

LARGE AND SMALL BUSINESSES: HOW PARTNERSHIPS CAN PROMOTE JOB GROWTH

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WEDNESDAY, MARCH 28, 2012

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SMALL BUSINESS,
Washington, DC.

The Committee met, pursuant to call, at 1 p.m., in room 2360, Rayburn House Office Building. Hon. Sam Graves (chairman of the Committee) presiding.

Present: Representatives Graves, Mulvaney, West, Owens, Schilling, Velázquez, Schrader.

Chairman GRAVES. Good afternoon, everyone. We will call this hearing to order. And I want to thank all of you for joining us today as we examine the practice of large and small business partnering to create added-value jobs and economic growth.

For many years, businesses have entered into agreements with other companies to supply a part for a larger product or provide a good and service. Increasingly, large companies create alliances with small firms to access their innovative ideas. These partnerships allow the larger companies to expand their current market or product offerings, enter into new markets, or simply gain a competitive advantage in a challenging economy. Small companies also benefit from these alliances by tapping into larger distribution networks, financing opportunities, and mentoring programs that larger businesses cannot supply.

It should be noted that both large and small businesses can be very dependent on each other. A study produced for the Business Round Table by Dr. Matthew Slaughter, one of our panelists today, noticed that each type of company is deeply embedded in the overall U.S. economy with extensive connections to each other.

Last week, the Committee held a hearing on the state of entrepreneurship. Heath Hall, co-founder of Pork Barrel BBQ here in Washington, D.C., testified that large businesses, such as Harris Teeter, Costco, and Safeway, took chances on stocking their unknown BBQ sauce and rubs, helping it to be stocked today in 3,000 stores in 40 states. This is an excellent example of the interdependence of small and large firms.

And again, I want to thank all of our witnesses for being here today. And before I yield to the ranking member I want to note that it is her birthday today and I hope everybody will join me in wishing her a happy birthday.

Ms. VELÁZQUEZ. Thank you. Thank you, Mr. Chairman. That is very kind. And good afternoon to all the witnesses.

America's nearly 30 million small businesses are central to the economy, representing 99.7 percent of all employers and pay nearly 50 percent of total private payroll. It is clear that as small businesses go, so goes the country. For many, this success is at least in part due to the symbiotic relationship that is enjoyed with their larger counterparts. During today's hearing we will examine this and seek to better understand the effect firm size has on the competitive landscape. Together, large and small businesses form a collaborative ecosystem that enables our economy to thrive. Small firms make up the vast supplier network that multinational companies rely on for goods and services. In fact, these corporations buy an estimated 1.52 trillion annually from small firms which is about 12.3 percent of their total sales.

Perhaps nowhere is this interdependence more evident than in the federal procurement marketplace. Total subcontracting dollars now eclipse \$200 billion with small businesses receiving more than one-third of these dollars. Over the last 15 years, several initiatives have supported this, including mentor prodigy programs. As a result, large companies are able to develop their supplier base, while small businesses obtain key experience that will enable them to grow stronger in the future.

While there are real benefits to this cooperation, the truth is that large companies often enjoy many advantages that small businesses do not. This is due to the many structural benefits that come with having greater market power, including more influence over pricing and advantages in the capital and labor markets. Larger companies are often able to control the relationship with small firms, leaving small suppliers to provide accommodations. This absence of negotiating influence makes it more expensive for small companies to purchase the goods and services they need to remain competitive.

Beyond their lack of equal bargaining power, small businesses face other obstacles in their quest for success. Even as the economy recovers, insufficient access to capital remains the number one challenge. Since peaking at \$712 billion in the second quarter of 2008, small business lending has declined by \$113 billion. Conversely, large businesses have actually seen an expansion in lending since the middle of 2010. It is clear that small businesses have been disproportionately affected by credit tightening, while large firms have emerged relatively unscathed.

Tax policy is another area creating disparity between small and large businesses as corporations often have dedicated tax teams for this purpose. Small firms, on the other hand, spend more time and money simply preparing tax returns. According to a report issued by the SBA Office of Advocacy, the cost of tax compliance is 67 percent higher in small firms than in large firms. Finally, it is also important to note that large companies are illegally taking federal contracting opportunities away from their smaller counterparts. In several cases, large businesses have used a small business front to win contracts through small business set asides. Such abuses not only impair the integrity of the procurement system overall, but divert money away from true small companies.

All of these issues, from tax treatment to access to capital to government contracts are critical to the relationship between large and

small businesses. While there is little doubt that these companies can and do work in a collaborative manner, the reality is that it is often due to the costly concessions made by small businesses. During today's hearing we will explore this complex relationship and the many benefits and challenges that come with it. Ensuring that small businesses can continue to flourish without the seemingly inescapable exploitation that comes with it is critical. Doing so will not only result in a more robust small business sector, but a brighter economic recovery for the nation.

Thank you, Mr. Chairman. And I yield back.

STATEMENTS OF MATTHEW SLAUGHTER, PH.D., ASSOCIATE DEAN FOR THE MBA PROGRAM, SIGNAL COMPANIES PROFESSOR OF MANAGEMENT, TUCK SCHOOL OF BUSINESS, DARTMOUTH COLLEGE; WILLIAM C. McDOWELL, PH.D., ASSISTANT PROFESSOR, DEPARTMENT OF MANAGEMENT, COLLEGE OF BUSINESS, EAST CAROLINA UNIVERSITY; ROBERT E. BRUCK, CORPORATE VICE PRESIDENT, INTEL CORPORATION; PAUL BLACKBOROW, CHIEF EXECUTIVE OFFICER, ENERGETIQ TECHNOLOGY, INC.

Chairman GRAVES. Our first witness today is Professor Matthew Slaughter, who is the associate dean for the MBA program and the Signal Companies Professor of Management at Tuck School of Business at Dartmouth College. In 2010, Professor Slaughter authored a key study for the Business Round Table on small and large businesses working together, and we look forward to hearing more about your study today. And welcome, Professor.

STATEMENT OF MATTHEW SLAUGHTER

Mr. SLAUGHTER. Committee Chairman Graves, Ranking Member Velázquez, and fellow members, thank you very much for inviting me to testify.

The topic of today's hearing is extremely important. Although the news for American workers has improved somewhat in recent months, America's labor market remains quite damaged. Today America has 110.7 million private sector payroll jobs. The first time the U.S. economy reached that number was in March of 2000. America has created no new private sector jobs in 12 years, during which time its civilian labor force has expanded by about 15 million people.

In my remarks I will stress that to address this jobs challenge one of the most effective ways to support job growth in small businesses is to support job growth in big businesses. This is because of extensive connections between large and small businesses, especially through the supply chain, selling to each other the goods and services used as inputs in product.

Small and big businesses have long helped strengthen the U.S. economy and each other. Let me here emphasize the rule of multinational companies which, like Intel, tend to be among America's biggest. Both the U.S. parents of U.S.-based multinationals and also the U.S. subsidiaries of foreign-based multinationals enhance the American economy by the capital investment, exports, research and development, and good paying jobs. Though far less than one percent of all American businesses, multinationals in 2009 ac-

counted for in the U.S. private sector 24 percent of jobs, 41 percent of investment, 71 percent of goods exports, and a remarkable 84 percent of research and development.

Neither small business nor large business operates in a vacuum; rather, each is deeply connected to the other in product markets, capital markets, and labor markets. One important connection is time. Small businesses of today can grow to become the big businesses of tomorrow. Many of America's largest and most successful companies started small. Indeed, as the quintessential person pursuing a dream from a garage or a dorm room. And many of those small start-ups were born and thrived because of having a big business as a major, if not the only customer.

Another important connection is the supply chain partnership. Companies selling to others the goods and services used as inputs in production. To make their own goods and services, large companies buy many important inputs from small companies and vice versa. Input suppliers and their customers strengthen each other, not just by generating sales but through many other channels, such as sharing information and performance standards. Of particular note here are small companies selling inputs to U.S.-based multinational companies.

In 2008, the U.S. parent operations of U.S.-based multinationals purchased over \$6 trillion in inputs, of which almost 89 percent was bought from other companies in the United States, not from companies abroad. But of these trillions of dollars in domestic input purchases by U.S. multinationals, how much is bought from small businesses in America? Surprisingly, this question cannot be answered by any data collected by the various statistical agencies of the U.S. government.

Given the statistical gap, in 2010, I worked with the Business Roundtable, an association of chief executive officers of leading U.S. companies to conduct an original survey of its members to learn about the role of small businesses and their supplier base. Taking these survey results as representative of all U.S. multinationals, I found that the U.S. parent operations of the typical U.S. multinational buys goods and services from over 6,000 American small businesses, buys a total of over \$3 billion in inputs from these small business suppliers, and relies on these small business suppliers for over 24 percent of its total input purchases. Extrapolating from these surveys, I further calculated that U.S. multinationals collectively purchase about \$1.5 trillion in inputs from U.S. small businesses, which is about 12 percent of the total sales of these small businesses. The bottom-line of this survey is that the supply chain partnership between U.S. small and big business is deep and essential to each other's economic success.

Let me close by offering three policy implications of the supply chain partnership. One important implication is that government efforts targeted at just small businesses or just big business affect all firms, not just firms of a particular size. Think of exporting. Because of the supply chain partnership, there are lots of small U.S. businesses engaged in the global economy by supplying large U.S. exporters, even if these small businesses themselves do no exporting on their own. A second important policy implication is that the supply chain partnership between large and small businesses will

almost surely become more important in the future. Large companies increasingly operate in large global networks in which final products are made in many stages that span many countries. As the global economy continues to grow in size and diversity, so too will the supply chain partnership between large and small businesses. And a final important policy implication is that to better support the partnerships between large and small businesses, U.S. government data need improving in various ways.

Let me thank you again for your time and interest in my testimony and I look forward to answering any questions that you may have.

Ms. VELÁZQUEZ. Mr. Chairman, it is my pleasure to introduce our next witness, Dr. William McDowell. He is a Management Professor of Entrepreneurship and Family Business at East Carolina University. He received his Ph.D. from the University of North Texas in Management in 2006, and his research specializes in the area of small and medium-size enterprises and their relationship within larger organizations within the supply chain. Dr. McDowell is also vice president of the National Small Business Institute, an organization dedicated to field-based student consulting and outreach to small businesses. As a co-editor of the Institute Journal, Dr. McDowell has written scholarly research articles in the fields of small business management, entrepreneurship, and field-based learning. Welcome.

STATEMENT OF WILLIAM C. McDOWELL

Mr. McDOWELL. Good afternoon, Chairman Graves, Ranking Member Velázquez, and members of the Committee. Thank you for the opportunity to appear before you today to discuss this very important topic. The views and research that I will present today are my own and not necessarily those of East Carolina University or its Small Business Institute.

Examining the potential benefits for large and small business collaboration is a very great thing but there are four key hurdles that small businesses face when trying to do business, especially with a large business. To be an effective partner, small businesses must be able to overcome these hurdles and obstacles in order to be effective.

Access to capital compared to large businesses is the first area. Small business basically means fewer assets, which does translate into less capital and less money for operations for equipment and expansion. In addition, because of being a small business, often-times they have a smaller product and market scope which does translate to fewer revenue streams from which to be able to access capital. And of course in this rough economy that we have just come through, many of these small firms have completely depleted their cash and inventory levels creating much more difficulties. Thus, the difficulty in obtaining capital, especially for women, minority, and socially disadvantaged businesses can be a very serious issue when they are trying to work with larger businesses.

In addition, small businesses, because of their size, are usually at the dependent stage when we look at the power dependency levels. Small businesses are often a niche supplier, sometimes supplying to only one business, and research shows that being a niche

supplier actually works against these small businesses in retaining contracts with larger businesses and especially in retaining contracts with the federal government. These smaller businesses, because of their niche status, can be simply eliminated when the larger businesses find cheaper alternatives or other ways of reducing margins, and so in this case being a niche-market producer does create a problem for them. However, research does show that information quality, continued quality improvement programs, trust, communication, these all do aid the small business in being able to be effective in these supply chain relationships; however, most of these organizations, because of their size, do not take advantage of things such as continuous quality improvement programs. Flexibility, because of their size, can be a very key competitive advantage, but again, oftentimes they do not realize that that is their advantage and they do not go out and try to seek ways to emphasize that.

Another disadvantage that they have is tax disadvantages. It is not necessarily the tax rate that is the problem but the difficulty in computing taxes for these small businesses. One major issue that has come up in a recent conference was that many small businesses do not have the experts on staff to find or take advantage of the tax credits that are available to them; therefore, they are missing out on those advantages. Large firms have large staff, large groups of individuals who are working to help them find these advantages and build on those, so that can be a problem. Recently, the National Federation of Independent Businesses indicated that the number one problem for small businesses is sales; however, this has come down to almost equal with taxes within the past few years. And right now the percentage point is only one percent between those two. But historically, taxes have been cited as the number one problem for small businesses over the last 25 years.

And the final area is basically the access to qualified business experts for advice and direction. Large businesses have experts on staff to help maximize profits, reduce the cost, and streamline their processes, whereas, small businesses often do not have these resources on staff to be able to do these for them. Unfortunately, too many small businesses, and this is from experience, are not familiar with programs by the SBA from local SBDCs, which is literally to their detriment because these can be excellent programs for them to help. Thus, they begin to narrow their focus because of not being able to take an outsider's view of the situation. And this is often to their detriment. Really, the crisis of today that they are facing prevents them from positioning for tomorrow. A problem with this is that they can overestimate sales. Again, if we look at the NFIB's recent paper it shows that small businesses continually overestimate what their sales are going to be only to be disappointed when they have their actual sales numbers come in. Larger firms, they are amenable to stakeholders; therefore, they are able to have individuals to help them estimate those sales.

So what are my recommendations? I think we need to continue to create a favorable lending environment for small businesses. We need to give better information for small firms to broaden their scope. We need to streamline the tax system so that all firms can

take advantage of all the advantages that are available to them, but most importantly, we need to give small firms access to information and experts through the SBA, the SBDCs, SBCs, and even the organization I am familiar with, the SBI.

I would like to thank you, Committee, for the opportunity to present my views of the current struggle of small business, and I welcome your questions.

Chairman GRAVES. Thank you very much. Our next witness is Robert Bruck, who is Intel Corporation's corporate vice president and general manager of its Technology Manufacturing Engineering Division. Mr. Bruck is responsible for managing Intel's global capital expenditures, as well as government and industry relations related to technology and manufacturing. Intel, which is the world's leader in silicon innovation, was founded in 1968 to build semiconductor memory products. Intel introduced the world's first microprocessor in 1971. Welcome. Thanks for being here.

STATEMENT OF ROBERT E. BRUCK

Mr. BRUCK. Chairman Graves, members of the Committee, I appreciate this opportunity to discuss with you the significant mutual benefits that result from collaborations between large and small businesses in our industry. Like nearly all large firms, Intel began as a very small entity. We were founded in 1968 by two scientists with only \$2.5 million in venture capital to manufacture semiconductor memory products. Our growth began to accelerate in the early '80s when a large firm, IBM, adopted Intel's microprocessor for its personal computers. IBM helped provide additional investment and enabled Intel to expand our capital and R&D investments. Today, Intel is a Fortune 50 company with 100,000 employees and annual revenues in 2011 of \$54 billion. In the last decade we spent \$68 billion on our U.S. operations, research and development, and manufacturing capacity.

A 2008 study found between 2001 and 2007, Intel contributed \$758 billion to the U.S. GDP with \$458 billion from direct operations and about \$300 billion from companies that used our products. Intel has over 5,000 suppliers in the U.S. with more than 2,200 of them classified as small businesses. In 2011, Intel spent more than \$3 billion on goods and services purchased from small businesses in sectors that range from the supply of chemicals and gases to construction services. All of these economic benefits are dependent upon the continuous development and innovation of semiconductor technology.

I would like to make three points to illustrate how Intel partners with small businesses to meet competitive challenges in the global marketplace. First, small businesses play a critical role and benefit from basic university research as well as participating in Intel's own research and development programs. Due to the technical challenges involved in semiconductor product design, materials research, and development of advanced process technologies, upstream research must begin as much as 10 or more years before products enter the market. Semiconductor companies have a rich history of pooling their resources to form research consortia to address long-term technical challenges in a pretty competitive environment. These consortia, such as the Semiconductor Research

Corporation are partially funded by various federal agencies, including NIST, DARPA, and NSF.

Continued and expanded federal support for what Intel CEO emeritus Craig Barrett calls “the greatest wealth creation machine in the world,” the U.S. university research system, is critical to the U.S. maintaining our global lead in science and technology and gaining the related job creation benefits for both large and small businesses. Intel builds on the results of pretty competitive research with its own proprietary research in the technology development phase. Intel spends between 13 and 15 percent of annual revenue on research and development, which in 2011 alone exceeded \$8.3 billion, making Intel the third largest company in the world for R&D expenditures.

Small businesses play a critical role in the research and development stage through their willingness to collaborate at the frontier of technology development to help commercialize new technologies. For example, Energetic Technologies, whom you will hear from next, receives significant technical assistance from Intel to develop specific light sources necessary for EUV lithography, a critical technology enabler. Energetic also received research grants from NSF, which were used to explore the potential for commercializing laser-driven light source technology in the life sciences areas. That same technology is also used to detect defects in semiconductor chip fabrication.

My second point is that large companies like Intel can assist small businesses through direct investment. Intel’s venture arm, Intel Capital, invests in small businesses to fill technology and supply chain gaps. In 2011, Intel Capital invested over \$500 million in more than 80 small businesses to cover a broad range of industry from consumer Internet to clean tech to health sciences. As an example, between 2005 and 2008, Intel Capital and Tallwood Ventures invested \$15 million into small business crossing automation. In 2009, another of our suppliers, Assist Technologies, went into bankruptcy. Intel and Tallwood invested another \$7 million for crossing to finance the purchase of certain assets from Assist, saving crucial U.S.-based capability. The result was a very successful new product and about 180 high-tech jobs in California were saved.

The last point I would like to make is Intel helps small businesses with educational, training, and quality programs that help make them stronger businesses with increased potential for job creation. For example, the president of a woman-owned, 19-employee visual communications company recently noted the following: “We have worked for Intel for more than 25 years. When the Intel supplier diversity and small business program took shape over a decade ago, we immediately experienced the value of its initiatives. Since then, we have significantly expanded our services and capabilities, made new business connections, and more importantly, have learned how to build a better company.”

Our written submission contains more detail on the three points I have made. Thank you.

Chairman GRAVES. Thank you, Mr. Bruck.

Our next witness is Paul Blackborow, who is the chief executive officer of Energetiq Technology, Inc. Founded in March of 2004, the company is a developer and manufacturer of advanced light sources

that enable the manufacture of nanoscale structures. These light sources are used in application for life science instruments and leading edge semiconductor manufacturing. Thanks for being here.

STATEMENT OF PAUL BLACKBOROW

Mr. BLACKBOROW. Chairman Graves and members of the Committee, I appreciate the opportunity to appear before you today to discuss various ways Energetiq technology, a small Massachusetts-based company and Intel, a large multinational corporation, collaborate. Our vibrant partnership has resulted in job creation and financial growth at Energetiq and technical solutions to pressing manufacturing challenges at Intel. Energetiq is a small, high-tech company based in Woburn, Massachusetts. We employ 20 people full-time, most of whom are engineers and scientists with advanced degrees. Energetiq specializes in developing advanced light sources for scientific and technical applications in the semiconductor, life sciences, and material science markets. Our staff focuses on research and development related to these technologies and to the assembly, testing, and marketing and sale of the products. The sub-assemblies of our products are manufactured by specialized companies primarily in Massachusetts and in New England. In 2002 [sic], we expected a majority of our manufactured products to be exported from the United States.

Our core competence lies in plasma physics. We manufacture two product lines based on patented technologies that we developed. The Extreme Ultraviolet Light Source product line is an enabling light source technology for next generation lithographic processes in the semiconductor industry. EUV lithography will allow the manufacture of chips with extremely small dimensions.

The Laser-Driven Light Source, or LDLS product line, is used for advanced measurement and inspection applications in the semiconductor chip fabrication and a diverse array of applications in the life sciences and material sciences. Our EUV and LDLS products are all part of Intel's supply chain. The EUV light source products are bought by many companies which in turn sell EUV lithography tools and materials to Intel for its manufacturing plants. Energetiq's LDLS technology and products are used by Intel to detect defects on silicon wafers as they pass through the chip manufacturing process. We have licensed one of Intel's largest capital equipment suppliers to incorporate the LDLS technology into its inspection and measurement tools.

Prior to the establishment of Energetiq, our founding team worked in high-level marketing and technical roles at a large supplier of process control products to Intel and to other semiconductor companies. In those roles we learned of Intel's technology road maps along with the EUV technical challenges that needed to be met by the supplier community. We were impressed with Intel's vision for EUV lithography, and even more by Intel's well publicized financial support of that vision through research funding and equity investments in its supplier companies. Intel made it clear that existing sources of EUV lights were lacking in performance. We were planning to start a new enterprise and Intel's public commitment to EUV lithography guided in large part the choice of our first product. Intel's lithography team leaders agreed to fund some

research at Energetiq to better prove the technology we developed. In addition, they introduced us to Intel's venture capital arm and provided two rounds of financing and valuable coaching on the investment process.

Financing from our investors, including Intel, allowed the further development of the EUV source technology and the development and introduction of the LDLS technology. Intel Capital has held an observer seat on our board of directors since 2006. This person has provided significant advice and resources to Energetiq, including assistance on resolving a complex legal and intellectual property issue. Our Intel Capital investment manager provides business development suggestions to Energetiq, and each year we are invited to attend the Intel Capital CEOs Summit. That event brings together the CEOs of the Intel Capital portfolio companies with senior executives from large public companies from around the world. We have been able to make many useful connections at that summit.

On the technical side, the senior lithography staff at Intel have monitored our technical progress on our two technologies and guided us toward certain business opportunities. We have been able to showcase our technologies to Intel's engineers and scientists at events held at Intel's development operations in Portland, Oregon. We regularly attend Intel Supplier Days where we can continue to learn the technical needs and challenges of Intel's manufacturing operations.

As a result of the technical and investment relationship in a small company, two technologies critical to the manufacture of Intel's present generation and future-generation semiconductor chips have been developed and commercialized. These particular technologies were not developed by Intel's large capital equipment suppliers, whose focus on making supremely reliable and productive chip manufacturing equipment has, perhaps, made them less capable to aggressively pursue new technology. Small companies like us can rapidly develop such technologies if we have a technical problem clearly defined.

In summary, Intel provided the inspiration for the first product for Energetiq followed by R&D funding and equity financing. Our relationship with Intel provides us significant credibility to our customers, suppliers, and our investors. We have continued to receive valuable technical and commercial guidance and support from Intel, and Intel's adoption of our EUV and LDLS technologies has helped drive our revenues from product sales. Our biggest customer is a large U.S. semiconductor capital equipment company, a major supplier to Intel, which represented about a quarter of our sales in 2011.

Thank you very much.

Chairman GRAVES. We will now start with our questions. We will start with Mr. West from Florida.

Mr. WEST. Thank you, Mr. Chairman. Also, ranking member thank you. And thanks for the panel for being here.

First question I would like to go to Dr. Slaughter and Dr. McDowell. As I was listening to you speak and read your testimony I was writing down what seems to be some negative factors that you listed which are driving our small firms to go into partnerships

with larger firms, such as capital access, sales, taxes, favorable lending environments, streamline tax code, access to business experts on staff, and access to research assistance. So if I could get your insights, where are the places where legislators such as ourselves have added to these negative factors and how can we alleviate some of these negative factors as we move forward?

Mr. SLAUGHTER. That is a great question, Congressman West.

Mr. WEST. Thank you.

Mr. SLAUGHTER. So a couple thoughts come to mind. One is clearly on the tax code. I mean, I think folks on both sides of the aisle here in Washington and in the business community acknowledge America has one of the most complex, high-burden effectively tax codes around the world. It is a challenge for the Intels, but as Dr. McDowell and others know from their scholarship and others, the order of magnitude and the degree of the complexity for the small business community is massive. So it is not just for C corporations. I think one of the things to keep in mind then with tax reform is a lot of these small businesses, especially when they start, they are S corporations, they are partnerships, they have got a lot of different legal entities where a lot of taxable events flow through on the personal side.

So one is mindset. When you are thinking about business tax reform, corporate tax is important but it has to be linked up with a lot of individual tax issues. And then again, the broad issues that a lot of economists from all parts of the political spectrum will acknowledge, broadening the base, reducing the complexity, lowering the rates. That is one.

I think the other thing, I am not sure what the policy implication is but I will just point out on the issue of capital access, clearly in the wake of the world financial crisis there is an issue about how the banking system is working. Some people will look at large corporations in America and they wonder to complain about the large amount of near-cash assets that large corporations have on their balance sheets. But as we just heard in the testimony, a great advantage of that actually is as our financial system struggles to heal, paradoxically it can be the business sector that provides a lot of the key financing needs for small businesses.

Mr. McDOWELL. I would agree that when we look at the tax issues over the past 25 years, that has been the number one issue. So I think just the complexity of it, all the new taxes, the green credits, different things like that, they only add to the burden of the small business in comparison. I mean, it is a burden to the large business as well but they have the resources to take care of those things. Small businesses do not have those resources. So that is one major issue that we have to look at.

But also when we think about the legislation, what they have done to help or hurt with the access to capital, you know, recently there was just so much uncertainty out there. Banks make their money by lending money. I mean, that is how they want to make money. They want to do that. But yet with all the regulations and the changes that occurred there is just a lot of uncertainty. And some of the bankers that I work with in my regular work with small businesses, you know, they want to lend. They want to do things that will help them make money. But of course, the regula-

tions are very difficult for them and for small businesses, of course, with the less access to capital or assets. I mean, to utilize as collateral, more guarantees, more things like that from the SBA can be very helpful and beneficial in those situations.

Mr. WEST. Thank you. Mr. Bruck and Mr. Blackborow, you know, as I was listening it seems like this is like the second and third generations of a great thing about small firms partnering with bigger firms. You talked about Intel with IBM and now Energetiq with Intel. So if you could, just briefly talk about what you saw as the lessons learned, the best practices in that relationship that you all experienced over these couple machinations.

Mr. BRUCK. Well, I suppose I could begin with the alignment on very long-term programs, and I want to commend the Committee for looking at research and development in particular and the partnerships between large and small companies because unlike many short-term issues that work with intellection cycles, these issues may take many, many years. And if you look at NASA's investments in the '60s and they have reported many times to Congress on the spinoff of businesses from health care and telecommunications and energy that have come out of that program, these things have to survive multiple administrations and have bipartisan support. So when we see that, like we have seen in Congressman Velázquez's state with the Center for Nanoscale Science and Engineering, you can attract global companies. Some of the best companies in the world have come there now for the GE450C development and are matching the state funds that come in and they are working to try to get some federal matching as well. And the members that participate are committed to small and minority-owned businesses getting a big part of the participation there. So you can see this kind of synchronization and cooperation is really critical to yield long-term success.

Mr. BLACKBOROW. I would just echo the long-term aspect of it. I think one of the things that has helped us really with working with Intel is Intel's long-term vision. This differs actually from the vision of venture capitalists who are the main source of funding for people like us. Intel can take a much longer view partly because it is a corporation. And so the relationship we have, we can go through peaks and troughs and Intel will stick with us because they value the technology over the long term. So it is really long-term investment for us, patient investment which we perhaps we would not get from the venture capital community, and we will not get a look from the banking community. At this point in our company's development, sources of loan capital are simply not available at all and that is something, of course, that would be helpful to us as we want to grow.

Mr. WEST. Thank you, Mr. Chairman. I yield back.

Chairman GRAVES. Ranking Member Velázquez.

Ms. VELÁZQUEZ. Thank you, Mr. Chairman.

Dr. McDowell, due to the recession, demand for both products and services dropped dramatically, and for the small business that weathered the storm and survived, how can they prove to lenders that they are creditworthy after a prolonged period of below average cash flow?

Mr. MCDOWELL. This is a major issue because, again, they depleted their cash and inventory levels and now we are trying to help them to work with larger businesses and that can be a major problem and hurdle for them to overcome. One thing that we can do is to help them to better plan for their future. Business planning is a very difficult thing and sometimes overlooked by small businesses. If we can have a greater business plan in place on the part of these small businesses then they will be able to better show where their revenue streams are going to come from, how they are going to help pass the cash that will enable them to be able to get credit. So that can be a very major plus and bonus for them.

Ms. VELÁZQUEZ. How can we help, you know, you mentioned that we have technical assistance through SBA, and in putting together a business plan or helping them prepare for the future in terms of having a business plan in place, how can—what can we do to get information that is available through SBA get to small businesses? Do you have any idea?

Mr. MCDOWELL. Well, I do believe this is a situation where really they need to be aware of what is available. And so therefore, the SBA and other organizations have not been doing a good job of marketing their own services to these small businesses. I think that the more education that we can give to small businesses and even to small business owners starting at the university level when they go through their training at a university if they are at a university or college, if we have more entrepreneurship programs such as, you know, interdisciplinary entrepreneurship programs or small business programs, so no matter what industry they are going into—arts, science, anything else—the more education they can have up front will help. But of course, at a later state we need to get them as much help as possible, and that is where I think universities can help if we will continue to push university systems and other aspects like that to help create an awareness of what is out there. Even things such as a lot of small businesses utilize social media as a marketing tool. You know, maybe the SBA and other resources need to look at where the small businesses are going for marketing to market their brands as well.

Ms. VELÁZQUEZ. Thank you. Dr. Slaughter, the report that you made reference to that you prepared was done in 2010. Right? Since then a lot of things have happened. We have an economy that is creating jobs and consumer spending is up. Given those indicators would you revisit your report and will it be different if you have those counter into your analysis those factors?

Mr. SLAUGHTER. I think two things come to mind. One is sort of at the company level of the surveys, in informal conversations with some of the companies that were involved in the survey in the first wave a couple of years ago, their sense is things have not changed very much. You know, I think that speaks to a couple things. One is the size of the companies that were involved in the survey. They were the Intels of the world and a lot of larger corporations. And again, on average when they have established over 6,000 small business supplier relationships, even amidst the financial crisis and the turmoil that created, a lot of those relationships still persist. And I think that some of the earlier testimony we heard speaks to that. The long-term nature of those relationships, both

the large companies and the suppliers try to maintain those. The one thing the numbers would be different is thanks to some modest, though still fragile economic recovery, the overall magnitude that one would infer from the survey that we conducted of the amount of input to purchase it, for example, would hopefully be a bit larger today than it was two years ago.

Ms. VELÁZQUEZ. Okay. According to the Bureau of Labor statistics, large multinational companies have cut their workforces in the U.S. by 2.9 million since 2000, while increasing overseas employment by 2.4 million over the same time period. By contrast, small firms created and net 14.5 million jobs in the 15-year period from 1993 to 2008. Why do we see such a disparity in the contributions of large and small firms in creating jobs here in the U.S.?

Mr. SLAUGHTER. So the broader answer is much faster economic growth abroad. There is a lot of academic research by me and others that have shown when U.S.-based multinationals expand abroad, that expansion in hiring and capital investment tends to support more hiring and more capital investment in America. So there is sometimes a presumption that more abroad means less in America, but when that growth abroad, as it has been with the tremendous growth in the BRIC and beyond countries is driven by really fast economic growth, a lot of that tends to be down to America.

Ms. VELÁZQUEZ. So you do not agree that the data for suggests that the outsourcing of jobs contributed to a higher unemployment in America?

Mr. SLAUGHTER. The outsourcing played some role but the prevailing scholarship to date shows that it is a very modest role. And if I may, the numbers that you cited, the more revised numbers from the BEA show U.S. employment declines that are not quite as large in the U.S. paired operations of U.S. multinationals. And it was entirely concentrated in a handful of manufacturing industries. Services, for example, in the U.S. over the 2000s, U.S. parent employment growth was several hundred thousand in conjunction with fast employment growth in services companies abroad.

Ms. VELÁZQUEZ. Thank you. Mr. Blackborow, when small businesses are awarded contracts through the small business contracting programs, they are allowed to subcontract a certain percentage of their work. However, there have been numerous reports that have detailed the abuses with these limitations on subcontracting. In your experience, what part of the contacting process makes it susceptible to contracting abuse?

Mr. BLACKBOROW. Honestly, I could not say. We have been the recipient of SBIR grants and we have been very happy with that. The comment I would make with regard to SBIR grants is not with regard to any elicited practices; simply that it takes too long to get between phases in the SBIR programs. So if you have a phase one program, getting to phase two where there is more money is often a big gap. And so shortening the timeline for SBIR programs for small companies like us would make the program much more supportive of our business goals. We have done very little subcontracting and only to universities, and I do not believe they are corrupt.

Ms. VELÁZQUEZ. We are not implying that.

Mr. BLACKBOROW. Okay.

Ms. VELÁZQUEZ. Mr. Bruck, the semiconductor industry is among the most capital-intensive in the world. By the way, we have asked GAO to do investigations. Those reports have been released right here and it shows that a lot of large companies that do not qualify and violate the eligibility requirement to apply for contracts that are awarded to small businesses have been awarded to large businesses and that is my question. What is that about?

The semiconductor industry is among the most capital-intensive in the world, both with research and manufacturing costs running well into the hundreds of millions of dollars. If these costs continue to escalate, how will small and medium-sized companies manage to secure adequate investment to allow them to innovate and keep pace with large companies like Intel?

Mr. BRUCK. Yes. It is a challenge and it is one of the reasons that we have developed such a closely integrated relationship with our small business partners. And this extends not only to our direct supplier but to the suppliers of our suppliers of our suppliers. We find that, you know, many of the issues around innovation or quality breakthrough or cost breakthrough happen many levels down in the supply chain, and that is where the big opportunity is for small businesses. And I think as the testimony here has shown, those companies are more agile in many ways and can move to invest first before markets are mature.

The other point I would like to make is with that investment, it does help us keep high paying jobs here in the U.S. The more capital intensive our industry, the more the labor cost, which is a relative cost to the total product, diminishes, which is why we have 75 percent of our revenue is exported to the rest of the world. Sixty percent of our jobs are here in the U.S. and they all average well over \$100,000 at all sites.

Ms. VELÁZQUEZ. Thank you. The R&D tax credit is of great importance to the technology and manufacturing industries. It provides businesses of all sizes the ability to invest and innovate research. How in your view could this credit be simplified to make it more business friendly, and why should it be made permanent?

Mr. BRUCK. Yes. A great point. And I think our view is making it permanent would be wise and helpful for U.S. job creation. In terms of its usefulness, I think expanding on the discussions we are having today to understand how R&D investment creates a broader impact in the U.S. job market and in U.S. GDP growth would be helpful I think to the overall narrative of why the R&D tax credits should be made permanent.

Ms. VELÁZQUEZ. Thank you. Thank you, Mr. Chairman.

Chairman GRAVES. Mr. Schilling.

Mr. SCHILLING. Thank you, Mr. Chairman. And welcome, fellows.

One of the things that—I own a small business in Moline, Illinois. It is just a small S corporation. One of the things that right now we are really hurting because, of course, the disposable cash with the high gas prices, of course, which we are trying to get under control, but one of the questions I have is do you believe that more regulation and higher taxes will help hold American companies here or will that be an incentive for them to move outside the United States?

Mr. BRUCK. To me?

Mr. SCHILLING. Yes.

Mr. BRUCK. Okay. Well, obviously it is a disincentive for investment here. Our view, and let me contrast between large and small companies because on both the tax issue and the regulatory issue, but we have a global economic competition that is going on. The main thing that we would look at as a large company is a level playing field. So I think trying to look for ways that, as I mentioned, 75 percent of our revenues is exported into other markets. So our competition is coming largely from Taiwan or Korea or Japan or places like that that may have more favorable tax treatment. But it is even more important for the small business. And if you look at the amount of money they can reinvest into research and development, reinvest into hiring and expanding operations, that really will have a very long-term return on investment. And so providing that assistance is critical.

The regulatory question, if you look at something like Sarbanes-Oxley, I certainly understand why we need to protect investors especially with companies as large as Intel. But as a percentage of overall revenue, the administrative cost for small business to comply with Sarbanes-Oxley is a crippling cost and again, takes away from investment and innovation and job creation. So looking at the regulatory framework and maybe contrasting the difference for large versus small businesses would be helpful.

Mr. SCHILLING. Very good. Mr. McDowell, this is kind of tied into the same thing. In your written testimony you say that lack of awareness of available tax credits rather than high tax rates may be the problem for small firms. According to the NFIB, high tax rates are a problem because they siphon capital that entrepreneurs need to invest back into their companies to create jobs. And I can relate to this firsthand because right now our taxes in our city, in Moline, Illinois, continue to go up and then the business is constantly dropping. And one of the problems is we have some equipment that needs to be replaced and instead of being able to replace the equipment we cannot and we are having to let people go. So it is kind of a tough situation here. Basically, how do you respond to something like that, sir?

Mr. McDOWELL. I am not saying that tax rates are not high for small business. I am saying that oftentimes, if we look at the trends over years, the taxes, you know, whether they have been up or down it always seems to be the number one problem for small business. I am not trying to deviate from that. But I am saying that what we are seeing today is that as more and more tax credits or different ways of even organizing your business are developed, too many small businesses are not taking advantage of the credits that are available to them. So I am not trying to imply that the taxes are not high and burdensome for businesses at all; it is just oftentimes there are too many things that are missed. And there are actually firms now that go out and specialize and go into small businesses such as yours and saying, look, we will do what we can to save your business and we will charge you a percentage of those tax savings as our fee. But again, the uncertainty for most businesses, whether or not it is going to be beneficial to them to explore different advantages or disadvantages can be difficult.

Mr. SCHILLING. Okay. Very good. I appreciate that. I yield back my time, sir.

Chairman GRAVES. Mr. Mulvaney.

Mr. MULVANEY. Very briefly. Thank you, Mr. Chairman.

Mr. Blackborow, you mentioned access to capital and you said you are participating in the SBIR program. Have you ever had occasion to try and get any other SBA financing, more traditional SBA lending, that type of thing?

Mr. BLACKBOROW. No, we have not. We have approached various banks from time to time to sense whether they would lend money to a company like us and they have not been very interested. Honestly, they do not feel that we are at a point in our growth that makes them feel comfortable enough. And thank goodness that we have people like Intel around.

The biggest challenges we have are really not around financing, honestly. Or taxes at this point in our growth. Our biggest issue is access to good, talented people. And so the things that I would point out to the Committee, our focus on STEM education in this country needs to be really emphasized. We have trouble finding good, qualified scientists and engineers now that are born in this country or educated in this country. And when we advertise for a job we often get applicants from China, from Russia, from India, and many of them require visas which we cannot always get. And so I would say—and equally we have grad students at MIT down the street from us who when they get a Ph.D. have to go home when we just educated them in this country. This does not make any sense to me at all. So I would say the things that we need to do is to keep the talent here in this country and then it will fuel the creativity of companies like ours.

Mr. MULVANEY. Thank you. I appreciate that comment. You mentioned also about the SBIR program and shortening the time between the phases. I am trying to keep the topic of conversation to the jurisdiction of this Committee. Is there anything else that the Small Business Committee, the Small Business Administration can do to help any of you gentlemen? I am trying to figure out what it is that we should be specifically focusing on in this room.

Mr. BLACKBOROW. Let me just answer as a small business to say that I believe I am not very aware of what the Small Business Administration does and I think that in itself is a challenge. We have not been reached out to. I probably could go find it if I dug into it but it has not been something that has been obvious to me that I should go chasing after because I am not sure what I would get when I would get there.

Mr. MULVANEY. You would be surprised, by the way, at the number of times we hear that, which is frustrating, us serving on the Committee. And recognizing the time, I am curious. I seriously have a question that is just of interest to me, probably not to the rest of the Committee, how do you all handle intellectual property? How do you handle proprietary information? When you do these partnerships between these big businesses and these small businesses, are you relying heavily on legal documents or is there something else that allows you to function but still allows you to sort of trust each other not to steal each other's ideas?

Mr. BRUCK. Well, no, it is very carefully controlled. And again, one of the points I would like to make about investment in small businesses and technology fields is that we can create high value products in this country that we can export to the rest of the world, but you need that intellectual property protection to be able to do that. And so what we will tend to do in a relationship like we have with Energetiq is to find what we want is the process technology, the technology related to building chips. We are not in the equipment business per se and so they should expect to own the IP around the hardware. And we bring in what is all of our background IP so we are not mixing that up. And then there is a very careful chain of custody as we create new technology together. But that allows them to go off and build products and serve an equipment market and us to go off and serve the chip market.

Mr. BLACKBOROW. Yes, I would say it is quite sophisticated, the relationship we have both with Intel and our other large customer in this business. We have very good intellectual property lawyers on our side and theirs, and we carefully carve it out. We both want to own what we need and we do not want to jointly own things that we do not need because it gets cumbersome. So it is easier if we own our intellectual property, they own theirs, and we carefully spell it out in the contractual arrangements that we have between the companies.

I would also say that Intel and the other companies are very respectful of our intellectual property and they need it, which is why they do not want to be seen to be taking it generally.

Mr. MULVANEY. Gentleman, thank you very much. Thank you, Mr. Chairman.

Ms. VELÁZQUEZ. Mr. Chairman, I just would like to share with the panel that SBA not only offers a series of different economic development programs through technical assistance to helping put a business plan together to matching borrowers with lenders. But last year when large financial institutions were not lending to small businesses, the SBA stepped up and we injected—the federal government injected close to \$30 billion into the economy. Where would this economy be today if it was not because of the role that we played in helping small businesses access affordable capital. So you have been lucky that you did not need their service, but a lot of businesses in this country, small businesses depend on the kind of services that the Small Business Administration provides.

Thank you, Mr. Chairman.

Chairman GRAVES. Thank you all very much for participating today. We appreciate it.

I would ask unanimous consent that members have five legislative days to submit statements and supporting materials for the record. Without objection, so ordered. And we appreciate it again.

Thank you. This hearing is adjourned.

[Whereupon, at 2:01 p.m., the Committee was adjourned.]

United States House of Representatives
Committee on Small Business

Testimony of Matthew J. Slaughter
“Large and Small Business: How Partnerships Can Promote Job Growth”

Wednesday, March 28, 2012

2361 Rayburn House Office Building

Committee Chairman Graves, Ranking Member Velazquez, and fellow Members, thank you very much for inviting me to testify on these important and timely issues regarding how partnerships between large and small businesses can promote job growth.

My name is Matt Slaughter, and I am currently Associate Dean and Signal Companies’ Professor of Management at the Tuck School of Business at Dartmouth, Research Associate at the National Bureau of Economic Research, and Senior Fellow at the Council on Foreign Relations. From 2005 to 2007 I also served as a Senate-confirmed Member on the Council of Economic Advisers, where my international portfolio spanned topics on the competitiveness of the American economy.¹ More recently I was a founding member of the Squam Lake Group, a non-partisan group of 15 academics who initially came together in the fall of 2008 to offer guidance on the reform of financial regulation amidst the World Financial Crisis.²

The topic of today’s hearing is extremely important. The news for American workers has improved somewhat in recent months: the rate of net job creation has accelerated, and the unemployment rate has fallen. But in many ways the U.S. labor market remains quite damaged, a fact stressed by Federal Reserve Chairman Ben Bernanke in a speech he delivered yesterday in which he said, “We cannot yet be sure that the recent pace of improvement in the labor market will be sustained.” Today America has 110.7 million private-sector payroll jobs. The first time the U.S. economy reached that same numbers of jobs was twelve years ago, in March of 2000. America has created no new private-sector jobs in over a decade, during which time its civilian labor force has expanded by about 15 million people. The result is that today over 23 million Americans, nearly one in six in the entire labor force, are unemployed or under-employed.

¹ In the past two years, I have not received any Federal research grants. Currently, in addition to the affiliations listed above I serve as a member of the academic advisory board of the International Tax Policy Forum; an academic advisor to the Deloitte Center on Cross-Border Investment; a member of the Congressional Budget Office’s Panel of Economic Advisers; and a member of the U.S. State Department’s Advisory Committee on International Economic Policy. For many years I have consulted both to individual firms and also to industry organizations that support dialogue on issues of international trade, investment, and taxation. For a listing of such activities, please consult my curriculum vitae posted on my web page maintained by the Tuck School of Business at Dartmouth.

² The book our Group co-authored that discusses the challenges in understanding and aiming to prevent financial crises is *The Squam Lake Report: Fixing the Financial System*, with Kenneth R. French, Martin N. Baily, John Y. Campbell, John H. Cochrane, Douglas W. Diamond, Darrell Duffie, Anil K Kashyap, Frederic S. Mishkin, Raghuram G. Rajan, David S. Scharfstein, Robert J. Shiller, Hyun Song Shin, Matthew J. Slaughter, Jeremy C. Stein, and Rene M. Stulz; Princeton University Press, June 2010.

In my remarks, I will stress that to address this central challenge facing America of spurring private-sector job creation, one of the most effective ways to support job growth in small businesses is to support job growth in big businesses. This is because of neither small business nor large business operates in a vacuum. Each is deeply embedded in the overall U.S. economy, with extensive connections to each other—especially through the supply chain selling to each other intermediate inputs, i.e., the goods and services used as inputs in the production process.³

Small and Big Business in America: Long-Term Contributions of Each

Let me start by stressing that small and big businesses have long helped strengthen the U.S. economy and each other. Start with the direct purview of this committee, small businesses. The Small Business Administration, an independent federal government agency charged with monitoring and supporting America's small businesses, defines a small business as an independent business with fewer than 500 employees. SBA's research into these firms has documented many contributions to America of small businesses, including the following.⁴

- Small businesses accounted for approximately 99.7% of the 29.6 million businesses in the United States in 2008. Their collective output accounts for more than half of private non-farm GDP.
- Small businesses accounted for 49.6% of total payroll employment in the United States in 2007: 59.9 million of that year's 120.6 million total payroll jobs. Small businesses also account for about 44% of total private payroll.
- Small businesses accounted for 64% of the net new jobs created in the U.S. economy between 1993 and the third quarter of 2008. Over that nearly 15 years, small firms created a net 14.5 million jobs out of the economy's total of 22.5 million. It is *young* small businesses that are especially important here: over the past generation, small businesses less than two years old have accounted for about 25% of gross job creation.⁵

Let me next emphasize that multinational companies, which tend to be among America's biggest, have, like small businesses, long helped strengthen the U.S. economy.⁶ The many channels of the contributions of these companies—both the U.S. parents of U.S.-based multinationals and also the U.S. subsidiaries of foreign-based multinationals—are well documented and researched. Multinationals enhance the American economy by their capital investment, their exports, their research and development, and by supporting good-paying American jobs.⁷

³ Portions of my testimony draw closely on the findings of my 2010 study, *Mutual Benefits, Shared Growth: Small and Large Companies Working Together*, prepared for Business Roundtable.

⁴ Small Business Administration, Office of Advocacy, *Frequently Asked Questions*. Updated September 2009.

⁵ Haltiwanger, John C., Ron S. Jarmin, and Javier Miranda. "Who Creates Jobs? Small vs. Large vs. Young." National Bureau of Economic Research Working Paper #16300, August 2010.

⁶ A U.S.-based multinational company is any U.S. enterprise, called the "parent," that holds at least a 10% direct ownership stake in at least one foreign business enterprise, called the "affiliate." In 2009, which at the time of writing is the most recent year of data available on U.S. multinationals from the Bureau of Economic Analysis of the U.S. Department of Commerce, there were 2,347 U.S. multinational parents that controlled 25,424 foreign affiliates.

⁷ See, for example, "A Warning Sign from Global Companies," by Matthew J. Slaughter and Laura D'Andrea Tyson, *Harvard Business Review*, March 2012. See also *Growth and Competitiveness in the United States: the Role of Its Multinational Companies*, McKinsey Global Institute research report, June 2010. See also *American Jobs, American Infrastructure, and American Global Competitiveness*, by Matthew J. Slaughter, Organization for International Investment research report, spring 2011.

Multinational companies perform large shares of America's productivity-enhancing activities that lead to high average compensation for American workers. For the most recent year of data available, 2009, contributions of these companies' U.S. operations included the following.

- *Output:* Multinational companies produced \$2.97 trillion in output (measured in terms of gross domestic product), which was approximately 28.7% of all private-sector output.
- *Capital Investment:* Multinational companies purchased \$553.6 billion in new property, plant, and equipment—40.9% of all private-sector non-residential capital investment.
- *Exports:* Multinational companies exported \$757.5 billion of goods to the rest of the world, 71.1% of the U.S. total.
- *Research and Development:* To discover new products and processes, multinational companies performed \$238.4 billion of research and development. This was a remarkable 84.2% of the total R&D performed by all U.S. companies.
- *Jobs and Paychecks:* All these productivity-enhancing activities contribute to large average paychecks for the millions of employees of multinationals. These companies employed about 27.4 million U.S. workers. This was 24.4% of total private-sector payroll employment. Total compensation paid by multinational companies was over \$1.9 trillion—a per-worker average of \$69,796, about 25% above the private-sector average.

Despite the long-term contributions that both small and large businesses have made to the U.S. economy, today it is many small businesses in America that are struggling most to recover from the World Financial Crisis and Great Recession. The most-recent monthly survey of U.S. small-business economic trends by the National Federation of Independent Business summarizes activity that remains “still historically low”—indeed, slightly below where it was one year ago.⁸

Why are so many American small businesses struggling so much? Clearly, one important reason has been tighter access to credit because of the World Financial Crisis. But this is by no means the only challenge that needs to be addressed. It is important to recognize that today few small-business owners cite access to credit as their single biggest challenge. Rather, the most-cited biggest problem is poor sales. Here is the breakout of their most-recent responses to the monthly NFIB survey item, “What is the single most important problem facing your business today?”

<u>Problem</u>	<u>Percent of Respondents</u>
Poor Sales	22
Taxes	21
Government Regulation	21
Inflation	9
Cost/Availability of Insurance	7
Big-Business Competition	5
Quality of Labor	5
Finance and Interest Rates	4
Cost of Labor	3

⁸ Dunkelberg, William C., and Holly Wade. *NFIB Small Business Economic Trends: March 2012*.

This NFIB survey finds that for every one small business owner who today says access to credit is the biggest problem s/he faces, more than five other small-business owners are saying poor sales is the biggest problem. This suggests that a major reason small firms are not hiring or investing aggressively is lack of customers making purchases. *The bottom line is that a paramount challenge facing the U.S. economy today is to help small businesses, and one of the most important ways is to boost their sales and thereby boost their hiring and capital investment.*

How Small Business and Big Business Work Together: The Supply-Chain Partnership

Neither small business nor large business operates in a vacuum. Rather, each is deeply embedded in the overall U.S. economy—with extensive connections to each other in product markets, capital markets, and labor markets.

One important link between small business and big business is time: small businesses of today can grow to become the big businesses of tomorrow. Many of America's largest and most-successful companies started small—indeed, as the quintessential person pursuing a dream from a garage or dorm room. This dynamic perspective is very important. The distinction at any point in time between small and large businesses is not permanent. Many small businesses aspire to grow large, and many innovative firms manage to do just that—often quite quickly.

Another important link between small business and big business is their supply-chain partnership: each set of companies sells to the other intermediate inputs, i.e., the goods and services used as inputs in the production process. To make their own goods and services, large companies buy many of their most important intermediate inputs from small companies—and vice versa. Input suppliers and their customers can strengthen each other, not just by the latter generating sales for the former but through many other channels such as sharing information and performance standards.

Of particular note here are small companies selling intermediate inputs to U.S.-based multinational companies. The potential scope for this link between U.S. multinationals and their small-business suppliers is very large, because of how very large are the input purchases of U.S. multinational firms. In 2008, the U.S. parent operations of U.S.-based multinationals purchased \$6.33 trillion in intermediate inputs, which was 72.5% of their total sales that year of \$8.73 trillion. Of this \$6.33 trillion in total input purchases, 88.8%—\$5.62 trillion—was bought from other companies in the United States.⁹

Contrary to the common assumption that the global engagement of U.S. multinationals has eliminated their ties to domestic suppliers, nearly 89 cents out of every dollar spent by U.S. parents on intermediate inputs is paid to other companies in the United States, not companies abroad. And this heavy reliance on domestic suppliers has been virtually unchanged for decades: in 1977, U.S. parents purchased 91.3% of their inputs from other companies in the United States.

⁹ Total purchases of intermediate inputs by parent companies are calculated as total sales less value-added output. Imported intermediate inputs are measured as total parent imports of goods. This implicitly assumes that all imported goods by parent companies are intermediates rather than final goods. Because some of these imports are final goods and services rather than intermediates, the calculated share of inputs bought from domestic suppliers reported above lies *below* the true domestic-supplier share.

But of these trillions of dollars in intermediate-input purchases by U.S. multinationals, how much is bought from small businesses in America? Surprisingly, this question cannot be answered by any data collected by the various statistical agencies of the U.S. government.¹⁰

Given this gap in official U.S. government statistics, in 2010 I worked with the Business Roundtable, an association of chief executive officers of leading U.S. companies, to conduct an original survey of its members to learn about the role of small businesses in their supplier base. Extrapolation from these survey results provides estimates of how large is the partnership between U.S. multinationals and U.S. small businesses.

During mid-2010, each Roundtable member company was asked to respond to the following questions about their interactions with small and medium-sized enterprises in the United States (SMEs, consistent with the SBA, defined as companies with fewer than 500 employees).

1. How many American SMEs provide products and services to your company in the United States?
2. What is the dollar value of total input purchases (products and services) by your company in the United States from American SMEs?
3. What percentage of the total input purchases (products and services) by your company in the United States is from American SMEs?

The reporting burden of these questions was quite high. Despite this high information requirement, 64 Roundtable companies—37.9% of the total—provided complete responses to the survey. These 64 responding companies account for about 3.0% of the total number of U.S.-based multinationals operating in 2008. However, the global revenue earned by these 64 responding companies accounted for a sizable 21.3% of the total revenue earned by all U.S. multinationals. Moreover, responding companies span the complete range of industries such as manufacturing, IT, telecommunications, finance, retail, transportation, and health care. The combination of the size and industry breadth of these 64 responding companies suggests that their collective responses will be reasonably representative of all U.S. multinationals.¹¹

For each of the three survey questions, the average (i.e., mean) responses were as follows.

¹⁰ Surveys underlying the BEA data on U.S. multinationals do not ask firms to report anything about the number or size of their supplier base. The SBA Office of Advocacy does not collect any information about the size of the customers of small businesses—e.g., whether they serve any U.S. multinationals. Surveys of establishments in manufacturing and other industries that constitute the Longitudinal Research Database of the U.S. Bureau of the Census do not ask plants to report anything about the number or size of their suppliers. And the national input-output tables constructed by BEA do not collect or report information about the size of suppliers to industries.

¹¹ The 64 survey responses show no obvious sign of response bias; in particular, by industry different from the industry mix of U.S. multinationals overall. Just as manufacturing's share of U.S. multinationals exceeds manufacturing's share of the U.S. economy overall (about 20% of GDP and less than 12% of private-sector employment), the share of responses coming from firms predominantly in manufacturing exceeds manufacturing's share of the U.S. economy overall. There was also no clear evidence of non-response bias: many companies from many industries stated they were not responding simply because they do not collect the data requested. And the overall response rate of 37.9% exceeds the response rate of many commonly used surveys. The revenue share of 21.3% was calculated using BEA data and responding-company data for 2007, the most-recent year of BEA data available during the period in which this report's survey was conducted and tabulated.

1. How many American SMEs provide products and services to your company in the United States?

Average Response: 6,246

2. What is the dollar value of total input purchases (products and services) by your company in the United States from American SMEs?

Average Response: \$3.27 billion

3. What percentage of the total input purchases (products and services) by your company in the United States is from American SMEs?

Average Response: 24.7%

Taking these survey results as representative of all U.S. multinationals, then the U.S.-parent operations of the typical U.S. multinational buys goods and services from 6,246 American small businesses; buys a total of \$3.27 billion in inputs from these small-business suppliers; and relies on these small-business suppliers for over 24% of its total input purchases. The bottom line of these results is that the supply-chain partnership between U.S. small and big businesses is deep and essential to each other's economic success.

Extrapolating from these survey results can provide an estimate of the total amount of intermediate inputs that the parent operations of all U.S. multinationals buy from U.S. small businesses. As calculated above, respondents' average share of total input purchases accounted for by small businesses is 24.7%. This share is quite robust to alternative methods of calculating averages; a conservative summary of several alternatives would peg it at 24%.¹²

Assume, then, that all the U.S.-parent operations of U.S. multinationals purchase 24% of their intermediate inputs from small U.S. businesses. Earlier, this report stated that in 2008 these parents purchased a total of \$6.33 trillion in intermediate inputs. *Then the U.S. parents of U.S. multinationals collectively purchase an estimated \$1.52 trillion in intermediate inputs from U.S. small businesses (i.e., 24% of \$6.33 trillion).*

How large a share of the total sales of U.S. small businesses is this \$1.52 trillion? In 2007, total revenues for all U.S. small businesses were \$12.37 trillion.¹³ *This means that input purchases by the parent operations of U.S. multinationals account for an estimated 12.3% of all sales by U.S. small businesses.*

¹² The averages reported in the text are "simple" means, which are calculated weighting equally the response of each of the 64 companies. The corresponding median responses (i.e., the response of the "middle" company when all 64 responses are arrayed from smallest to largest) to the three survey questions are 2,734; \$0.98 billion; and 19.5%. For the share of total input purchases coming from small businesses, several alternative means were calculated using different size-based weights. This resulted in the following range of weighted means: 35.49% (weighting each response by the company's inputs purchased from small businesses); 24.27% (weighting each response by the company's total input purchases inferred from its reported share and level of small-business input purchases); 24.23% (weighting each response by the company's 2009 global revenues); and 23.99% (weighting each response by the company's 2007 global revenues).

¹³ This total-sales figure is calculated from data available at www.sba.gov/advo/research/data.html. At the time of writing this testimony, SBA has not released sufficient information to calculate total small-business sales for 2008. Given that total U.S. GDP is reported by the BEA to have fallen by 0.3 percent from 2007 to 2008, the 2008 total sales for U.S. small businesses were likely very similar to the 2007 amount.

Conclusions and Policy Implications

Small and big businesses in America are connected to and working with each other through their supply-chain partnership. The parent operations of U.S. multinationals buy an estimated 24% of all their intermediate inputs from U.S. small businesses—an estimated \$1.52 trillion in total, which is about 12.3% of all sales by U.S. small businesses. Let me close by offering three brief policy implications of the supply-chain partnership.

One important policy implication follows from this analysis: government policies targeted at just small business or at just big business affect all firms, not just firms of a particular size. So, government policies should be aiming to promote investment growth and job creation for all U.S. businesses. Think of exporting. Policy support targeted at small businesses—such as greater access to information about how to enter into export markets—will help big business by strengthening an important part of its supplier network. Similarly, policies to support growth of big business—e.g., trade and investment agreements to expand their exports—will boost their input purchases from small businesses. Because of the supply-chain partnership, there are lots of small U.S. businesses engaged in the global economy by supplying large U.S. exporters—even if they themselves do not export directly.

A second important policy implication is that the supply-chain partnership between large and small businesses will almost surely become more important, not less so, in the future. A distinguishing feature of the integration of the global economy over the past generation has been, paradoxically, the disintegration of production. Through the use of sophisticated technology networks, companies increasingly operate within elaborate global production networks in which final products are made in many stages spanning many countries, linked together primarily by the international trade and investment of multinational companies. These networks have contributed to not just the multinational companies at their core but also to their small-business suppliers as well. As the global economy continues to grow in size and diversity, so, too, will the supply-chain partnership between large and small businesses.

A third important policy implication is that to better understand the partnerships between large and small businesses, U.S. government data need improving. My survey about the big-little supply-chain partnership I needed to conduct because U.S. government statistics currently cannot capture the extent and evolution of this partnership. This is in no way a fault of the dedicated public servants that work at statistical agencies such as the U.S. Bureau of the Census. Rather, it simply reflects the fact that many of the business surveys conducted and analyzed by these agencies were created decades ago in ways that are not rich enough to adequately capture the evolving complexity of business in America. Here in the 21st century, if we want to craft U.S. economic policies that reflect the reality of this complexity and thus that better support U.S. job creation, then we need to find a way to update and expand many of our key economic statistics.

Let me close by thanking you again for your time and interest in my testimony. I look forward to answering any questions you may have.

Testimony of
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Prepared for the
United States House of Representatives
Committee on Small Business

Large and Small Businesses: How Partnerships Can Promote Job Growth

March 28, 2012

Good afternoon, Chairman Graves, Ranking Member Velázquez, and members of the committee. Thank you for the opportunity to appear before you today to discuss this very important topic. My name is William McDowell, and I am an Entrepreneurship and Family Business professor in the College of Business at East Carolina University as well as the Vice President for Research and Publications for the national Small Business Institute® and co-editor of the Small Business Institute® Journal. The views and research that I will present today are my own and not necessarily those of East Carolina University or the Small Business Institute®.

My research specialty is focused in the area of small and medium sized enterprises (SME) and the relationships between SMEs and large businesses within the supply chain, and I am pleased to be here today to discuss the current challenges and issues facing small businesses, particularly SMEs when interacting with larger businesses. I would like to summarize four key areas in which small businesses face hurdles in interaction with their larger business counterparts as well as obstacles that these small businesses face that are not as prevalent in larger businesses. These include:

1. Access to capital compared to larger businesses;
2. Deep levels of dependency on larger organizations in the supply chain;
3. Tax disadvantages;
4. Access to qualified business experts for advice and direction.

Access to Capital Compared to Larger Businesses

Businesses are considered a small business by the SBA based on the number of employees and average annual receipts. Because of the very nature of being small, these businesses generally have fewer assets which can be utilized as collateral when seeking funds for operations, equipment, and expansion. In addition, the relatively smaller product and market scope of these organizations compared to larger organizations often translate into fewer revenue streams, and, due to the economic problems that have become a reality over the past several years, many small businesses depleted cash reserves as well as inventories.

These issues and more have created an environment in which small businesses have more difficulty in accessing necessary capital in comparison to larger businesses. One area where this continues to be especially true is for women, minority and socially disadvantaged businesses. While this has seen improvement over the past two years, it can still be a problem. One of the greatest areas of concern is that, despite the continued push for access and availability, it is often the ignorance of availability that restricts access to capital. For smaller businesses with fewer resources, the time costs involved in researching capital availability and the lack of direction when looking for this capital is of primary concern.

Deep Levels of Dependency on Larger Organizations in the Supply Chain

Research indicates that small businesses are commonly the dependent party when examining the power/dependency levels within interorganizational relationships in the supply chain. These smaller organizations are often niche suppliers to larger organizations, and many times they supply to a single buyer. My own research has demonstrated that increased niche focus actually works against the small businesses ability to land and retain contracts with large suppliers like the federal government.

Unfortunately, these smaller firms can find that their products or services are no longer needed should the larger organization shift their needs or find another, potentially cheaper, source. In addition, smaller firms, in an effort to work with the larger organization, spend considerable resources in aligning activities in the areas of data, inventory, and accounting systems. Once the smaller firm has committed to these changes, the larger organization may begin to squeeze margins beyond the operating point for the smaller business, thus causing the business to look for other buyers or to even close its doors.

Previous research has shown that the performance of smaller organizations is often dependent on the continued exchange of quality information and communication between the larger and smaller organizations. If these smaller organizations have a more trusting relationship with the larger firm in the interorganizational relationship, the firm's confidence and performance will improve. These smaller firms must work towards increasing flexibility and adjust their internal processes in order to continue high performance.

Tax Disadvantages

When examining the tax disadvantages of small firms compared to large firms, it is important to note that it is not necessarily the tax rates that are burdensome, but the ability of small businesses to calculate their own tax liability that is the problem. Larger organizations can easily afford financial experts that assist in determining what can be declared as tax exempt or to find all of the applicable tax credits based on their market or business. Unfortunately, small businesses are at a disadvantage in this area due to not having these qualified experts on staff. These smaller businesses often do not realize the tax savings that they can realize because they are not aware of the tax credits offered to them, and they may feel that the financial burden of obtaining the services of experts in this area are not appropriate with the uncertainty of the

outcome. The reality is that in many instances small businesses have tax credits that they are overlooking or are just not aware of.

While recent data from the National Federation of Independent Businesses (NFIB) indicates that the number one problem for small business has been sales since 2008 (22%), this has come down to almost even with taxes as the number one problem (21%). When these trend lines are examined back to the mid 1980's, however, the dominant area noted as the most important problem for small businesses is taxes with around 20% of firms. This is a solid indication that taxes have been and continue to be a major area of concern for small business. What is interesting is that over the past 25 years, when the tax rates have been up or when they have been down, about one in five businesses state that taxes are their number one problem.

Access to Qualified Business Experts for Advice and Direction

As mentioned earlier, larger businesses have the ability to afford experts in many areas of their business to streamline processes and maximize returns. Small businesses and those individuals who operate or own them often believe that they cannot afford these experts, and many are not even aware of what continuous quality improvement programs and systems can do to their bottom line. Recent research indicates that businesses that are very small don't even consider these systems as beneficial to their business. In many cases, small businesses may not be aware of SBA programs, SBIR programs, programs designed to target disadvantaged businesses, or other government assistance. Again, because of doing it "on their own," these business operators may be missing out on much help.

Small businesses often develop a very narrow focus in business interactions. By not being able to view the total business operations from a wider perspective, they may continue a course with a very narrow scope concerning their own suppliers, buyers, products and markets. Unfortunately dealing with the crises of today often prevents them from thinking about positioning for tomorrow. Again, help in operations, marketing, finances, and other areas may be lacking because of ignorance of availability.

Another potential problem for small businesses is that smaller firms tend to overestimate their expected sales. This is a trend that has been maintained for many years. The reason for this is that small businesses seem to always be overly optimistic about their projected sales, only to be disappointed by the actual sales numbers. This is a distinct disadvantage for smaller firms because many larger firms have experts on hand that can help them to better estimate what their sales are going to be. These larger firms have shareholders and other stakeholders holding them accountable to ensure that these forecasts are very near to correct, whereas the smaller firms may not. A natural result of this would be to continually see sales as a primary problem, when really it is the lack of experts or expertise that results in accurate projections.

Recommendations

While there are many areas where small businesses are at a strategic disadvantage compared to large businesses, these are four of the most pressing areas of concern. When examining each of these areas, the underlying issue in many ways a lack of information. Access to capital is a major hurdle for small businesses, but there are solutions. Continuing the creation of a lending climate favorable to small businesses is a start. Even helping small businesses find access to other opportunities and revenue streams can assist in the ability to secure the necessary financing from operations, development or growth.

Small business dependency issues will continue to be a problem simply because of their size, but better information, a broader scope in market and product, and even more finances to expand and develop can help in this area of weakness. While tax issues are of concern, more information and education concerning tax credits and even more tax advantageous ownership forms can be of help. Again, in each of these areas, the primary help comes through better information.

So, a solution to the fourth issue addressed can also be a solution to all of these areas of concern. Simply put, this comes through helping small businesses have access to qualified experts. Already the SBA offers help and assistance to small businesses to better organize and operate. Local SBDCs, SBCs, and other organizations such as SCORE assist small businesses in business planning and development.

I am personally involved in the Small Business Institute® (SBI) which was developed by the SBA in 1975 (then called the Small Business Institute Directors Association) with the goal of creating collaboration between teams of business students in universities with local businesses to provide assistance with problems these firms are dealing with. Through the first 20 years, with financing from the SBA, these universities served 150,000 small businesses through direct consulting and gave hands on experience to approximately 500,000 university students. This initial funding and development of the SBI program was greatly responsible for the development of small business, entrepreneurship and consulting classes and programs. Even though the funding was eventually cut, there are still approximately 1000 small businesses per year receiving direct consulting support through the SBI. A renewed support for programs such as the SBI on university campuses nationwide can assist in getting more information and expert help to our struggling small businesses, thus creating a positive economic impact.

Conclusion

Thank you, committee, for the opportunity to present my views of the current struggle of small businesses. I do believe that, regardless of the form or source, small businesses still need help to remain a vital part of the economy and to remain essential for economic growth and employment. Though economic times can be difficult, the innovation and determination of the small business owner and operator can lead them to success. If we can continue the focus on providing the necessary resources, small businesses will be successful and will better our nation.



PREPARED STATEMENT OF INTEL CORPORATION

For the

**COMMITTEE ON SMALL BUSINESS
OF THE U.S. HOUSE OF REPRESENTATIVES**

On

**LARGE AND SMALL BUSINESSES:
HOW PARTNERSHIPS CAN PROMOTE JOB GROWTH**

**Robert E. Bruck
Corporate Vice President and General Manager
Technology Manufacturing Engineering Organization
Intel Corporation**

March 28, 2012

Intel Corporation respectfully submits this testimony for the record in conjunction with the Committee's hearing on "Large and Small Businesses: How Partnerships can Promote Job Growth." As once a very small company and now a Fortune 50 company, Intel has indeed experienced shared significant growth with both its customers and suppliers.

I. Evolution of Intel and the U.S. Semiconductor Industry

1. Intel's Humble Beginnings

In 1968 Robert Noyce and Gordon Moore, two scientists who helped build Fairchild Semiconductor, decided to leave that company and form their own business to manufacture semiconductor memory products. Soon after, a third visionary named Andy Grove, a Hungarian immigrant, joined the team. The new company, Intel Corporation, began with 12 employees, limited cash and \$2.5 million in venture capital.

From the beginning, Intel has been an innovative semiconductor component manufacturer dependent on sales to business customers known as original equipment manufacturers (or OEMs) that have had their own innovative product ideas. In 1969, Intel developed its first random access memory product. Shortly thereafter, a Japanese calculator manufacturer (Basicom) sought a custom multi integrated circuit calculator and opened up a brand new market for microprocessors, the importance of which was little understood – even by Intel – until years later. In 1971, Intel developed the world's first EPROMS and microprocessor (the 4004 chip), but the latter product didn't take off until the personal computer (PC) was born.

As with all small businesses, Intel also had a few failures (e.g., digital watches in 1972). In 1981, IBM adopted Intel's 8088 chip for its own line of PCs. A very large customer even at that time, IBM provided the consumer demand and additional revenue, along with an important source of investment capital, that Intel needed to expand our own capital and R&D investments for continued improvement in integrated circuits.

In 1985, Intel stopped making semiconductor memory products due to significant competition by much larger manufacturers subsidized by several Asian governments, and began focusing exclusively on the development of microprocessors where competition was nascent. That critical decision enabled the explosive growth that led to the company Intel has become.

2. Intel Today

Intel is the world's largest semiconductor manufacturer by revenue, and is a leading provider of computer, communications and networking products. We have approximately one hundred thousand employees worldwide, with more than half of them based in the U.S. Our revenue last year was about \$54 billion, generated from sales to customers in more than 120 countries.

While three quarters of Intel's manufacturing capacity is located in the U.S., more than three quarters of our revenue is generated overseas. The revenue we generate outside of the U.S. helps create and sustain our high paying jobs at home and positively impacts our entire U.S. supply chain.

We have more than 10,000 suppliers worldwide, with more than 6700 (or greater than two thirds) of them classified as small businesses. About 5,000 of our total suppliers are U.S. based, and more than 2,200 of those are small businesses. Intel spent more than \$3 billion in 2011 on goods and services purchased from U.S. small businesses in industry sectors that vary from the supply of chemical gases to the supply of construction services. The general types of goods and services provided by small businesses are listed in the table below.

Summary of Types of Goods & Services Provided to Intel by Small Businesses

ADVERTISING	CONSTRUCTION SERVICES	GAS	MATERIALS SERVICES	REAL ESTATE
AIR	CONTROL AND LIFE SAFETY SYSTEMS	GLOBAL TRANSPORTATION	MATERIALS (POLYMERS, METALS, QUARTZ, ETC.)	SECURITY
BENEFITS	ELECTRICAL	INTERNET MARKETING	MEDIA	SILICON
CALL CENTERS	FACTORY SERVICES	LEGAL SERVICES	NETWORK/TELECOM	SOFTWARE
CAPITAL EQUIPMENT	FOUNDRY	LODGING/MEALS/ TRAVEL	OFFICE PRODUCTS	SPARES
CHEMICALS & GASES	FULLFILLMENT	LOGISTIC	PRESS RELATIONS	TECHNICAL CONSULTING
COMPUTING HARDWARE	FURNITURE	MARKET RESEARCH	PRINT & DESIGN	TEMPORARY SERVICES

Semiconductor manufacturing is extremely expensive requiring significant capital expenditures, R&D, exotic materials science, extremely sophisticated manufacturing tooling, complex construction technology for mega factories, and a vast variety of services. Our R&D expenditures in 2011 alone were \$8.35 billion and our capital expenditures that same year were \$10.8 billion. A leading edge factory now costs more than \$5 billion when fully equipped, and with a new technology generation developed every two years, many of the tools used (constituting more than two thirds of total factory cost) are replaced with new tools designed to make ever smaller transistors.

Even during the strained economic climate of the last few years, Intel has continued to invest to stimulate economic and job growth. In February 2009, the company announced a \$7 billion upgrade to its manufacturing facilities in Oregon, Arizona, and New Mexico—projects that are helping to maintain approximately 7,000 high-wage, high-skill U.S. jobs while providing 4,000 contract jobs for technicians and construction workers.

In 2010, Intel announced that it will spend an additional \$6 billion to \$8 billion over the next several years to bring next-generation manufacturing technology to several existing factories across the U.S. and to build a new development factory in Oregon. This new investment will support approximately 6,000-8,000 additional U.S. construction jobs during the building phase, and eventually add approximately 800-1,000 Intel high-skilled, high-wage jobs.

And in 2011, Intel announced plans to invest more than \$5 billion in a new chip manufacturing facility, called Fab 42, in Chandler, Arizona. The new fab will create thousands of construction and permanent manufacturing jobs at Intel's Arizona site.

We have spent more than \$68 billion on U.S. operations, manufacturing and R&D, from 2002 to 2011. Most of the product manufactured from our U.S. investments will be sold to the 95% of worldwide consumers that live overseas.

Intel's operations have had a major economic impact on the U.S. economy. In 2008, we commissioned IHS Global Insight to conduct an independent study of Intel's longer-term economic impact in the U.S. The study calculated Intel's economic contributions based on four layers of impact. The first three layers measured the direct, indirect, and induced effects of Intel's own operations, and the fourth layer considered productivity gains throughout the economy that stem from the use of Intel® microprocessors. The study found that between 2001 and 2007, Intel contributed \$758 billion to the U.S. gross domestic product (GDP). Of this total, \$458 billion was stimulated by Intel's operations, and \$300 billion was attributable to Intel's productivity-based impact across a multitude of industries that use our microprocessors.

We periodically conduct local assessments to better understand Intel's direct and indirect economic impact on the specific communities where we operate. For example, Intel commissioned a group called ECONorthwest to prepare an economic impact assessment of our Oregon operations, our largest manufacturing site. Published in October 2011, the report found that "total economic impacts attributed to Intel's operations, capital spending, contributions, and taxes amounted to almost \$14.6 billion in economic activity, including \$4.3 billion in personal income and 59,990 jobs in Washington County, Oregon."

All of these economic benefits are entirely dependent on the continuous development of innovative semiconductor products. As explained in Section II below, Intel relies heavily on research collaborations with universities and relationships with a wide range of suppliers to develop and commercialize some of the most advanced products in the world. Collaborations with small suppliers are critical in this process.

3. U.S. Semiconductor Industry Profile

The rest of our industry relies on a similar ecosystem. Semiconductors have been, on average, the top U.S. export for the last five years; these sales have fueled tremendous growth within the entire U.S. industry supply chain. Today's semiconductors enable computers, smart phones, automobile systems, the smart grid, household appliances, medical imaging devices, factory robotics, internet communications, gaming platforms, and satellites, among other downstream commercial products. Here are relevant data for the entire industry:

- 2011 Sales = \$153 Billion
- 2011 Market Share = 51% of \$300 Billion World Market
- U.S. Jobs = 189,000
- Average Income = \$111,772
- Percent of Sales Outside U.S. Market = 82%
- R&D Investment = \$20 Billion, 17% of Total Sales
- Capital Equipment Expenditures = \$13 Billion, 11% of Sales

As discussed in the next section, the success of the semiconductor industry is due to continuous technological advances built upon robust research and development. Semiconductor

innovations form the foundation for America's \$1.1 trillion dollar technology industry affecting a U.S. workforce of nearly 6 million, according to the Semiconductor Industry Association (SIA).¹

This workforce is comprised of vast network of small and medium enterprises (SMEs), including equipment manufacturers, contractors, and other suppliers to the chip industry, software designers, network administrators, cloud computing specialists, web developers and content editors, medical imaging technicians, information technology service personnel, and desktop publishers, among others. The 6 million employee figure does not include all of the jobs that are made more productive or enhanced by IT— for example, pharmacists who check drug interactions, doctors who have access to real-time medical data of their patients, auto mechanics that utilize internet diagnostic tools, real estate agents who use computer listings and virtual tours, and on-line retailers, to name just a few.

In brief, our dynamic industry creates hundreds of thousands of opportunities for small businesses. Our industry's global supply chain is complex and multi-tiered. Small businesses not only directly supply other large semiconductor manufacturers, they also service the research consortia that are funded by the federal government and large manufacturers.

II. Intel's Constant Drive for Innovation Creates Small Business Collaborations

1. Scope of Our Research, Development and Manufacturing (RDM) Model

Due to the extreme complexity of leading edge semiconductor products, research on the materials, design and process technology needed to make new products begins five to ten years before they enter into high volume manufacturing. This research is done both externally outside of our company and within Intel.

Specifically, whereas companies internally carry out primarily nearer-term research and development, the longer-term fundamental science research that underpins new technology breakthroughs and paradigm shifts are largely performed at universities. "Basic research" is funded with help from the federal government.

A. *External Research*

Basic university research adds to the body of knowledge from which *all* companies benefit and which no one company (large or small) can afford alone. In addition, university research is the avenue by which scientists and engineers are educated and trained for careers in technology. These careers include working in small and large businesses, government labs, academia, and in many cases, self-started companies buttressed by research results that are later commercialized through technology transfer.

Long-term fundamental science research performed at universities and funded by the industry and the federal government is critical to sustaining the pipeline of new discoveries that will fuel the semiconductor industry, our Nation's economy and new job creation in America.

¹ See Semiconductor Industry Association (www.sia-online.org).

The Science Coalition (TSC) recently published a report entitled, “Sparking Economic Growth: How federally funded university research creates innovation, new companies and jobs.”² The report documents how 100 companies, many of which are characterized as SMEs, have immensely benefited from investments in university basic research. The report states: “Innovation fueled by basic research has been a cornerstone of the U.S. economy for the last half-century, leading to the creation of countless companies, technologies and products. Federally funded university-based research is essential to America’s ability to produce innovation.” The testimonials and data included in the study lead one to conclude that strategic federal investments in basic research and public-private partnerships benefit small, medium, and large entrepreneurs alike.

Basic, pre-competitive research that benefits the entire semiconductor industry, both large and small companies, involves three critical research and development consortia: Nanoelectronics Research Initiative (NRI), The Focus Center Research Program (FCRP); and the Global research Consortia (GRC).

NRI, managed through the Semiconductor Research Corporation (SRC), supports university research finding a replacement technology to allow faster, smaller, more energy efficient devices beyond the limits of today’s semiconductor technology.

- In addition to Intel, other semiconductor industry companies like Global Foundries, IBM, Micron, and Texas Instruments contribute millions of dollars annually to the NRI effort. With government and university contributions, these funds are leveraged for a combined total of approximately \$20 million annually for NRI that support nearly 40 universities, 75 professors, and 150 students in 20 states.
- In addition to directly supporting the NRI centers, the National Science Foundation (NSF) accepts NRI funding for projects at the NSF Nanoscience Centers across the U.S., which not only leverages NSF’s large investments to fuel basic science and support students, but also helps promote research in relevant areas for future nanoelectronics innovation. These NSF related funds total about \$40 million per year.
- The National Institute of Standards and Technology (NIST) also directly supports the four NRI multi-university centers and lends its metrology expertise. Advancing nanoelectronics requires measuring structures with atomic accuracy, characterizing new materials and molecules, and even measuring the signals from individual electrons.
- State governments in California, Indiana, New York, and Texas and the City of South Bend also invest in the NRI in recognition of the significant employment benefits that will follow commercialization of nanoelectronic technology.

In addition to NRI, since 1997 the Department of Defense and the U.S. semiconductor and supplier industries have jointly funded university research through the Focus Center Research Program (FCRP). By focusing on mid- to long-term research projects of great interest

² <http://www.sciencecoalition.org/successstories/fullReport.cfm>.

to our national defense and the semiconductor industry, FCRP projects help maintain U.S. leadership in a technology vital to U.S. prosperity, security and intelligence.

The third consortia, GRC, funds nearer term research and benefits from local collaborative funds from the states of New York and Texas among others.

In addition to Intel's contributions to the NRI, FCRP and GRC projects, our company funds a wide range of other university research. Intel's total investment over the last five years in such collaborations has been about \$250 million. This collaborative research often produces spin off technologies of use outside of the semiconductor industry that small businesses can commercialize.

B. *Internal Research and Development*

The results of pre-competitive research are then combined with internal research and used by semiconductor companies in the competitive, development phase. Intel spends anywhere from 13% to 15% of its annual revenue on research and development. As noted earlier, Intel R&D expenditures for 2011 alone exceeded \$8.3 billion. At this stage, small businesses play a critical role in experimenting at the edge of technology development. Larger suppliers often are more reluctant to explore unproven technologies because they have their hands full meeting robust quality and reliability targets for products introduced into high volume manufacturing.

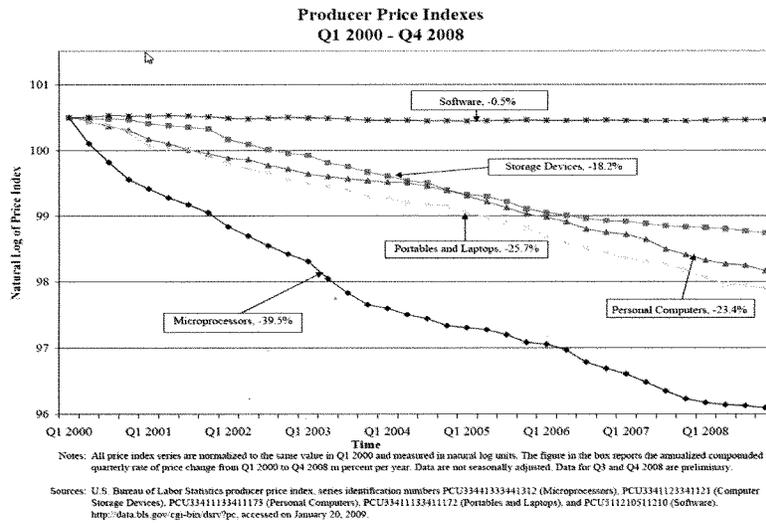
Energetiq Technologies, which also is testifying in this hearing, is a prime example of the mutual benefits of Intel's collaboration with small businesses to develop critical technologies. Intel encouraged Energetiq, with both technical and financial assistance via an investment from Intel Capital, to develop new sources of light for EUV lithography that is critical for future process technologies used to manufacture leading edge microprocessors. In addition, Energetiq's laser driven light source (LDLS) technology is incorporated into the inspection and measurement tools of some of Intel's largest capital equipment suppliers to aid in the detection of defects on silicon wafers as they pass through the chip manufacturing process. As a result of the technical and investment relationship with a small company, two technologies critical to the manufacture of Intel's present generation and future generation semiconductor chips have been developed and commercialized. Energetiq, for its part, has benefitted not only from the revenue generated by sales to Intel's suppliers, but its relationship with Intel provides significant credibility with its customers, suppliers and other investors enabling it to enlarge its business.

2. Results of Our RDM Model

The semiconductor industry is dynamic. Microprocessor manufacturers like Intel have to develop new features, conduct complex materials science integration research, analyze and improve researched topics to develop reliable / low-cost manufacturing techniques, increase computing speed, lower power usage, and drive down overall costs, including environmental costs, to remain competitive. Large computer makers -- some with two to three times Intel's annual revenue -- exert significant buying power over microprocessor companies.

Intel and its suppliers are on a constant innovation treadmill that has produced extremely impressive economic results. In the last 10 years, the average price of Intel's microprocessors for personal computers has fallen approximately 60 percent.

Due to significant technological improvements brought about by Intel's RDM model, the real cost of processing power has dropped roughly 40% *annually* between 1998 and 2008 (see chart below). This is significantly greater than the usual drop in tech product prices. In fact, the quality-adjusted price of microprocessors has declined more than any of the 1,200 products tracked by the Department of Commerce. Computing power that cost \$1 in 2000, now costs less than a penny.



3. Intel Capital Investments in Small Businesses

In 1991 our company formed Intel Capital, now one of the largest venture capital organizations in the world. Intel Capital's mission is to enhance Intel's strategic objectives by making and managing financially attractive investments in external companies. Intel Capital fulfills this mission by making investments in companies that will fill gaps in our technology roadmaps, by making investments in companies that provide technology that will stimulate demand for Intel products, and by making investments in adjacent market segments. Energetiq Technology Inc., referred to earlier, is a prime example of the first kind of investment – i.e., a company Intel Capital invested in to develop specific light source technology necessary to implement EUV lithography.

Since its inception in 1991, Intel Capital has invested \$10 billion in more than 1,200 high tech companies. Many of those 1,200 companies were small businesses at the time of investment and over half of the investments were made in the United States. Intel policy does not allow publishing of detailed financial information beyond our corporate annual financial

report, but a significant part of the more than \$3 billion spent in 2011 on small businesses came from Intel Capital investments.

On top of its own investments, in 2011, Intel Capital pledged to invest an additional \$200 million in U.S. technology companies in support of a new White House initiative, Startup America, and we joined the Startup America Board of Advisors. Startup America was established to inspire and accelerate high-growth entrepreneurship throughout our nation (see <http://www.whitehouse.gov/economy/business/startup-america>).

In addition to the Intel/Energetiq relationship discussed earlier, the following two case studies illustrate the type of investments Intel Capital makes in many of the more than 6,700 small business suppliers that support Intel's operations.

A. Case study: Crossing Automation

Today, Crossing Automation (www.crossinginc.com) is a leading designer and manufacturer of fab and tool automation products used by the foremost semiconductor device and equipment companies and is leveraging its technology to serve the emerging HB-LED and solar markets. The company employs approximately 180 employees worldwide, with over 66% of the employees in Fremont, California. Crossing is profitable and performs better than all of their industry benchmarks.

Between 2005 and 2008, Intel Capital and Tallwood Ventures invested approximately \$15 million in Crossing to foster the company's development of their products. In 2009, the company had the opportunity to purchase part of the assets of Asyst Technologies. Asyst was a leading US based supplier of automation products and a 2009 Intel Preferred Quality Supplier Award Winner, so they were one of our best suppliers. However, Asyst was carrying a lot of bank debt from an acquisition, and when the 2008/9 financial crisis hit, the company was very quickly forced into a cross border bankruptcy, which had the potential to dramatically impact Intel's supply chain and manufacturing schedule.

Intel Capital and Tallwood Ventures intervened by investing approximately \$7 million into Crossing to finance the purchase of the assets of Asyst Technologies out of bankruptcy. Intel Capital collaborated with our internal Technology and Manufacturing Engineering Group to temporarily provide favorable payment terms to the combined entity, providing an essential component to ensure the company's survival. The results of the company since 2009 have been impressive:

- About 180 Asyst and Crossing high tech jobs mostly located in Fremont, California have been saved as a result of the asset purchase. The combined entity has been profitable for 28 consecutive months and cash flow positive for the last nine quarters..
- The company has developed a very successful new wafer transport system product that combines the Crossing and Asyst's concepts.
- Intel has been one of Crossing's top 10 customers over the last 3 years, and we are considering its new product for our factories.
- Crossing Automation is a pioneer in 450 mm wafer transport solutions, a critical project for Intel, and has shipped three different products at this advanced wafer size.

B. *Case Study: Xradia*

Xradia (www.xradia.com), based in Pleasanton, California, is a leading maker of high resolution 3D, X-ray microscope systems, the only American company in this technology area. Xradia sells its products worldwide into the semiconductor, oil & gas, research, and life sciences market segments. The company had between \$25-50M in revenues in 2011 and has approximately 85 employees, who are mostly based in Pleasanton.

Xradia's technology was originally developed at the Lawrence Berkeley National Laboratory, which is a Department of Energy laboratory managed by the University of California. The founder licensed this technology from those entities and formed the company in 2000.

In 2007, Intel Capital and other investors invested \$7 million in Xradia. In 2011, Intel worked with Xradia and certain banks to get the company needed working capital at favorable terms. Since the investment in 2007,

- Investors brought in a new CEO to run company.
- The company has had a >30% CAGR.
- Over 50% of the company's revenue base is from international sources.
- More than 40 high tech jobs were created in Pleasanton, CA.
- Intel has supported the company through its purchase of Xradia's products.

4. Other Intel Initiatives Supporting Small Businesses

Small businesses typically need more than direct financial assistance to grow and develop. Other ways to assist them include the sharing of technical and investment know-how, business contacts, and assistance with education needs.

A. *Intel Policy on Promoting Small Businesses and Supplier Diversity*

As discussed in Intel's Corporate Responsibility Report, the company has a policy to promote business opportunities for small businesses and companies whose ownership has historically been under-represented in the supply chain. We feel strongly that this practice contributes to economic development among increasingly diverse and small business segments, and that it fosters healthy capacity building throughout the supply chain.

Intel is committed to promoting and encouraging the integration of small and diverse suppliers in all eligible areas of product and service procurement. To support these efforts:

- Intel recognizes small business ownership based on the Small Business Administration size standards, using the North American Industry Classification System (NAICS) to identify the industries; and
- Intel recognizes diverse business ownership as 51 percent owned/operated by a diversity owned individual(s).

The great majority of diverse businesses Intel works with today also qualify as small businesses. Intel's assistance to many small and diverse businesses encompasses other initiatives besides monetary investments and the purchase of their products.

B. Examples of Other Intel Efforts to Support Small Businesses

In 2005, 600 U.S. small businesses attended capability enhancing educational classes sponsored by Intel with a \$350,000 investment. These courses on marketing, finance, operations and infrastructure were taught by an educational non-profit, offered at a low cost (\$20) and made publicly available to any interested small business. Six months after attendance, attendees noted a 3% to 31% improvement in actual application of learned skills across all topics. In 2006, Intel's Sales and Marketing Group provided \$1.5 million dollars for small business education.

Between 2004 and 2007, Intel's Supplier Diversity and Sales and Marketing teams worked together to increase supplier diversity. For instance, Intel's U.S. Small Business marketing team sponsored a program on SBTV.com where Intel participated in a panel explaining how small business can win large corporate contracts. The web programs Intel sponsored were viewed by over 50,000 individuals. During the same time period, in cooperation with Dartmouth University, Intel created a scholarship for the prestigious Tuck School of Business Advanced Minority Business Executive Program. Many of the scholarship award recipients continue as valued incumbent suppliers to Intel today.

Intel also has periodically provided networking opportunities to small and diverse suppliers with scholarships that facilitate their attendance at national advocacy conferences. As reflected in the following case study, we also often provide business advice to our suppliers.

C. Case study: Assistance to Small Print Design Woman-Owned Business

For over twenty years, Intel has purchased marketing materials from a small, minority owned visual communications business that has 19 employees and 2011 revenues were \$3.2 million dollars.

To ensure this small business continued growing, Intel sponsored its owner/president to attend a one week executive program managed by Tuck at Dartmouth. As a result of this event, the small business implemented a new growth strategy to develop a new division that expanded services to include internet marketing. Through this expansion, a technical director and five developers were hired. The business successfully evolved beyond typical marketing design to re-architect its services for mobile applications and digital devices.

Continuing the trend to help the company further innovate, Intel extended the opportunity to this same small business to participate in product packaging design and in the production of the design for a microprocessor box. The scope of Intel assistance included help on how to reduce the use of materials and address environmental impact concerns. The supplier reached new customers and also won Intel's packaging contract award, demonstrating greater capacity to grow her business capabilities and increase employee job security. In brief, the business expansion and product innovation created other customers and decreased reliance on Intel, one of its major customers.

The following is a recent quote from the company's President related to her company's relationship with our company: "We have worked for Intel for more than 25 years. When the Intel Supplier Diversity and Small Business program took shape over a decade ago, we immediately experienced the value of its initiatives. Since then we've significantly expanded our services and capabilities, made new business connections, and more importantly, have learned how to build a better company. Intel has helped us showcase our capabilities and utilize our full resources. Knowing how to support large global corporations is now a cornerstone of the many things we offer to Intel and others." Last year, this same person noted: "Running any business has its challenges. But small, diverse businesses face even greater hurdles. Intel's Diversity Supplier program has helped our business prepare for opportunity, open doors, and cultivate new relationships."

III. Government Policy Considerations to Support Business Partnerships

Certain government policies facilitate an innovative and investment friendly ecosystem that can make it significantly easier for small businesses and small/large business collaborations to grow. The impact may be indirect, but nevertheless significant.

1. Pre-competitive Government R&D Funding

Intel applauds past Congressional support for increases to the research budgets at NIST, NSF and DARPA and welcomes the Administration's Fiscal Year (FY) 2013 R&D budget requests for these agencies. We also commend continued federal support of the SRC's Focus Center Research Program (FCRP) and Nanoelectronics Research Initiative (NRI) which involve over forty universities across the country.³ Since its inception in 2005, the NRI R&D consortium discussed in Section II.1.A has produced 600 technical publications and 19 patent disclosures. Still, this basic research program is just beginning and the initial efforts are small compared to the government's research efforts in the 1940s and 1950s that led to the early semiconductor inventions. Nanoelectronics research must grow significantly over the next several years given the technical challenges our industry faces as we shrink transistors to sizes long thought unattainable.

These successful joint partnerships combine industry, government, and academic resources and talent to focus on major basic research challenges related to the entire semiconductor industry. They also equip the next generation of students with the tacit knowledge they will need to compete. Federal funding for basic research and public-private research partnerships at universities will benefit all companies, regardless of their size, while ensuring U.S. competitiveness in this strategic industry. While we acknowledge budget constraints, the federal government should prioritize research funding, as it will strengthen today's industry and lay the foundation for tomorrow.

2. STEM Education

Increasing the quality of science, technology, engineering and mathematics education is critical for our industry, large and small businesses alike. Intel relies on its internal talent and

³ See Semiconductor Research Corporation (www.src.org).

the talent of its suppliers and consultants to help develop and commercialize the technologies we need to build improved products and remain competitive. In other words the availability of individuals with a high quality STEM education to work at Intel, with the research universities, and among our suppliers is essential to perpetuate the innovation cycle.

Private industry must work with government to provide the right kind of incentives that will persuade more students to obtain STEM related degrees. Our CEO, Paul Otellini, is a member of President Obama's Council on Jobs and Competitiveness. Mr. Otellini co-leads the Council's High-Tech Education Task Force that is focused on increasing the number of engineering graduates to help spur economic growth. As part of this White House task force initiative, Intel committed to double its engineering internships in 2012 (many of whom will go to small companies). Many STEM graduates and interns go on to form the small businesses that often take on the risks of developing unproven technologies.

3. Smart Immigration Policies

Until America can produce enough U.S. citizens with advanced STEM related degrees, it would really help U.S. technology companies if the U.S. government were to enact more flexible immigration policies for highly skilled workers that would enable them to more easily secure permanent residency. The significant contributions of highly educated entrepreneur immigrants are well known, including those made by Andy Grove to Intel and semiconductor manufacturing in their early days.

Due to a lack of U.S. graduates with advanced STEM related degrees, this issue has been debated at length among U.S. policy makers. Despite broad bipartisan agreement that it makes no sense to send foreign born graduates with advanced degrees back to their countries, however, little progress has been made to make it easier for them to stay in our country and provide the talent we need to spur economic growth.

4. Creating a Competitive U.S. Environment

Reducing unnecessary and time consuming regulatory barriers is more critical for small than large businesses. For example, the White House Startup America initiative mentioned earlier is working on accelerating the processing of patent applications. There are other impediments, however, to being able to quickly respond to market demands and that thus take away the advantage of small and more flexible businesses – for example, in the environmental arena where regulatory requirements are not always designed to preserve operational flexibility.

5. Creating a Competitive Federal Tax System

American businesses of all sizes face a competitive disadvantage in the global marketplace because of the U.S.'s outdated tax system. Other countries have reformed their tax code in response to the increasingly important role the corporate tax rate plays in investment and plant location decisions, and in spurring economic growth. Unfortunately, the U.S. tax code has failed to keep up with the changing global economy and the last significant overall of the tax code was in 1986, over 25 years ago.

On April 1, 2012, Japan will officially lower its statutory corporate tax rate, giving the U.S. the distinction of having the highest corporate tax rate in the developed world. Currently, the U.S.'s combined statutory rate stands at 39.2 percent which is more than 50% higher than the OECD corporate tax rate average of 25.1 in 2011.

It is critical that Congress enact fundamental tax reform and make the U.S. an attractive location for manufacturing and R&D investment and help American businesses (large and small) stay competitive in the global marketplace. Tax reform must focus on three important components: 1) an OECD competitive corporate tax rate of 25% or lower; 2) a territorial international tax system similar to the rest of world; and 3) a permanent and enhanced R&D Alternative Simplified Credit.

6. Increasing Market Access Benefits Large and Small Businesses

By using the rapidly developing global digital infrastructure, now more than ever small U.S. businesses can take advantage of foreign markets to grow their revenue and create more jobs at home to support sales overseas. As Intel has testified on various occasions, however, there are a number of emerging non-tariff barriers overseas that can impede U.S. business – especially small exporters that do not have the resources to deal with them -- and some of those regulatory barriers are affecting digital services and information flows across borders.⁴ It is imperative that Congress provide USTR the necessary financial resources and other support to maintain open markets and increase market access where it does not exist.

⁴ See Prepared Statement for the Record of Intel Corporation for the Committee on Ways and Means of the U.S. House of Representatives on "President Obama's Trade Policy Agenda and the Future of U.S. Trade Negotiations" (February 29, 2012); Prepared Statement of Intel Corporation Before the Committee on Finance, Subcommittee on International Trade, Customs, and Global Competitiveness, of the U.S. Senate on "International Trade in the Digital Economy (November 18, 2010).



Statement of Energetiq Technology, Inc.

For the

**Committee on Small Business
Of The U.S. House of Representatives**

On

Large and Small Businesses: How Partnerships Can Promote Job Growth

Paul Blackborow
CEO, Energetiq Technology, Inc.
March 28, 2012

Introductory Summary

This testimony describes how Energetiq Technology, a small Massachusetts-based company, and Intel, a large multinational corporation, have found ways to collaborate to their mutual benefit. The resulting partnership has resulted in job creation and financial growth at Energetiq and technical solutions to pressing manufacturing challenges at Intel.

Who is Energetiq?

Energetiq Technology, Inc is a small, high-technology company based in Woburn Massachusetts. We employ 20 people full-time, most of whom are engineers and scientists with advanced degrees. Our workforce is supplemented by a network of local consultants who provide services in the fields of finance, IT management, software development, marketing communications and electronic design. Energetiq's staff focuses on research and development of intellectual property and products, marketing and sales, and the assembly and testing of those products. The manufacturing of the sub-assemblies of Energetiq's products is outsourced to specialized companies, primarily in Massachusetts and New England. These sub-assemblies are integrated into final products in the Energetiq facility and then shipped to Energetiq's customers. Energetiq sells its products all over the world, with particularly high sales in the United States, Japan and Europe. In 2012 we expect the majority of our products to be sold to customers outside the United States.

What are Energetiq's products?

Energetiq specializes in making advanced light sources for scientific and technical applications in the semiconductor, life-science and materials science markets. Our products are based on Energetiq's core competence in plasma physics. These products are critical for a variety of advanced manufacturing processes.

Energetiq manufactures two product lines, based on patented technologies we developed.

The Electrodeless Z-Pinch™ Extreme Ultraviolet (EUV) source product line is an enabling light source technology for next generation lithographic processes in the semiconductor industry. EUV lithography will allow the manufacture of chips with dimensions of 16 nanometers and smaller. The resolution of the lithographic process is driven largely by the wavelength of light used. EUV lithography uses a wavelength of 13.5 nanometers, more than ten times shorter than the 193nm wavelengths used today. To put 16 nanometer chip dimensions in perspective, a human hair has a diameter of around 100,000 nanometers.

The Laser-Driven Light Source (LDLS™) product line is used for advanced measurement and inspection applications in semiconductor chip fabrication, and for a diverse array of applications in the life-sciences and materials-sciences. The LDLS products are used, for example, by a large U.S. medical equipment company for analyzing the pigmentation in skin, and by large U.S. manufacturers of glass products for measuring the properties of glass for displays and for energy-saving windows.

Who are Energetiq's customers and how does Energetiq fit into Intel's supply chain?

We sell our products primarily to large corporations, such as Intel's capital equipment suppliers; to universities, such as SUNY Albany; and to large research institutions such as Sematech, the semiconductor industry research consortium. More than three quarters of our sales are to such customers. Our largest customer is a large U.S. semiconductor capital equipment company – and a major supplier to Intel – that represented about a quarter of our sales in 2011. We have also received research grants from the SBIR programs at the National Institutes for Health and the National Science Foundation, which have led to successful commercial application of Energetiq's technology in the life-sciences.

Both our EUV and LDLS product lines fit into Intel's supply chain. The EUV light source products are used by a number of companies supporting the introduction of EUV lithography into the manufacturing plants of U.S. and other semiconductor manufacturers, including Intel. We sell EUV sources to the manufacturers of inspection equipment for EUV photo masks, to the companies making photosensitive resist materials for EUV lithography, and to the companies making the complex EUV optical assemblies incorporated in the lithographic printing tools, known as EUV scanners.

Energetiq's LDLS technology and products are used today in the factories of Intel and other U.S. and overseas manufacturers for the detection of defects on silicon wafers as they pass through the manufacturing process. We have licensed one of Intel's largest capital equipment suppliers to incorporate the LDLS technology into their inspection and measurement tools.

What is the history of Energetiq and its interactions with Intel?

Prior to the establishment of Energetiq, the founding team worked in high-level marketing and technical roles at a large supplier of process control products to Intel and to other semiconductor companies. In those roles, we were in regular dialogue with Intel scientists, engineers and managers and we were invited to attend Intel's Supplier Days. These Supplier Days included presentations of Intel's manufacturing technology roadmaps, along with discussions of its technical challenges that needed to be met by the supplier community. In addition, Intel's senior lithography staff explained Intel's technical goals with regard to EUV lithography to the wider industry, including through the use of technical conferences and press articles.

We were impressed with Intel's vision for EUV lithography and even more by Intel's well-publicized financial support of that vision through research funding and equity investments in its supplier companies. It was clear from Intel's public statements and actions that there was a clear need for novel sources of EUV light to support the introduction of EUV lithography, and that existing technologies were lacking in performance.

We were planning to start a new enterprise and Intel's public commitment to EUV Lithography guided in large part the choice of our first product. We arranged an amicable departure from our employer and founded Energetiq in early 2004 to address this opportunity.

We spent the first few months of our new company's existence rapidly inventing a new kind of EUV light source, securing the associated intellectual property, building a prototype, and collecting initial data on the prototype's effectiveness. Armed with this early data, by the summer of 2004 we were ready to present the concept and the data to Intel. We were able to meet the leaders of Intel's lithography team in short order and we presented our work. Intel's reaction was very encouraging and equally rapid. The lithography team leaders agreed to fund some research and development work at Energetiq to better prove the performance of the technology. In addition they immediately introduced us to Intel Capital, Intel's venture capital arm. Though we had funded Energetiq with our own savings and received some funding from external investors, we knew that we might well need more substantial funding in the future.

Although Intel did not make a direct investment until later, the early engagement of investment managers from Intel Capital helped us to focus our business plan.

Intel Capital invested in Energetiq in 2006. They invested again in 2008 during our second round of financing. During both financing rounds, the investment managers at Intel Capital provided valuable coaching on the investment process. The financial support from our investors allowed further development of the EUV source technology and the development and introduction of the LDLS technology.

Intel Capital has held an observer seat on our Board of Directors since 2006. Apart from attending our quarterly Board of Directors meetings (one of which is hosted each year by Intel at its headquarters in Santa Clara, CA), our Intel Capital Board Observer has provided significant advice and resources to Energetiq. Based on Intel Capital's wide range of experience with the diverse companies in the Intel Capital portfolio, they recently helped us navigate a legal and intellectual property issue that needed to be resolved.

Our Intel Capital Investment Manager provides business development suggestions to us, and each year we are invited to attend the Intel Capital CEO Summit. That event brings together the CEOs of the Intel Capital portfolio companies with senior executives from large public companies from around the world. We have been able to make many useful connections at that summit.

On the technical side, we have remained connected to the senior lithography staff at Intel. They have monitored our technical progress with our two technologies and guided us toward certain business opportunities involving customer technical challenges. We also have been able to showcase our technologies to Intel's engineers and scientists at events held at Intel's development operations in Portland, OR.

We are regularly invited to attend Intel's Supplier Days, where we can continue to learn the technical needs and challenges of Intel's manufacturing operations. With Intel developing ever more complex microprocessor products every two years, the technical challenges and opportunities to address them do not slow down.

How has Intel benefited from this relationship?

As a result of Intel's technical and investment relationship in a small company, two technologies critical to the manufacture of its present and future-generation semiconductor chips have been developed and commercialized. These particular technologies were not developed by Intel's large capital equipment suppliers, whose focus on making supremely reliable and productive chip manufacturing equipment has, perhaps, made them less nimble with regard to new technology development. Small companies like Energetiq can rapidly develop such technologies if the technical challenge is clearly defined.

Intel Capital invested in Energetiq with two objectives; first, to enable the development of technology critical to chip manufacture; and second, to earn a financial return on its investment. Energetiq has delivered well on the first objective. Intel Capital retains a significant shareholding in Energetiq and it's our goal to ensure that Intel's financial objective is also achieved.

How has Energetiq benefited from this relationship?

Intel provided the inspiration for Energetiq's first product, followed by R&D funding and equity financing. Our relationship with Intel provides us significant credibility with customers, suppliers and investors. We have continued to receive valuable technical and commercial guidance and support from Intel, and Intel's adoption of our EUV and LDLS technologies has helped drive our revenues from product sales.

Summary

The interaction between our small company, Energetiq, and large U.S. companies, notably Intel, has led to significant mutual benefits. We have been able to rapidly develop technologies needed by these large companies. In return, we have received expert technical and commercial guidance and financial support. The result has fueled our growth as a company and helped maintain the technical edge of our large-company partners.

Rep. Owens Questions for the Record

1. In your testimony, you indicate on page nine that Xradia's technology was developed at the Lawrence Berkeley National Laboratory (LBNL), which is managed by the University of California, and that you support increases to the research budgets of NIST, NSF, and DARPA (page 11). Your testimony also states that the Xradia founder obtained a license from LBNL to form Xradia. Did LBNL receive some form of compensation for the use of the technology it developed and do you support government funding of research that leads, at least in some instances, to the development of commercialized products and creates a flow of revenue back to the federal government?
2. On page twelve of your testimony, you indicate your support for a federal role in funding and developing STEM programs. Do you agree that the government has a valid and necessary role in funding these programs and that there is a significantly benefit the U.S. as a whole?

1. *We are not aware of specific terms between Xradia and LBNL, but I have asked Janice Golda, Director of Lithography Equipment Development to pass your question on to Xradia. She will respond directly to you or will have Xradia do so.*
2. *Intel believes the federal government has a valid and necessary role in funding STEM programs. A chronic shortage of engineering students threatens America's role as the world's leading innovator and continues to impede our nation's fragile economic recovery. Intel was an active advocate for the administration's Race to the Top program which funded competitive grants to states that promoted reforms including more rigorous standards and assessments. Intel supports legislation that encourages private and public partnerships such as Congressman Honda's STEM Education Innovation Act of 2011. The bill would create an Office of STEM Education in the Department of Education, support state consortia on STEM education to shape best practices, and provide grant funding to organizations to develop educational technology innovations that will unleash the power of STEM education—building partnerships across sectors to support STEM learning. Early in the Obama administration, Intel became a founding member of Change the Equation, the President's initiative dedicated to improving STEM learning. This collaboration between business leaders, government officials and STEM educators identifies best practices and innovative approaches to encourage students to pursue STEM careers.*

Companies like Intel are actively collaborating with top universities in the U.S. and around the world to accelerate the advancement of student education in the areas of science, technology, engineering and mathematics; and proliferating research and curricula to meet rapid technology advances. Intel feels the government can play a vital role in public/private partnerships to help deliver fresh perspectives and foster collaboration between industry and academia through equipment grants, scholarships and fellowships, and research grants. The scope of U.S. government support for STEM programs should include state and local support for elementary and high school development and federal support for higher education curricula and research at the university level.



STATEMENT FOR THE HEARING RECORD

**JOHN (JACK) E. BAILEY
SENIOR VICE PRESIDENT, POLICY, PAYERS, AND VACCINES
GLAXOSMITHKLINE U.S. PHARMACEUTICALS**

**COMMITTEE ON SMALL BUSINESS
U.S. HOUSE OF REPRESENTATIVES**

HEARING ON

Large and Small Businesses: How Partnerships Can Promote Job Growth

MARCH 28, 2012

**2361 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC**

March 28, 2012

The Honorable Sam Graves
Chairman
House Committee on Small Business
2361 Rayburn House Office Building
Washington, DC 20515

The Honorable Nydia M. Velázquez
Ranking Member
House Committee on Small Business
2361 Rayburn House Office Building
Washington, DC 20515

Dear Chairman Graves and Ranking Member Velázquez:

On behalf of GlaxoSmithKline (GSK), I write to thank you for holding the upcoming hearing on *Large and Small Businesses: How Partnerships Can Promote Job Growth*. I also write to describe GSK's symbiotic relationships with our small business partners and to convey that public policies that negatively impact my company can have an adverse downstream economic impact on small businesses.

GSK is one of the world's leading research-based pharmaceutical and healthcare companies. We have a challenging and inspiring mission: to improve the quality of human life by enabling people to do more, feel better and live longer. This mission gives us the purpose to develop innovative prescription medicines, vaccines, and consumer health products that help millions of people here in the United States and around the world.

GSK is a global organization that employs 96,500 people in over 100 countries, including 17,000 in the United States. GSK employees live and work in all 50 states. Our U.S. corporate operations are based in Research Triangle Park, North Carolina, and Philadelphia, Pennsylvania. We also have research and manufacturing facilities in North Carolina, Pennsylvania, Massachusetts, Missouri, Montana, New Jersey, New York, South Carolina, and Tennessee.

GSK's Small Business Supply Chain

Like other large biopharmaceutical companies, GSK relies on and helps to sustain a large-scale supply chain as we discover, develop, manufacture, distribute, and market new medicines. In the period October 2010 - September 2011, we used the products and services of over 8,500 external suppliers and vendors in the United States. Over 1,000 of these suppliers and vendors were small businesses as defined by the U.S. Small Business Administration. GSK purchased \$241.8 million in goods and services from these small businesses, representing 7.3% of our total supplier spend in the United States during this time period. About 160 of these suppliers were woman-owned small businesses, with whom we spent approximately \$62.5 million, and about 64

suppliers were minority-owned small businesses, with whom we spent approximately \$26.9 million.¹

GSK procures a wide range of services and products from these small businesses, including laboratory and clinical supplies, staffing services, computer and office supplies, meeting management services, exhibit and convention services and supplies, janitorial services, capital projects, and secondary packaging.

GSK makes a concerted effort to identify small diverse businesses that can provide the goods and services we require. For example, for the past ten years, our Supplier Diversity and Business Development team has hosted annual networking forums to promote connections between GSK Procurement staff and small diverse businesses interested in supplying services and products to GSK. These forums enable both GSK and the small businesses to understand better each others' needs and capabilities.

GSK Supplier Diversity Mentoring Program

We recognize that small businesses in general, and diverse small businesses in particular, often face unique challenges to meet the procurement needs of large, multinational companies, especially those like GSK that operate in highly regulated environments. For this reason, ten years ago we established the GSK Supplier Diversity Mentoring Program ("Program") to support the development and sustainment of supplier capabilities to provide goods and services that meet our requirements.

Both existing and potential suppliers are eligible to participate in the Program. Among existing suppliers, we look for those who demonstrate the willingness and potential to grow within GSK's supply chain particularly when there are greater growth opportunities within GSK for the supplier. For potential suppliers, we seek those who have the potential to develop in critical areas where small businesses have traditionally not competed (e.g., clinical services, pharmaceutical packaging); however, potential suppliers understand that Program participation does not guarantee they will earn GSK procurement business in the future.

The Program uses a formal mentoring model. Mentors (trained GSK staff) and mentees (small businesses) are paired, set goals, and meet regularly over a twelve month period. The core of the Program is a business process assessment that evaluates the small business' overall business operations, staff, pharmaceutical industry knowledge, unique processes, and technology systems. The end product of the assessment is a clearly defined framework that identifies gaps between the small business' stated vision and its current capabilities, as well as tangible recommendations and business improvement goals for moving the business toward its stated vision. GSK will then provide financial assistance to the business to implement improvement projects that address key development areas identified in the assessment.

¹ These figures are taken from GSK's most recent small business diversity reports submitted to the U.S. Department of Veterans Affairs and the U.S. Department of Health and Human Services. Because of the way GSK is required to report these data, there may be some overlap in the diversity status classification figures.

The experience of one of these businesses, Callis Contractors Inc., a general contractor in Durham, North Carolina, illustrates the Program's potential to enhance small business competitiveness. As part of the business process assessment, GSK and Callis jointly assessed the company's processes and identified issues preventing it from becoming a GSK preferred supplier; these issues ranged from management accessibility to ability to scale up supply to meet GSK's needs. Callis implemented improvements based on our recommendations which enabled it to become a preferred supplier and win GSK business worth approximately \$3 million, including roofing projects, office and laboratory renovations and improvements, parking deck repairs, and underground storm water investigations.

Additionally, we sponsored Callis to participate in both the Tuck School of Business Executive Education Management program at Dartmouth College, which allowed them to strengthen their business acumen, and a local community college program which awards required Project Management certifications. (GSK has provided nearly thirty scholarships to small business owners to attend executive education programs at leading institutions like Dartmouth and the Kellogg Graduate School of Management at Northwestern University.) We also helped Callis develop relationships with other large corporations with procurement needs.

As a result of these combined efforts, Callis has won not only GSK business but several projects with other firms, hired more employees, and paid for several employees to attend a local university. Jesse Callis, owner of Callis Contractors, has stated, "GSK has been a wonderful mentor. They are a real leader in their commitment and actions to help diverse minority suppliers. In my case, they provided assistance that has led to a very significant growth of my business. This in turn has provided jobs for others in . . . Durham [North Carolina] and [the] surrounding area ensuring that monies paid by GSK stay in the local communities. This is a win for everyone involved."

In addition to Callis Contractors, Inc., GSK staff have mentored another fourteen small businesses in the Program's first ten years of existence. The relatively low number of mentees during this time reflects the fact that mentoring is a time- and resource-intensive activity. Mentoring is most effective when focused on a small number of high potential high-performing companies. However, GSK also has provided a variety of business improvement advisory services to small business suppliers that have not participated in our formal mentoring program.

Public Policies Affect All Supply Chain Partners

The Supplier Diversity Mentoring Program illustrates the close, symbiotic relationship between GSK and its small business supply chain partners. We depend on our supply chain to support and grow our business. In turn, the success of our small business partners depends in large measure on our continued economic success – not only in terms of our need and ability to award procurement contracts but also in the continuation and expansion of our supplier development initiatives such as the Supplier Diversity Mentoring Program.

This means that public policies targeted at just large businesses, like GSK, or at just small businesses, like Callis Contractors, can ultimately affect all partners in the supply chain. The adoption of policies that negatively impact GSK's operating environment could cause us to

forego business expansions or renovations, or to cut back on inputs, with adverse downstream financial consequences for our small businesses partners. Conversely, the adoption of policies that inhibit the creation, growth, and development of small businesses can limit the pool of qualified suppliers from which we source the inputs we need to discover, develop, manufacture, distribute, and market new medicines.

I will provide one specific example. Federal contractors such as GSK are required to develop a Small Business Subcontracting Plan for awards greater than \$600,000, or a commercial plan covering all of our commercial activities. GSK strongly supports the intent behind this requirement because it increases opportunities for small businesses, including minority firms and disadvantaged businesses. However, the applicable regulation imposes a significant paperwork burden that raises GSK's cost of complying with the Small Business Subcontracting Program. We recommend that the federal government explore innovations that will reduce the paperwork burden and compliance cost for large businesses.

This is just a single example of how a specific requirement related to government contracting imposes burdens on our use of small businesses, but our concern applies more broadly: Any public policy – even policies not related to government contracting – that substantially increases our cost of doing business or inhibits our growth opportunities could impact our relationship with small business partners. Therefore, I respectfully urge members of the Committee and your colleagues to consider carefully the potential impact on large businesses of the policies you adopt toward small businesses – and vice-versa.

Thank you for the opportunity to submit this statement for the record and for your attention to this often overlooked but important issue. If you have any questions, please contact Sally Walsh at (202) 715-1015.

Sincerely,

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