



Testimony

of

Morgan Reed

Executive Director

The Association for Competitive Technology

before the

Committee on Small Business

The Subcommittee on Contracting and Workforce

on

Help Wanted: The Small Business STEM Workforce Shortage
and Immigration Reform

April 25, 2013

Chairman Hanna, Ranking Member Meng, and distinguished members of the Committee: My name is Morgan Reed and I thank you for holding this important hearing on small business science, technology, engineering, and math (STEM) workforce shortage and immigration reform.

I am the executive director of the Association for Competitive Technology (ACT). ACT is an advocacy and education organization for people who write software programs -- referred to as application developers. We represent over 5,000 small and mid-size IT firms and advocate for public policies that help our members leverage their intellectual assets to raise capital, create jobs, and innovate.

Our organization was founded in 1998 with the commitment to foster an environment allowing small technology companies to flourish. Our founders believed that the greatest innovation occurs in nimble companies like these and our board of directors has always been exclusively comprised of small business owners. The emergence of the mobile economy over the last five years has provided tremendous opportunity for our members to market software directly to consumers as apps.

While this new marketplace has thrived, we are now faced with a serious challenge -- our country is not producing enough software developers to allow companies to grow. America's schools no longer provide the math and computer science skills to fuel the innovation that has long driven economic growth in this country.

This concern has become so grave that many companies are willing to pay double the current fees for additional visas and green cards so long as the added funds are designated exclusively for science, technology, engineering, and math education. The industry is willing to incur these extra costs -- up to \$5 billion -- believing that schoolchildren educated in STEM subjects are more likely to pursue careers in technology.

The simple fact that companies are willing to pay double the existing fees should speak volumes -- when's the last time anyone has uttered the words "charge me more, please"?

The small businesses that are tomorrow's leading technology companies know that finding the right employee today through an H-1B, and tomorrow through better STEM education, is critical to their ability to reach their full economic potential.

The Tech Ecosystem and Job Creation

I spend a significant portion of my time speaking to non-developer audiences who want to know about the state of the mobile apps economy. Unlike other industries, I find that I have to update my numbers for every speech, not just once or twice a year. Just two years ago, total industry revenues were \$3.8 billion and expected to rise to \$8.3 billion. However, by the end of last we already reached \$20 billion and are now projected to

reach \$100 billion by 2015.¹ This is a meteoric rise for an app economy that didn't even exist five years ago.

Smartphones derive considerable value from the apps that run on them. Consumers are attracted to phones based on the functionality these programs provide. Telephone companies and handset makers have devised entire ad campaigns highlighting the apps that run on their platforms. "There's an app for that" is probably one of the most recognizable ads in the technology space.

This success has had a dramatic impact on job creation. ACT's study in 2011 estimated that the current mobile apps economy has created, saved, or supplemented more than 600,000 jobs nationwide across iOS, Android, Windows Phone 7, and Blackberry platforms.² Another study by TechNet showed nearly 500,000 jobs created by the app economy on the major platforms alone.³ We are sure that those numbers have grown by 20 percent or more through 2013, compared to an overall job growth rate more in the 7-10 percent range.

ACT July 2012 Study of Top 800 Apps: Findings and Analysis

In 2012, ACT looked at of the current mobile app ecosystem, this time examining apps not only by revenue, but also by type and by geographic location.⁴

The results of our research showed two key results relevant to this committee:

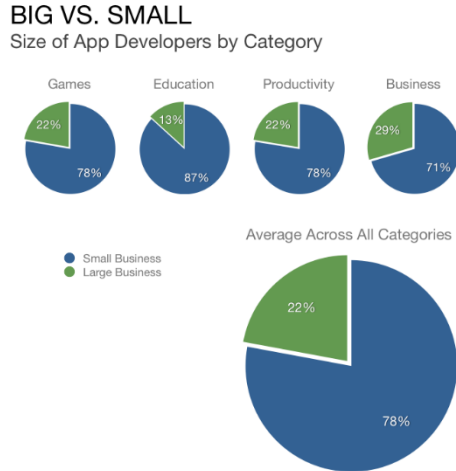
- 1. Seventy eight percent of the top app developers are small businesses, with U.S. based companies heaviest in California, but significant regional diversity, especially in Business and Education applications**
- 2. U.S. developers make a majority of apps, but international developers make up a growing portion of the market.**

¹ Egle Mikalajunaite, "The Application Development Market Will Grow to \$US100bn in 2015," research2guidance (July 6, 2011) *available at* <http://www.research2guidance.com/the-application-development-market-will-grow-to-us100bn-in-2015/>.

² "Testimony of Morgan Reed before the House Committee on Energy and Commerce Subcommittee on Commerce, Manufacturing and Trade." (Oct. 5, 2011) *available at* http://democrats.energycommerce.house.gov/sites/default/files/image_uploads/Testimony_10.05.11_CMT_Reed.pdf

³ "New TechNet Sponsored Study: Nearly 500,000 'App Economy' Jobs in the United States," TechNet (Feb. 7, 2012) *available at* <http://www.technet.org/new-technet-sponsored-study-nearly-500000-app-economy-jobs-in-united-states-february-7-2012/>

⁴ "Apps Across America: The Economics and Ecosystem of the Mobile App Market," ACT (July 18, 2012), *available at* <http://actonline.org/files/Apps-Across-America.pdf>.



ACT research continues to find that the majority of the top-selling mobile app developers (78%) are small businesses. Nowhere is the dominance of small business seen more than in education apps, where over 70% of the app developers surveyed were small businesses. Of those small businesses, 87% have 50 or fewer employees.

Without question, the new, increasingly mobile consumer is creating opportunities at every level and in every location of this country.

The Bad News

America’s dominance in this fast growth market is held together by our ability to find new employees who can provide and support innovative new solutions. According to the U.S. Bureau of Labor Statistics, America is expected to create 120,000 new jobs in computer science annually throughout the decade, but our universities only produce 40,000 graduates a year qualified for these positions.⁵ Self-taught individuals will help to fill that gap but at the end of the day, even the self-taught require an understanding of the kind of complex mathematics that drive today’s data-crunching algorithms.

Moreover, the jobs we are sending overseas by failing to educate at home aren’t bad ones. Software developers command significantly higher wages — \$93,280 at the median according to the Bureau of Labor Statistics;⁶ all with an unemployment rate among computer-related occupations of only 3.2 percent.⁷

⁵ This estimate is based on the U.S. Bureau of Labor Statistics’ occupational employment and job openings data, projected for 2010–2020, available at <http://www.bls.gov/emp/>; Integrated Postsecondary Education Data System from the U.S. Department of Education’s National Center for Education Statistics (NCES) available at <https://webcaspar.nsf.gov>.

⁶ “Occupational Employment and Wages, 15-1132 Software Developers, Applications” Bureau of Labor and Statistics (May, 2012) available at <http://www.bls.gov/oes/current/oes151132.htm>.

⁷ “Unemployed Persons By Occupation And Sex” Bureau of Labor and Statistics (March 2013) available at <http://www.bls.gov/web/empsit/cpseea30.pdf>.

For ACT's members, this job shortage creates an ideas problem. Prospective employees may choose to work at a larger corporation because of the job security that risky new ventures simply cannot match. And while you may think that's good for the employee, it could be bad for our innovation economy. According to an analysis of patents by the US Patent and Trademark Office, small businesses account for 51 percent of the most innovative (and most often cited) patents.

The primary reason is the steep decline in schools teaching computer science. Only 1 in 10 high schools offer the class, and computer science accounts for just 0.6 percent of all Advanced Placement tests taken — a 60 percent drop since 2000.⁸ University students are less likely to major in a technical subject if they have not studied it in high school. To fill classrooms, computer science departments admit foreign students who are then ineligible to work in the U.S. upon graduation.

When the Association for Competitive Technology's small-business members visit their representatives in Washington, they identify this broken pipeline of STEM education as the root cause of the high-tech worker shortage. Unable to find qualified computer science graduates, one California member company has 40 unfilled positions currently and some positions have been open for more than two years. At a hearing last year, Flurry, the fastest growing mobile analytics company, testified that it had more than 80 openings, many requiring the kinds of math and science that can't simply be learned over a weekend. Earlier this week, Microsoft testified that they had 6,300 open positions. Imagine what it's like for a small company to convince a great candidate that they should turn down the offer from Microsoft, or any other major technology company.

Finally, the *Economist* reports that for every job created in the high tech sector, 4.3 additional positions are created in the local economy.⁹ Therefore the jobs we see unfilled today will lead to hundreds of thousands of lost local employment in a wide variety of other fields.

If we lose those jobs, where do they go? The beauty of the internet is its global, always-on nature. But this very global nature is why our failure to deal with the STEM problem could be catastrophic. Unlike other businesses, these high paying tech jobs can simply move elsewhere. Small companies that previously would never have considered overseas hiring now look to Israel for high skilled math workers, or Norway for User Interface expertise.

⁸ The College Board's Database of AP Course Audits, *available at* <https://apcourseaudit.epiconline.org/ledger/search.php>.

⁹ "The Jobs Machine: Start-ups founded by immigrants are creating jobs all over America" *The Economist* (Apr. 13, 2013).

Fixing The Problem

Step One: the H-1B Band-Aid

There is no way to fix that skills gap overnight; it will take eight to ten years to see any STEM program produce the kind of impact we know is needed. So where does the needed math and science talent lay today? Right here in America's colleges and universities.

It is estimated that in colleges and universities, foreign-born doctorate degree holders account for approximately 33% of the full-time faculty in computer sciences, 26% in engineering, 33% in mathematics, and 22% in the physical sciences. At the postdoctoral level, the participation of foreign doctorate holders is 56% in engineering, 50% in mathematics, and 42% in physical sciences. Data show that since 1990, approximately 50% of the U.S. Nobel laureates in the scientific and technical disciplines were foreign-born.¹⁰

With that kind of talent pool here on our shores, finding a way to keep them becomes critical. But H-1Bs are very limited, and often go to large, deep-pocketed firms that can afford to wait months to find out if a visa has been awarded. According to a 2011 GAO study, in years where the H-1B cap was met quickly and applicants denied, small businesses were the big losers, facing economic loss and product delays.¹¹ To avoid this negative impact on small business, a higher, more rational cap to H-1Bs must be in place.

However simply increasing the cap will not be enough. We need the right employee to make it to our small business doorstep because we can't just pick anyone to fill the slot. Today's technology companies have found that the right team can be more valuable than just the right skill. According to a recent Reuters article, the right fit is everything:

“Especially in a small start-up, they say, more than expertise is required: The right fit is critical. ‘When you’re creating something from scratch you need somebody outstanding,’ said Nathan Blecharczyk, co-founder of the red-hot short-term rental company Airbnb. The firm currently has only two engineers working on its search capability, he explained – a critical function that could be improved if he could find just the right caliber of engineer. ‘There isn’t enough of

¹⁰ CRS Report *Foreign Science and Engineering Presence in U.S. Institutions and the Labor Force* Christine M. Matthews, Oct. 28, 2010.

¹¹ “For example, in years when visas were denied by the cap, most large firms reported finding other (sometimes more costly) ways to hire their preferred job candidates. On the other hand, small firms were more likely to fill their positions with different candidates, which they said resulted in delays and sometimes economic losses, particularly for firms in rapidly changing technology fields.” U.S. Government Accountability Office, “H-1B VISA PROGRAM: Reforms Are Needed To Minimize The Risks And Costs Of Current Program,” www.gao.gov, January 2011

the talent that we need to basically create this business in the U.S.,' he said. 'We do need to look globally for that talent.'"¹²

To help small businesses, we support efforts to recapture unused employment-based green cards. We also support an exemption from the annual limits for U.S. advanced STEM degree holders. This should reduce the backlog, helping a small business make a realistic offer that results in a key team member moving from “visitor” to “resident.”

Clearly small businesses need more H-1B visas in the pipeline. Unfortunately, some recent efforts to increase the number of H-1B visas come with far too many strings attached. The most recent version of the “Gang of Eight” bill in the Senate includes language that could create incredible regulatory hurdles.

We understand the desire of those in the Senate to ensure the correct use of H-1B, but if the level of bureaucracy functionally bars small businesses from using H-1B visas, we will harm the very innovators we need to support.

Specifically, the bill includes a recruitment requirement for non-dependent employers who are only modest users of the H-1B program. This recruitment language will require companies to maintain extensive records of individualized hiring decisions and subject employers to extensive scrutiny and second-guessing by the Department of Labor (DOL), years after the hiring decision, over case-by-case hiring outcomes.

And while the H-1B program should not be used to displace U.S. workers, the language mixes displacement and layoffs. Companies, especially small ones, often need to pivot to meet new strategic challenges. Their design or plan may not be workable against a competitor, or the platforms they depend on may change. These regular business requirements do not rise to the level of “for cause” terminations, and therefore create incredible burdens on small businesses who must be nimble to survive.

Instead, we believe legislation could help to protect workers better by other means. For example, legislation could restrict these provisions to employers whose net hiring of U.S. workers for the year is lower than layoffs within the same occupation.

Step Two: The STEM Investment

Scott Stanfield, an ACT member and president of Vertigo Software, Inc., addressed the STEM question with the best possible answer I have ever heard. When asked about why he supported using H-1B money for STEM, Mr. Stanfield answered:

I have been in business for a bit more than 15 years, and I plan to be in business 15 years from now. I know I will need talented, well-educated programmers in the future. I want that child who is just now entering grade school to have the training needed so that I can hire them as soon as they are ready.

Mr. Stanfield’s long-term perspective is not uncommon for our small business

¹² “VCs and Startups Call for More H-1B Visas, But Some Say Talent Shortage is Exaggerated,” Reuters, (April 10, 20113).4/10/13

members. They all plan to be in business, the technology business, for the foreseeable future. And they know that will take serious investment.

Technology businesses both large and small see value in funding STEM education through additional fees on H-1B visas and green cards. The I-Squared Act proposes to raise \$500 million annually over ten years to be allocated for teacher training, post-secondary STEM programs, and computer science community college training. This funding represents a fraction of the positive economic impact for future generations who can fill these jobs currently going overseas, or simply remaining unfilled.

Looking beyond a Band-Aid fix, however, requires us to focus our efforts on primary and secondary education. If we hope to produce enough graduates capable of qualifying for these high wage tech jobs, then students must be exposed to computer science education at an early age. This will require a renewed commitment to the subject in school districts across the country. Currently, only ten percent of high schools offer computer science courses. If students have never taken a technical subject before college, they are unlikely to pursue it as a major.

In the Senate I-Squared legislation, tech companies have expressed a willingness to pay double the current fees for additional tech visas and green cards if the extra funds are dedicated to STEM education in U.S. schools. Generating as much as \$5 billion to expand education in these subjects, the tech industry hopes that more schoolchildren exposed to computer science will choose careers in the tech field.

The current draft of the Senate's "Gang of Eight" immigration bill allocates money for STEM education funded by H-1B visa fees, but most of it is directed to post-secondary education. A far larger percentage must be dedicated to educate schoolchildren in primary and secondary schools if they are to develop an interest in computer science and acquire the skills necessary to pursue it as a major in college.

The work of a few nonprofits reveals this approach yields success. One example comes from a group called CodeNow that conducted afterschool computer science training for students in Washington, DC. The organization targeted children in underserved communities whose schools didn't offer the subject. After teaching the students how to write software, one of the participants won a national STEM video game challenge only a year later. More importantly, these high school age children are sticking with it. Today, 30 percent of the program graduates have gone on to major in computer science at university.

Another program called the Young People's Project teaches school children math and other STEM skills. It is a math literacy outreach and mentoring program, utilizing high school and college students as "math literacy workers" that focus on innovative teaching techniques to make the subject more accessible through hands-on activities and workshops. The organization believes that kids who master math (and other STEM skills) develop greater academic self-esteem, and are more likely to succeed in school and become leaders in their community. They have programs in Boston; New York City; Jackson, MS; Ann Arbor, MI; Eldorado, IL; and Mansfield, Ohio.

These non-profit organizations have provided valuable insight for the government into

how to design effective STEM programs and the incredible results that could be achieved with the kind of real, long-term investment that the I-Squared Act provides.

Conclusion

Mobile app makers and small tech companies are at the leading edge of innovation and job creation, but their inability to hire more workers is limiting their growth. Recent immigration legislation offers relief in the form of expanded H-1B visa and green card access.

This meets immediate staffing needs, but doesn't provide the solution to America's chronic shortage of software developers and engineers. Our nation cannot maintain its global technology leadership with a foreign labor dependency. We must foster the growth of an American software developer workforce to ensure our industry's long-term stability and competitiveness.

Lucrative careers in the thriving tech industry should be more accessible to American students. If we are willing to invest in STEM education, particularly at the secondary level, we can get this done. The tech industry is willing to do its part to help fund these measures through increased fees for high skilled visas. The Senate I-Squared Act provides that opportunity. We hope Congress agrees with this approach and allows us to help.