INNOVATION AS A KEY IN THE TTIP

Introduction

The Transatlantic Trade and Investment Partnership (TTIP) can significantly contribute to mutual economic development by removing unnecessary impediments to innovation, including by supporting transatlantic research and development and other cooperation in innovation. Including a separate chapter on emerging technologies will emphasize the importance of innovation and facilitate development of a comprehensive, coherent set of measures to create a transatlantic zone in which innovation can flourish. A comprehensive innovation chapter should address the need to support broader access to funding sources for innovators, including exploring credit guarantees and banking sector support and avoiding stifling private equity activity. The innovation chapter should also address impediments to the freest possible exchange of ideas, capital, goods, services, and people, and create common frameworks between the U.S. and EU for programs to encourage both research and development and also the commercialization of new technologies.

For illustration, such measures should include:

- Removal of statutory impediments to collaboration between public and private sectors thereby allowing for optimal research cooperation.
- Provisions to facilitate the transatlantic mobility of researchers and technologists engaged in collaborative projects[1].
- Support for policies that promote investment in innovation-centric sectors.
- Support for business incubators and other vehicles to assist young innovators.
- Provisions for the cross-border flow of information that facilitate research into new and innovative processes and products, as well as technological developments such as the industrial internet.
- Elimination of “localization requirements” and other protectionist policies for the application or transfer of technology whose development is supported by public funds.

Much of the world’s scientific and technical innovation takes place within and between the U.S. and EU. Working together, we have the opportunity to revitalize languishing industries, accelerate the development of advanced technologies, develop new products and services, create good paying quality jobs and enhance the ability of the transatlantic market to compete with the rest of the world. Moreover, transatlantic leadership in R&I policy would set the example for other countries struggling to develop and implement appropriate policies that support and accelerate innovation.

[1] See TABC position on skilled workforce/labor mobility

Part I: Emerging Technologies

Emerging Technology: **Advanced Computing Systems**

Transatlantic Dimension - The case for inclusion in TTIP negotiations:

The hardware technology 'free ride' that High Performance Computing (HPC) has had for the past two and a half decades is ending due to limitations in CMOS performance improvements. Significantly more investment in fundamental design disciplines as well as key hardware and software technology components will be needed than in the past.

The scale of the investment and resultant economic impact are such that international cooperation and collaboration could be leveraged to accelerate the availability of next generation systems.

Specific Challenges & Recommendations:

The challenges of building the next generation of advanced systems include:

- *Overall system design and architecture* – including overall system architecture and chip design: Architectural innovation at all levels of the system will be required. This innovation will have to result in systems that are readily programmable, reliable and power efficient.
- *Data management* – including network architecture and design, memory system architecture and design, I/O system architecture and design, storage system architecture and system and application software: Future systems will need to ingest, manipulate, manage, analyze and extract understanding in real time from exponentially increasing amounts of structured and unstructured data.
- *Software development* – including compilers, libraries, frameworks, APIs, programming models, standards and tools: As systems architectures become more complex users will need far more powerful software tools to help them tap into the vast capabilities of the hardware.
- *System wide power and energy management* - Power management will evolve, from the largely static and hardware focused environments of today to a much more dynamic, application driven, process requiring significant software support and interoperation with the underlying hardware.
- *Reliability* - Like power management, reliability engineering will also evolve, from the largely static and hardware focused environments of today to a much more dynamic process requiring significant software support and interoperation with the underlying hardware.
- *Cost Engineering* - Trade-offs between the use of industry standard technology where available, and uniquely designed and developed components must continuously be made with an eye towards cost efficiency consistent with system mission and design targets.
- *General System Software and Hardware Management* - As systems and workflows grow in size and complexity so does the software and hardware required to manage them. Innovation is needed to enable the system to support large scaling, workflow balancing, new use modes, interactive supercomputing, as well as system monitoring and feedback.
- *Risk management* - It is important to note that the new architectures and key enabling

technologies discussed above are evolving and require significant research. As such there are considerable unknowns today, which introduce a large element of ongoing risk throughout the development process.

- *Commercialization considerations* - Early instantiations of the largest next generation HPChe largest systems are typically beyond individual company investments. There is real opportunity in building on-ramps to this technology through government/academic/industry partnerships and innovation centers. The focus on and investment in, rapid transfer of algorithmic and application innovation/impact from government to industry, at scale, can create real competitive advantage for industry.
- *Requirement of Skilled Technical Workers* -There is a growing need for work ready technical skills. Many of the STEM (Science, Technology, Engineering and Mathematics) skill related openings go unfilled due to the lack of qualified lower-skilled graduates from secondary and technical schools as well as the most highly skilled university graduate.

Emerging Technology: **Nanotechnologies**

Transatlantic Dimension - The case for inclusion in TTIP negotiations:

Nanotechnology has been recognized as key enabling technology in the U.S. and Europe. It is expected that a growing number of nanomaterials will enter the markets in the years to come.

Specific Challenges & Recommendations:

The EU has already started to regulate nanomaterials as a whole and impose strict requirements on nanomaterials (e.g. consumer information, notification) in certain sectors which hampers their market access and discriminates nanomaterials against non-nanomaterials. Moreover, single member states have or are in the process of introducing nanoinventories which also impede the market access of nanomaterials in these member states. U.S. regulation on the other hand focuses exclusively on single nanomaterials with specific hazards. Harmonizing the regulatory approaches for nanomaterials considering the results of the safety research of nanomaterials show that nanomaterials are not more toxic than other materials and that for that reason a size of a material alone may not trigger regulatory requirements. Continue and promote further transatlantic cooperation in the area of safety research for nanomaterials.

Emerging Technology: **Electric Vehicles and Smart Grid**

Transatlantic Dimension - The case for inclusion in TTIP negotiations:

Future standards for e-vehicles and smart grids are further to be discussed between transatlantic standard bodies and regulatory agencies to ensure transatlantic leadership in these emerging technologies, particularly with a view to standards and regulation. First steps have been taken by the automotive industry to settle on the Combined Charging System (CCS) for fast electric recharging points for electric vehicles. One future issue is wireless power transfer which is going

to be developed in the short term.
Specific Challenges & Recommendations: Ongoing discussions between the standards and regulatory agencies (e.g. regular ANSI and CEN/CENELEC meetings to advance their respective eMobility roadmaps) must continue with distinct political support from both governments. Pre-competitive scientific work in transatlantic research centers such as Argonne National Laboratory and Joint Research Centre in Ispra should focus on relevant issues (e.g. alignment of battery test procedures, new technologies) and should involve relevant stakeholders groups.

Emerging Technology: **Energy Efficient Appliances**
Transatlantic Dimension - The case for inclusion in TTIP negotiations: Both the EU and U.S. regulate energy efficiency of appliances through energy labels and minimum efficiency limits but they do this differently. Innovation is necessary to achieve high energy efficiency with the objective of saving energy when consumers use appliances at home. These are difficult considerations that require in-depth understanding of the function of appliances and how consumers use appliances.
Specific Challenges & Recommendations: It would be beneficial for the EU and U.S. to jointly analyze this area and create harmonized legislation.

Emerging Technology: **Exhaust Gas Emissions for Passenger Cars**
Transatlantic Dimension - The case for inclusion in TTIP negotiations: In both the U.S. and the EU technologies have been developed and legislation put in place to ensure ever cleaner passenger cars. Strength lies in combining approaches and couple with the introduction of World Harmonization Test Cycles. This also allows the EU and the U.S. a combined approach to serve as a basis for future work with other nations/regions.
Specific Challenges & Recommendations: In order to achieve ultra-clean vehicles, jointly discover possibilities to combine U.S. legislation (specifically California) on SULEV (Super Ultra-low Emission Vehicle) and the EU's RDE (Real Driving Emissions) and PEMS (Portable Emissions Measurement Systems).

Emerging Technology: **Resource Efficiency supported through Implementation of Reuse and Quality Recycling Technologies**
Transatlantic Dimension - The case for inclusion in TTIP negotiations: The need to find new sources and ensure sustainable supply of valuable and critical materials required by emerging technologies (e.g. in the field of renewable energy, electric vehicles) has been recognized in the EU and the U.S. as well as the need to better utilize/use more efficiently the resources we already have.
Specific Challenges & Recommendations: E-waste (WEEE) is one of the fastest growing waste streams in both the EU and the U.S. The management of WEEE has not only an environmental impact (through preventing/reducing hazardous impacts) but can also contribute to the efficient use of resources and the retrieval of valuable and critical secondary raw materials Regulations and current informal approaches differ within and between the U.S. and EU for electronics and electronic waste (e-waste). There is not a need to develop one combined approach for what already exists. However, it is possible to work together to ensure that recognized certification standards exist for promoting quality treatment throughout the entire recycling chain of waste electronics (from collection to final material recovery). This will encourage appropriate handling and maximize the recovery of valuable and critical resources and materials.

Emerging Technology: **Chemicals Regulation**
Transatlantic Dimension - The case for inclusion in TTIP negotiations: Chemical regulation has the potential to impact innovation across many industry sectors. TABC supports enhanced regulatory cooperation and transparency that will support meeting environmental and health objectives in a manner that is consistent with innovation and facilitation of transatlantic trade.
Specific Challenges & Recommendations: TTIP is an opportunity to: • Enhance scientific cooperation • Improve the basis for regulatory cooperation and burden sharing • Achieve greater transparency within the regulatory process, including notice and comment procedures to allow for identification of potential trade impacts at appropriate points in the chemical regulatory process The joint industry proposal by American Chemistry Council and CEFIC, the European Chemical Industry Council, includes detailed recommendations with regard to greater transparency, improved scientific and regulatory cooperation.

Part II: Horizontal Policy Areas that facilitate Pre-Regulatory Cooperation, Compatible Standards and Regulatory Frameworks for Innovative Technologies

Intellectual Property Protection

Intellectual property is essential to economic expansion, business, societal innovation and national competitiveness for both the US and EU. IP-intensive industries are linked to 35% of U.S. GDP and nearly 30% of all U.S. employment; similarly IP-intensive industries are linked to 39% of EU GDP and roughly 35% of all employment in the EU[2]. As internet-enabled innovation increasingly drives productivity and growth on both sides of the Atlantic, the importance of intellectual property to creating new jobs and growing exports will only increase.

TTIP should reflect this shared reliance on intellectual property. Both markets share a deep commitment to protecting intellectual property and a recognition that strong intellectual property regimes are an indispensable element of successful economies and to create and maintain innovation and technology-driven exports, competitive opportunities, and jobs. Inclusion of provisions on intellectual property in TTIP is especially important as a means to foster strengthening of intellectual property standards globally.

Financing of Research and Innovators

Achieving full harmonization of EU and U.S. programs, rules and regulations on public support for private R&D (e.g. EU Horizon 2020, public procurement of innovation, state aid) are desirable but difficult to put in practice in the short-term. A pragmatic approach to facilitate reciprocal access to R&D programs including funding, tenders for innovation procurement, etc. would be useful, particularly in the area of pre-competitive research.

One such example are EU R&D actors who can currently access U.S. funding from National Institutes of Health. In return U.S. partners have access to EU funding in the healthcare section of the EU's Seventh Framework Programme (and to a fairly limited extent for the Virtual Physiological Human activities within the ICT part of FP7). Also in healthcare projects commissioned by Defense Advanced Research Projects Agency (DARPA) EU players may be involved to perform R&D with U.S. funding. Similar EU-U.S. arrangements in Horizon 2020, also in other sectors, would be most valuable to accelerate transatlantic innovation.

In order to assist entrepreneurs and innovators, financing options should go beyond support for R&D, i.e. support for broader access to funding sources, including by:

- Exploring credit guarantees and banking sector support;
- Helping business angels' networks widen their scope and stimulate venture capital;
- Avoiding stifling private equity activities with more regulations.

[2] http://www.epo.org/news-issues/news/2013/20130930.html

Competition

Taking into account the decentralized globalization of competition policy and mutual objectives to protect the global competitive process, foster innovation and reduce inefficiencies, the U.S. and the EU should direct their competition authorities to:

- Jointly develop best practices on due process (procedural fairness) for all competition cases and push for their global implementation through organizations such as the OECD and International Competition Network.
- Ensure robust economic analysis is used in analyzing the impact of transatlantic transactions of concern, and that the best tools on how and when to perform such analyses are shared with newer competition agencies.
- Help newer competition agencies more fully understand the intersection of intellectual property law and competition policy and the dangers associated with using intrusive remedies that could negatively affect innovation.
- Strict enforcement of competition law in all sectors and in particular in those driving innovation.
- Ensure that vertically-integrated companies cannot lever their position to inhibit innovation and market entry.

Access to Raw Materials

Access to and affordability of non-energy raw materials are crucial for the transatlantic market and to advance the process of innovation. Major sectors of the transatlantic economy depend on access to raw materials, including construction, chemicals, automotive, aerospace, machinery and equipment, as well as high technology/ICT and consumer goods. A secure supply of key raw materials is a prerequisite for maintaining the industrial value chain and innovating new materials and products. The U.S. and EU need to jointly address market distortions affecting important raw materials available on the international market. At the same time resource efficiency should be recognized as a key dimension of raw materials security:

- Secure access to materials (both primary and secondary hence also recycling) that are critical to create green and energy efficient technologies (e.g. neodymium that is used in permanent magnets of efficient electric motors, indium that is used in solar panels, cobalt and nickel that are used in rechargeable batteries).
- The U.S. and EU should strengthen their cooperation in the development and use of standards, test methods and guides for the characterization, classification, recycling and re-use of valuable and critical raw materials
- Develop substitutes, alternatives or reduce material use for critical materials used in energy efficient technologies where such materials may be strategic for U.S. and EU governments, in danger of short supply, subject to increased demand, controlled by very few companies/countries.
- Set the right framework on conditions and incentives for investments in the transatlantic market to foster sustainable supply.
- Boost transatlantic cooperation on materials research.

Procuring Innovation

Public Procurement of Innovation (PPI) is defined as the purchase of innovative products, services or processes through public demand with the aim to stimulate commercialization of innovative research and to improve the performance and functionality of public services to solve important socio-economic challenges. This purchase might need to be preceded by research and development in order to accelerate innovation and prepare a future commercial purchase: this exploratory phase is called pre-commercial procurement (PCP) of R&D services in the EU. A variety of terminologies can be encountered in the U.S. depending on the public organization such as pre-competitive procurement, procurement of innovation, public procurement of R&D services, public technology procurement, technology procurement etc.

The PCP and PPI programs in EU and U.S. have three common key objectives:

- Stimulate economic growth by driving innovation from the demand side so as to increase the expected return on investments in R&D.
- Improve service levels of public entities and agencies to its citizens by becoming an early adaptor of innovative technologies.
- Shorter-time-to-market: Accelerate innovation by funding transition process from R&D to commercialization, with the public sector acting as an early adopter customer.

Furthermore, PCP is an approach for procuring R&D services which enables public procurers to not only share the risks and benefits of designing, prototyping and testing new products and services with the suppliers but to create optimum conditions for wide commercialization and take-up of R&D results through standardization and/or publication, and IP retention by the supplier. At the same time pre-commercial procurement pools the efforts of several procurers and stimulates industrial product development from its early R&D stages to test series in order to best fit the needs of public entities.

The U.S. has a long and extensive experience in PCP and PPI whereas the EU is still lagging behind. However, in Horizon 2020 there is an extensive effort by the European Commission to stimulate PCP and PPI by public entities as a means of transferring research results to the market. Thus PCP and PPI are becoming key drivers of Innovation in Horizon 2020 and in the overall EU Digital Agenda.

PCP can be split into three phases where various companies (SMEs and larger companies) are in competition. PCP follows the “Curiosity Driven Research Phase” with Phase 1 (Solution Exploration), Phase 2 (Prototyping) and Phase 3 (Development of a first batch/test series). Each of the phases is assessed by an evaluation providing a re-assessment of the goals of the tender as well as an opportunity to re-focus the work developed.

U.S. agencies and departments funding R&D procurement projects are also the beneficiaries of the results and they become early adopters, such as Department of Health, Defense (Defense Advanced Research Projects Agency), Energy (Advanced Research Projects Agency-Energy), Homeland Security (Homeland Security Advanced Research Projects Agency), Transportation (Research and Innovative Technology Administration) and the Office of the Director of National Intelligence’s Director of Science and Technology (Intelligence Advanced Research Projects Activity). Some examples of most innovative solutions that emerged from U.S. government R&D procurements include Internet Protocol, Global Positioning System, High Performance Super Computing and Semiconductor Key Innovations.

PCP and PPI programs in EU member states and in the U.S. present unique opportunities for transatlantic cooperation on innovation, in particular transforming inventions successfully into

commercial applications. TABC recommends that EU and U.S. government officials jointly develop a common policy for PCP and PPI by taking the following steps:

- Acknowledge the potential of public entities as early adopters to create demand for innovative products and industry which can bring research results into the market.
- Stimulate innovation through PCP and PPI for economic growth on both sides of the Atlantic:
  - Define a joint mission, objectives, strategies and tangible results to be achieved.
- Focus on common challenges:
  - Climate change, environment, homeland security, cybersecurity, cloud computing, healthcare, data protection and privacy, energy (smart grids), transportation, aging population.
  - Leverage mature R&D procurement programs of the U.S. to develop joint initiatives with emerging PCP and PPI programs at the European Commission, specifically in Horizon 2020 and member states.
  - Encourage exchange of information and best practices between EU and U.S. procuring bodies.
  - Create 'Technology Dialogues' between U.S.-EU public entities.
- Enable access to industry funding instruments from respective agencies on both sides of the Atlantic. They should extend their support for transatlantic PCP and PPI programs, thus encouraging public entities to become early adopters of innovation.

Overarching Innovation Chapter: Focus on framework conditions

- Transparent, science based regulatory regimes:

A balanced approach to risk management through a science based approach and careful balancing of the principles of precaution and proportion in relevant regulation is fundamental to advance the transatlantic innovation economy. Whereas precaution calls for the avoidance of risk, proportion allows the benefits of risk taking to be weighed against the possible consequences on the basis of the best available evidence. We support the notion of an 'Innovation Principle' in risk management and regulatory practice which provides that whenever precautionary legislation is under consideration the impact on innovation should also be taken into full account in the policy and legislative process.

- Procedures for the treatment of flows of controlled technology for collaborative, transatlantic research and development projects that recognize the particular needs for such exchanges:

As to export control aspects, there are regulations in place, such as the Wassenaar Arrangement and licensing policies which enable the required exchange of knowledge and goods as part of international research cooperation. In practice, however, these regulations are very detailed and complicated, and in some cases even ambiguous. Simplification of highly technical descriptions will improve accessibility and ease of understanding.