees (19 percent), and the average number of employees for employer firms (4.3 to 6.5 employees depending on sources of data).²⁰

While Shane's analysis is much closer to the ACTiVATE model, direct comparisons need to be made carefully. The \$9,000 support figure is designed to overcome the lack of capital that is the most commonly reported barrier to entrepreneurship and is described as the money required to "start the entrepreneurial process," which is not detailed, but might be compared to the ACTiVATE program. The \$9,000 figure excludes another \$6,000 that the prospective entrepreneur is assumed to provide from his or her own funds. The jobs created in the Shane analysis exclude the employment of the entrepreneurs themselves. Finally, costs per job as estimated by Shane only consider the \$9,000 of external support, not the \$6,000 of funds provided by the entrepreneurs.

Despite these differences it appears that the ACTiVATE cost of job creation and other characteristics of ACTiVATE companies compare favorably to the statistics cited by Shane. The cost of direct ACTiVATE jobs at \$11,300 to \$15,600 (from Exhibit 8) includes employment of entrepreneurs and rises to \$14,700 to \$25,000 per job when jobs held by ACTiVATE entrepreneurs are excluded. Currently, however, participants pay tuition of \$3,000 against a total ACTiVATE program cost of \$8,000 per participant. Thus external support for each ACTiVATE participants is \$5,000. When only external support is considered, the ACTiVATE cost per direct job (excluding founders) ranges from \$10,300 to \$15,600 or roughly one-half of Shane's estimated range of costs. Four of 29 ACTiVATE companies currently have employees (14 percent), while in a year 8 of these companies (28 percent) will have employees if all hiring plans are realized. These ratios compare favorably to the 19 percent national figure cited by Shane. If hiring plans are successful, the eight ACTiVATE companies with employees will have an average of 10.6 workers in 12 months, a decrease from the average of 12 employees for the 4 current ACTiVATE employer companies. Either case represents a much higher achievement than the national benchmark of 4.3 to 6.5 employees per employer company.

In comparison to Shane's analysis, the ACTiVATE program is more cost-effective at creating employment. If hiring plans are realized over the next 12 months, the program will also result in a higher proportion of companies that create jobs in addition to the employment of the founders compared to national averages. Similarly these employer companies will have substantially more employees per company than national average benchmarks.

Finally, it should be repeated that the estimate of jobs directly created by ACTiVATE companies is almost certainly conservative. The tendency of some of these companies to use independent contractors or commissioned sales staff as the equivalent of staff, but not counting these contractors as direct hires, probably underestimates the number of jobs that are directly dependent on ACTiVATE companies. The analysis has also not credited program impacts to

²⁰ Scott A. Shane, "The costs of entrepreneurial job creation," The New York Times, July 6, 2008. <http://boss.blogs.nytimes.com>

companies owned by women when they entered the program unless there was specific attribution by these women. No attempt has been made to project the findings for those program participants who responded to the surveys or for whom data are otherwise available to the roughly half of all participants for whom no data are available. As a result this analysis implicitly assumes that none of these women (i.e. those for whom no data are available) have created companies or added to Maryland's employment. To the extent that the estimates of jobs created are conservative, the cost per job created is overestimated.

If the UMBC program is able to create 150 direct ACTiVATE jobs in the next 12 months, rather than the 124 estimated above, then the cost per total jobs created (i.e. ACTiVATE direct jobs and multiplier jobs) would be only \$5,000. These 26 additional jobs could include:

- new jobs at companies owned by women before they entered the program and not credited to the program, but which resulted from changes at the companies attributable to ACTiVATE (at least 15 such jobs which might fit this description are projected over the next year, but not included in the total above)
- new jobs at companies created by the class of 2010. There has been 1 start-up for every 4 of 5 women in the program, suggesting that the 2010 class will generate three or more companies in addition to the 1 already started.
- jobs at companies that are the equivalent of new jobs, but not counted as such because they are contract personnel, commission sales people, or some other alternative to direct hires
- jobs at companies that are started by the 17 women who said they are still pursuing entrepreneurship or by the 16 women who said that the timing was not right for starting a company
- jobs at companies started by participants who have not responded to the Sage/Nearing survey or are not part of the databases maintained by ACTiVATE at UMBC or Path Forward

Any of these alternatives is possible. Each would drive the cost per job down. If an additional 26 jobs were confirmed and attributed to the ACTiVATE program, the cost per total job created would only be \$5,000.

Fiscal benefits to Maryland state and local governments

The direct jobs created by the founders of ACTiVATE companies generate income and other tax revenue for state and local governments in Maryland. This is also true for the "multiplier-effect" jobs that are supported by the program. Income tax is the most prominent of these fiscal benefits.

The employment generated by the ACTiVATE companies is in highly compensated industries. As noted above, bioscience jobs in Montgomery County have average annual salaries of well over \$90,000. Information technology and consulting are also sources of well-paying jobs.

Young companies like those created by ACTiVATE at UMBC will likely pay less than industry benchmarks. For an estimate of income taxes paid to Maryland governments, this analysis assumes an average salary for direct ACTiVATE jobs of \$50,000 (as opposed to \$80,000 to \$90,000 if these companies were well established). The kinds of jobs that these companies support with their non-payroll expenditures and through the consumer spending of ACTiVATE employees and employees at their suppliers pay approximately \$43,500.²¹ Using these salary levels, total compensation for current ACTiVATE jobs, including the multiplier jobs can be estimated.

Exhibit 9 summarizes employment and estimated compensation currently and in 1 year if hiring plans are fully realized. Current total compensation related to ACTiVATE companies is estimated at \$6.9 million annually. This could rise to \$11 million annually within the next year.

Exhibit 9: Total income related to ACTiVATE companies (compensation in millions of dollars)

<i>Timing of estimates</i>	<i>Direct ACTiVATE jobs and estimated compensation (1)</i>	<i>Secondary jobs and estimated compensation (2)</i>	<i>Total jobs and estimated compensation</i>
Current employment	77	69	146
Prospective employment in 1 year	124	110	234
Current compensation	\$3.9	\$3.0	\$6.9
Prospective compensation in 1 year	\$6.2	\$4.8	\$11.0

Notes. (1) Direct job compensation based on average annual compensation of \$50,000.
(2) Secondary job compensation based on average annual compensation of \$43,500.
Sources. IMPLAN, Nearing

State and local taxes can be estimated using either effective or marginal tax rates. Effective rates are calculated on the basis of adjusted income levels and taxes actually collected, while marginal rates are published online. The office of the Maryland Comptroller routinely publishes data for determining both effective and marginal tax rates.²² Effective rates are lower than marginal rates and are appropriate when the income being assessed is reflective of total household income. Marginal rates are more appropriate for estimating taxes collected on extra dollars of income available to a household. As ACTiVATE related income is often only 1 source of household income, marginal rates may often be a more logical estimate of the taxes generated by this income.

²¹ Compensation for supplier jobs and jobs in the consumer economy are derived from a model of the Maryland economy created by IMPLAN, the industry standard source of econometric data on states and localities.

²² "Income Tax Summary Report: Tax Year 2008," Comptroller of Maryland. www.marylandtaxes.com

Exhibit 10 summarizes tax generation by ACTiVATE-related jobs currently and prospectively in 1 year's time. The low estimate is based on effective tax rates; the high estimate uses marginal tax rates. The mid-point estimate averages the low and high estimates and may be a reasonable compromise between the assumption that the income being analyzed is total household income and the assumption that it is all income representing extra dollars to these households. Using the mid-point estimate the current employment related to ACTiVATE is generating \$281,000 in income taxes for the state and an additional \$179,000 for local governments (i.e. counties or the City of Baltimore). Prospectively, ACTiVATE could be responsible for \$450,000 in state income taxes and \$287,000 in local income taxes by mid-2011.

Exhibit 10: Estimated income tax generation by ACTiVATE-related jobs (thousands of dollars)

<i>Government</i>	<i>Current estimate</i>			<i>Prospective estimate in 1 year</i>		
	Low (1)	Mid-point	High (2)	Low (1)	Mid-point	High (2)
State	\$236	\$281	\$325	\$379	\$450	\$522
Counties	\$152	\$179	\$206	\$244	\$287	\$330
Total	\$388	\$460	\$531	\$623	\$737	\$851

Notes. (1) Low estimate is based on effective state income tax rate of 3.45 percent and a local tax rate of 2.22 percent applied to total compensation.
(2) High estimate is based on marginal state income tax rate of 4.75 percent and a local tax rate of 3.00 percent applied to total compensation.
Sources. Maryland Comptroller, Nearing

IV. Case studies of ACTiVATE graduates

The following brief case studies are intended to place a human face on the ACTiVATE program. By focusing upon women who have been successful in creating growing businesses, who are still working towards entrepreneurship, or who have used the program to reinvigorate and redirect their careers, these case studies breathe life into several of the key impacts that the program has had on those who have participated to date.

Kris Appel, president and founder, Encore Path, Inc.²³

The story of Kris Appel, the entrepreneur, and Encore Path President and founder, represents all the good that can happen when people focus on common objectives. Before joining the ACTiVATE program, Ms. Appel had 17 years of federal government experience. In her own words, she had “no business experience, no product, just a yearning” to be an entrepreneur.

She joined the ACTiVATE class of 2006. Early in her ACTiVATE experience, she identified a technology that she both understood and thought worthy of commercialization. She describes the technology as “low-tech,” but it really isn’t. The University of Maryland School of Medicine

²³ Personal communications, Kris Appel, Encore Path, Inc, with Anirban Basu, Sage Policy Group, Inc., August 9, 2010

had developed an arm rehabilitation device for stroke survivors. The machine was bulky, uncomfortable, and unattractive, weighing in at 55 pounds.

Prior to graduation from the ACTiVATE program, Kris Appel adopted that technology and had already founded Encore Path. With assistance from the medical school, an efficient prototype manufacturer, Maryland Technology Development Corporation (TEDCO) and angel investors, Kris was steadily able to refine the device's design. Further testing with the University ensued and then the Maryland Department of Business and Economic Development (DBED) issued a Challenge Fund grant of \$150,000. Kris says that "DBED and TECDO are huge supporters of the company."²⁴

By October 2008, manufacturing had begun. Five hundred devices were produced of which 200 have already been sold, most of them (70 percent) directly to stroke survivors. The U.S. Commerce Department facilitated the sale of 15 percent of the devices abroad while the balance has been sold to American hospitals and rehabilitation centers. During the week of the interview with Sage, the company was in the process of hiring 3 additional sales people. The company is now preparing for its next round of angel financing. According to Kris, what has transpired is "totally, totally because of ACTiVATE. ACTiVATE changed my life."

Thanda Wai, Ph.D., Monitoring & Enforcement Officer, Office of Technology Transfer, National Institutes of Health²⁵

Dr. Wai represents precisely the type of professional woman who has become a hallmark of the ACTiVATE program. Prior to joining NIH in 2006, Dr. Wai had been involved in administering intellectual property rights (IPR) in a number of different contexts, including serving as an IPR Specialist at the International Rice Research Institute in the Philippines from 2001-2004. She earned her Ph.D. at Michigan State University from the Genetics Program (both plant and animal genetics) and the Department of Botany and Plant Pathology jointly. Subsequently, she was awarded a postdoctoral Molecular Biologist fellowship at the USDA-Agricultural Research Service.

Dr. Wai recollects learning about ACTiVATE from a colleague at work. Immediately, she was attracted to technologies available through ACTiVATE related to one of her life's passions, agriculture. For a time, she explored the possibility of commercializing available mosquito repellent technology. But she felt that there was already too much competition in the market and that various regulatory hurdles would diminish the technology's prospects for productive commercialization.

²⁴ As noted earlier in the report, most ACTiVATE companies are self-funded. Encore Path, Inc. is the counterexample of a company that has tapped virtually every funding resource available to start-ups in Maryland.

²⁵ Personal communications, Thanda Wai, Ph.D., Monitoring & Enforcement Officer, Office of Technology Transfer, National Institutes of Health, with Anirban Basu, Sage Policy Group, Inc., August 9, 2010

She then turned to something totally different – a computer bag designed by a Virginia Tech student. But that effort also ground to a halt for reasons largely related to university bureaucracy.

So in large measure, this story has yet to be written. Thanda continues to dream of her own business. It appears that what matters most to her is not the nature of the product or the context of its application, but the entrepreneurial process itself. She is presently pursuing “little steps” that she hopes will ultimately translate into enough wealth that she can spend her time identifying worthy charities to which to contribute.

Dr. Kimberly Brown, Amethyst Technologies, LLC²⁶

Dr. Kimberly Brown stands for the proposition that there are many talented scientists and technicians who do not create companies because they lack or feel that they lack sufficient business acumen. Her scientific credentials are impeccable; she obtained a Ph.D. and M.S. in Chemical Engineering from the University of Maryland, College Park. While at University of Maryland, she received a GEM fellowship and Sloan fellowship. She completed her undergraduate studies at the University of Delaware and received a B.S. in Chemical Engineering with 2 minors, Mathematics and Linguistics.

But in her own words, “I knew nothing about running a business”, including dealing with issues such as finance, human resources and intellectual property. According to Kimberly, one of ACTiVATE’s most important attributes is that “the program exposes you to things outside of your comfort zone.”

Importantly, she had an opportunity to become an entrepreneur and she wanted to seize the day. In September 2006, she decided to purchase contract rights from Cell Systems, Inc., her employer at the time, and to found Amethyst Technologies. In order to properly develop her business acumen, Kimberly joined the ACTiVATE Class of 2007. Timing, resources and opportunity combined to create a success story. At the beginning, there were 2 employees. There are presently 20 employees, all of whom are in Maryland and include engineers, software developers and regulatory experts. Dr. Brown hopes to grow Amethyst into a \$20 million business within five years.

Amethyst is certainly operating in areas conducive to that type of growth. They operate in the areas of biodefense (the Army is their leading client and they work with 9 discrete Army divisions), clinical trials, vaccine development, malaria and in other key areas. The company is presently in the process of setting up a lab, developing software and is endeavoring to create a business relationship with the Centers for Disease Control in Atlanta, GA.

²⁶ Personal communications, Dr. Kimberly Brown, Amethyst Technologies, LLC, with Anirban Basu, Sage Policy Group, Inc., August 10, 2010

The company has been profitable since its inception and has no debt. According to Dr. Brown, a start-up needs “one good client, one good advocate, and one good mentor.” She had all 3. Moreover, she continues to engage ACTiVATE as a source of ongoing counsel.

Diane Ryan, Ryan Technologies Group, LLC²⁷

Diane Ryan represents 1 of the classic instances of entrepreneurship by necessity and by desire. She participated in ACTiVATE as part of the Class of 2006. At the time, she had a comfortable position as a senior systems engineer at ManTech International Corporation. Her principal client was the Social Security Administration.

Despite her apparent stability, she went to an ACTiVATE event to understand the program and promptly decided that it was not for her. The program seemed to be about things that were well beyond her comfort zone; things like business management and biotechnology. But despite her skepticism, she applied to be a part of the ACTiVATE program anyway. Her decision was influenced in part by assurances that the program was “malleable” and that there was much more to the program and associated technologies than the life sciences.

As her work at ACTiVATE began, an entrepreneur was steadily being hatched. But the entrepreneur was not created immediately. In the beginning, she worked with 2 other women towards the commercialization of a type of sensor. But the group was not able to move ahead in a consistent direction and was disbanded. Midway through the ACTiVATE program, she actively wondered whether she had the capacity and capability to form and manage a business. And after all, she already enjoyed stable employment.

Or did she? Warnings were emerging that the contract with SSA only had a few months to go. Six months left turned to 4 months...then 2. All of a sudden, she was eligible for unemployment insurance.

Thankfully, she had amassed some savings during the final months of the contract. She also took advantage of a program financed by the Department of Labor, Licensing and Regulation and run by Women Entrepreneurs of Baltimore. This 8-week program built upon her ACTiVATE experience. It helped her to complete a business plan, identify an initial client and receive her first payment.

An entrepreneur was born and Ryan Technologies became the newest Maryland-based business. The business is located in South Baltimore. Marketing to date has largely been through word of mouth and through local business organizations, including the Greater Baltimore Technology Council. She has just landed a contract with a Verizon Wireless contractor and is now preparing to take on a contractor or permanent staff. The ranks of her clients also include the YWCA of the Greater Baltimore Area and Maryland TEDCO.

²⁷²⁷ Personal communications, Diane Ryan, Ryan Technologies Group, LLC, with Anirban Basu, Sage Policy Group, Inc., August 9, 2010

Linda Burger, Senior Vice President, Howard County Economic Development Authority, Center for Business and Technology Development²⁸

UMBC has been very good to and for Linda Burger. As an undergraduate majoring in information systems management at UMBC, she was recruited by the National Security Agency (NSA) before she graduated. Along with her interest in systems management, she also enjoyed Spanish and was awarded a certificate of competency in that language by the university.

While she enjoyed the work at NSA, she also became familiar with government contractors and the profitability that successful companies enjoy. With a business degree from Johns Hopkins, Linda and her husband started their own company in 1996 and found success with repeat IT and systems management work for satisfied clients. The company also explored the development of tools that would help franchise businesses create consistent but customized websites. The appeal of this product was the ability to generate revenue not dependent on time or billable hours. However, lacking experience with the creation of a new product, she and her husband failed in their new product development efforts.

When her children arrived, she cut back on full-time work with her company and by 2001 dissolved the company to be a stay-at-home mom. For the next several years, she occasionally did part-time work, including teaching Spanish, thanks to her UMBC certificate.

By 2005, her children were in school and it was time to return to work. By exploring the UMBC website, she discovered the Center for Women and Information Technology and a day devoted to "computer mania", which led her to ACTiVATE. Linda joined as the last member of the class of 2005.

She entered the class expecting to start a new company. Given her past disappointment with creating website development tools, Linda was attracted to the possibility of using a proven technology that had been vetted by the program. These attractions were counterbalanced by the fact that she was commuting from Frederick to the class while driving her growing children to activities nearer to home. She was also aware of the struggles and difficulties of starting a business and the substantial cost of health insurance for the self-employed.

At this time, Fort Detrick, located on route to class, was experiencing a post 9/11 boom in work as the federal government poured money into countering bioterrorism. A position in technology transfer became available halfway through that first ACTiVATE class and Linda successfully applied. ACTiVATE (and UMBC) had once again helped her find a career path.

That 2-year position led to her current position with Howard County where she works with incubator companies, reviews business plans of budding entrepreneurs, and helps them to

²⁸ Personal communications, Linda Burger, Senior Vice President, Howard County Economic Development Authority, Center for Business and Technology Development, with John Duberg, Nearing Group, Inc., August 20, 2010

understand the dynamics of marketing. Many of the entrepreneurs she works with now are women.

ACTiVATE has direct application to her current work. She has made connections between program participants and entrepreneurs in Howard County, helping in particular to overcome a sense of isolation that business creation can generate and extending the network of women entrepreneurs in Maryland. She has also used an ACTiVATE company to provide services to her office. Before Linda came to Howard County roughly half of the entrepreneurs being helped by her office were women or minorities. That share is now 63%.

Linda sees the ACTiVATE program as building a pool of prospective women entrepreneurs who are capable of creating new companies even though these efforts may not be undertaken for years. The program has been a life changing experience for her and one to which she has made a long-term commitment. In addition to her work with entrepreneurs in Howard County, Linda has also volunteered to serve on the board of Path Forward.

Other perspectives on ACTiVATE at UMBC can be seen in the comments of participants. The following quotes are representative of how women have responded to the program.

“I appreciate going through the process. A methodology I can apply over and over. Very sound.”

Juanita Boyd-Hardy – ‘05

“The program gave me a kick in the butt to do what I have been wanting. I appreciate the support, safety net of the class. I’ve been approached for a job by another start-up company but realize my passion is for forming my own company.”

Kerrie Brady – ‘05

“I started a network of support that is tremendously valuable as I move forward, people who really want to help and be there.”

Mona S. Jhaveri-Brown – ‘05

“This has been an incredible experience with all of the available resources and network of people to share their experiences and provide guidance in all aspects of a start-up.”

Meta Lankford – ‘05

"The program has shown me how big and vast the world is. My path has been so traditional. The course opened my opportunities to move forward."

Lenaye Lawyer – ‘05

"Clear structured approach to how to evaluate business ideas and how to get a business started. The academic approach has been in depth and streamlined. I feel adequately prepared to work through this process until a successful plan is achieved."

Jean Logan – ‘05

"ACTiVATE opened my eyes to the new opportunities and challenges of starting a company and a supportive group of women. And I've learned every back road in Maryland to get here."
Loleta Robinson – '06

"ACTiVATE gave me the confidence to successfully start and run my own consulting and technology business."
Leah Zimmerman – '06

"ACTiVATE has changed my life."
Lynne Feingold – '07

"I got so much from this program and hope the circle will grow! I look back at a year ago and I remember that I had a hunch to have something of my own. Now I have clarity in my mind of what I want and how I will achieve it. I wake up every morning with new ideas for the new day and surprise myself. I suspected I am resourceful, but I did not know I could bounce that high from one step to the next from absolute "zero". I have no fear now - I just know that I can make a billion dollar business happen."
Katya Kovalskaia – '08

V. Findings

In reviewing the achievements of ACTiVATE, a number of major findings emerge.

- ***Entrepreneurs can be created***

ACTiVATE at UMBC is generating more than 5 new companies from each class. While a significant number of women in the program had prior experience with starting and owning companies, many did not. The most successful graduates so far — Kris Appel and Kimberly Brown — were complete novices who have within a few years created robust small businesses with substantial prospects for growth.

- ***High-quality jobs can be created***

More than two-thirds of the companies started by ACTiVATE women are in biotech/medical applications, information technology or services/consulting. Other companies include both high and low tech businesses; electronic research and development versus retail or entertainment services. Thus the great majority of the jobs and work created by the program is in knowledge-based industries that are likely to experience higher rates of growth and higher rates of compensation than the norm.

- ***The cost of creating entrepreneurs, new companies, and high-quality jobs can be modest***

All of this economic development work can be done inexpensively. At a maximum cost per direct job created of \$15,600, ACTiVATE is a highly cost-effective job creation strategy. It is also almost certain that in the next year this per job cost will decrease substantially. When total jobs dependent on ACTiVATE at UMBC are considered, the cost per job created is at most \$8,200. This per job cost could drop to \$6,000 if hiring over the next year proceeds as expected.

- ***ACTiVATE at UMBC generates a significant stream of income taxes***

The mid-point estimates for annual income taxes generated by current ACTiVATE-related jobs are \$281,000 for the State of Maryland and \$179,000 for county governments or a total of \$460,000 in state and local income taxes. In a year, annual income tax collections may rise to \$450,000 for the state and \$287,000 for county governments.

- ***There is potential for enhancing the culture for entrepreneurship in Maryland***

Silicon Valley is the prime model for entrepreneurship in the world. The networks of people, density of technology and intellectual property, and other resources create a culture of entrepreneurship that works.

Many of the comments about ACTiVATE's effectiveness and impacts support the idea that a culture of entrepreneurship among women may be one of the most important outcomes of the program. Enhancing and expanding an "old girls' network" has, for example, already shown benefits to fledgling companies and entrepreneurs. The longer the program operates the more likely it is that this culture of women entrepreneurs will become an established part of the business environment in Maryland.

- ***Women represent a wellspring of entrepreneurial talent***

One of the benefits of ACTiVATE is creating a supportive environment for women who are ambitious, but inexperienced as entrepreneurs. This common bond has clearly helped some women gain the confidence they would otherwise have lacked. Additionally, the program creates a safe and supportive setting for testing new skills and stepping outside of traditional comfort zones.

- ***ACTiVATE at UMBC has contributed to Maryland's reputation as a leader in entrepreneurship***

ACTiVATE appears to resonate with many people. The expansion of the program to Texas and the prospects of Path Forward spreading the program across the country, if not around the world, are based on work done at UMBC. UMBC can legitimately take credit for being a leader in entrepreneurship.

- *Local conditions can stimulate the entrepreneurship process*

The early experiences of ACTiVATE at Texas State show that the particular conditions and settings for entrepreneurial programs make a substantial difference in how the program is implemented and the outcomes that can be realized. A number of factors in Texas seem to create a particularly strong entrepreneurial environment that can accelerate the process of business formation that ACTiVATE encourages. The basic concept of teaching entrepreneurship and wrapping newly-acquired knowledge around new technologies has worked.

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Kimberly Brown, Amethyst Technologies, LLC

Linda Burger, Senior Vice President, Howard County Economic Development Authority, Center for Business and Technology Development

David Fink, Director of Entrepreneurial Services, bwtech@UMBC Research and Technology Park

Terry Chase Hazell, Texas State ACTiVATE

Ellen Hemmerly, Executive Director, bwtech@UMBC Research and Technology Park

Julie Lenzer Kirk, Path Forward Center for Innovation and Entrepreneurship

Renee Lewis, Path Forward Center for Innovation and Entrepreneurship

Diane Ryan, Ryan Technologies Group, LLC

Nan Sherman, Administrative Assistant, ACTiVATE[®] Program, University of Maryland-Baltimore County

Thanda Wai, Ph.D., Monitoring & Enforcement Officer, Office of Technology Transfer, National Institutes of Health