Clemson University Internationalization Task Force
Subcommittee Report
Global Partnerships and Initiatives: Agreements, Collaborations, and Partnerships

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SUMMARY

This report examines the nature of Clemson’s engagement with overseas entities and/or international entities in the U.S.A., compares these to current and emerging perspectives and practices in higher education, and suggests new foci, models and directions to enhance the outcomes of Clemson’s engagements and undertake more strategic Global Partnerships and Initiatives.

The internal review inventories and describes the following:
1. Memoranda of Understanding, Student Exchange agreements, and Activity Agreements held in the Office of Global Engagement;
2. Inventories of International Activities and Global Engagement for each College collected by the Internationalization Task Force,
3. Emerging initiatives within the colleges and OGE;
4. Strategic Plans of the university and the Office of Economic Development Strategic Plan; as well as,
5. Activities or units on campus that could be, but not yet are, used as assets in global engagement.

The data indicate that Clemson faculty have been engaging institutions abroad for specific purposes, often related to research collaboration or the desire to host research interns from abroad. Most of the MOUs and agreements on file were established for these types of links; however, few have been sustained beyond the initial activity and even fewer expanded/institutionalized to include additional activities and/or faculty or units on campus. In addition, the few centers, institutes and enterprise campuses with international foci are similarly narrow or limited in scope.

When put in context of the emerging models of Global Partnerships and Initiatives in Higher Education, Clemson’s model for global engagement is rather traditional, following the pattern of point-to-point relationships with a primary focus on student mobility. Clemson has to date not shown the same degree of innovation in partnerships as many of our peer or aspirant institutions.
Complex partnerships are a new paradigm of international engagement, which move the relationship from the realm of personal, almost private “one-on-one” relationships, into the domain of structured, shared, strategic partnerships, leveraging multiple, inter-connected relationships to build “ecosystem-to-ecosystem” relationships that encompass all aspects of the university mission: academic, research, social and economic impact (Appendix B contains a list of models of complex partnerships used at other institutions).

Clemson has the opportunity to build global networks and engage in activities with international partners that have broad impact across the university’s mission areas. Our recommendation is to broaden the institution’s concept of international partnerships, take emerging practices into consideration, and develop a plan for identifying potential partners and building complex global partnerships.

REVIEW FINDINGS
Clemson University has many assets, but few articulated strategies, for becoming a globally engaged institution. Among the external assets are the strong international economic presence in the State and the region, and the recognized quality of the institution. Internal assets include the stronger than average involvement of students and faculty in mobility programs, an internationally engaged faculty, internationally focused centers and programs, and enterprise campuses that entertain relationships with the local affiliates of international companies.

FINDINGS 1: Context for Global Partnerships and Initiatives in South Carolina

Clemson University’s social and business environment, in Upstate South Carolina, is very international. Data shows a 90% increase in the foreign-born population over the last 10 years, 15% of the State GDP tied to the export of goods and 22% of jobs tied to international trade. With the presence of over 500 foreign companies from 23 countries, international business is a major contributor to the economy of South Carolina. Despite the clear trends toward internationalization of the state’s industry and economy, neither South Carolina nor Clemson have taken specific steps to link the state’s strategy for internationalization to the mission of higher education. Other states, organizations and institutions have done so. The APLU has, for the first time this year, designated 16 “Innovation & Economic Prosperity Universities” to reflect the importance of this trend.

Land grant institutions by the nature of their mission are tasked with creating positive social and economic impact. At a time when business is global and the US is a market of choice for technology and consumer products companies throughout the world, the Land Grant University’s global engagement strategy can, and should, assist the State to engage efficiently throughout the world. The means for doing so would include the development a globally competent workforce, attracting entrepreneurs, FDI and jobs, the commercialization of research, entrepreneurship, business incubation and economic development strategies.
States Go Global, a recent report of the Rockefeller Institute for Government at SUNY (June 2014) describes a “Four pillar strategy” that a number of states have implemented to engage in higher education internationalization. The four pillars are the development and implementation of:

- An international higher education policy agenda;
- A strategic plan and set of goal/outcomes;
- International exchanges and study abroad;
- Collaborative and innovative research programs.

The State of South Carolina has not engaged in this endeavor and the State’s international policies do not currently align with its higher education institutions. The following examples illustrate this point:

- **“The South Carolina-Israel Collaboration”**
  Successive Governors of South Carolina have signed agreements with the State of Israel (1992, 2012) to cooperate around 6 areas: biomedical, advanced materials, sustainable systems, transportation, defense/security and insurance/health IT. Yet, at this stage, there are no agreements and no partnership activities between any South Carolina institution of higher education and institutions in Israel. In contrast, Connecticut, California, Maryland and their higher education institutions (UConn, Caltech, Stanford, University of Maryland) have signed partnership agreements with the State of Israel and Israeli universities, focusing on various areas of collaboration.

- **South Carolina-Canada Trade Links**
  Canada is a member of NAFTA, the top export market and first import market for South Carolina. Yet, Clemson University has no partnership with any Canadian University.

- **South Carolina Higher Education Committee**
  The 2009 report of SC HEC entitled “Leveraging Higher Education for a Stronger South Carolina” surprisingly does not include internationalization of higher education as one of the main themes, although it does include research and innovation, and preparing the workforce for economic development cluster needs as main foci in the report.

- **Sister State Agreements**
  The State of South Carolina has “Sister State Agreements” with three German Lander, One Australian State and Taiwan providing international students from those States with an international tuition waiver. However, Clemson University does not make any particular use of that policy. We have relationships with 19 German partner universities. Only one of them is located in one of the three Lander.
FINDINGS 2: Current State of Global Partnerships and Initiatives at Clemson

The Office of Global Engagement (OGE) currently has 177 international agreements on file. Additional agreements may be kept in the offices of research and economic development. Those on file in the OGE include:

- 112 Memoranda of Understanding (MOU) with 57 countries
- 32 Student Exchange agreements with 15 countries. These allow for the exchange of 116 students every year (70 outgoing Clemson students, 46 incoming students)
- 19 Activity agreements with 12 countries (i.e. articulation, dual degree, internship hosting, etc.
- 14 Study abroad agreements (the majority of Study Abroad operate without need for formal agreement of this type).

The most active of these are focused on student mobility through exchange, study abroad and articulation agreements/shared curricula. NONE of the agreements listed above support what would be considered a complex or strategic partnership.

Interestingly, the Clemson Engineers for Developing Countries student led projects in Cange, Haiti, may at the moment be the closest example of a complex initiative. It involves stakeholders in the non-profit and industry sectors, and engages in activities across a broad range of disciplines that have academic, social and economic impact.

FINDINGS 3: Emerging Complex Partnerships at Clemson or Models on the Drawing Board

The following new initiatives were identified that have the potential to expand the nature and impact of Clemson’s international initiatives. Some are projects driven by a specific college, others by the OGE. None are far enough along in development to count as ‘established’. These include:

1. **Fluid Campus** concept of the School of Architecture (SOA). The SOA currently houses programs in Charleston, Genoa and Barcelona. In 2012, they set an objective to add locations in Latin America and Asia, evolving into a “Fluid Campus” through which faculty, students, projects and ideas flow. To date, a potential location in China has been suggested, but no decisions have been made about the establishment of additional campuses.

2. **East Africa: Parks Management, Sustainability and Youth Development.** The College of Health and Human Development has for the past four years been cultivating a network of professionals (including many alumni of HEHD’s Ph.D. programs) and institutions engaged in work in park and wildlife management, environmental conservation, and youth development in four countries of East Africa. The former Dean is currently serving as a visiting professor at Massai Mara University in Kenya.
3. **Engineering in India. Amrita-VIT-IIT Ghandinagar.** The College of Engineering and Science is developing a strategy for a college footprint in India involving multiple institutions in India and a range of activities from student recruitment, collaborative research, study abroad/creative inquiry, that will have impact across the mission areas. The institutions are being chosen strategically and multiple departments are engaged in the development of the relationship. A recent site visit to Amrita University included four engineering programs (Civil, Mechanical, Industrial and BioE) and the vice provost for global engagement.

4. **Clemson Canada Center** has launched an initiative that engages students, faculty, researchers, and industry partners from 5 focus areas (i.e. Forestry, Clean Tech, Med Tech, Automotive and Optics & Photonics) in the exchange of ideas, research and services to support the entry of innovators into the Canadian and South Carolina markets. This initiative requires collaboration among faculty, the offices of Research and Economic Development, and the entrepreneurship and business incubation programs; and, should build, for each focus area, an ecosystem-to-ecosystem relationship, with multiple partners on both sides of the border collaborating to produce outcomes in teaching, research, outreach and economic impact.

Additional initiatives have been suggested based on existing assets and relationships. Initial conversations to explore the potential of these have been initiated by the Director of Global Partnerships and Initiatives as recently as December 2014.

1. **A Global Network of Centers of Excellence in Automotive Engineering.** Based on the education, research and economic development goals of the Millennium campus in Greenville, this project will attempt to draw a map of structured global relationships by engaging partners that can satisfy Clemson’s need for specialized automotive engineering talent. In this example, the “ecosystem” is not regionally focused but instead relying on a network of “centers of excellence in automotive engineering”, wherever they are in the world.

2. **Archbold Tropical Research and Education Center (ATREC),** a Clemson-owned property in Dominica used primarily by the College of Agriculture, Forestry and Life Sciences. To accomplish the goal of “studying the entire spectrum of ecological, economic and social factors that influence human relationships with tropical ecosystems” (ATREC charter), the potential exists to develop an overarching project on “sustainability in an island economy” that could include all six colleges and schools in a partnership with Dominica’s two year college and local government.

3. **Clemson Center for Chinese Studies.** This center, housed with the College of Business and Behavioral Sciences, has for a number of years worked to establish a set of relationships and activities within China or around the study of China. While relatively successful with academic programming, the Center has been limited by its
structural location within a single college. This has prevented the center from serving as an organizational node for activities in China, which our inventory of activities shows to be broadly spread across the colleges and enterprise campuses. A careful review is needed of these activities and the potential role of the center to ascertain the potential for a comprehensive strategy for engagement in China.

While still in development, these examples represent a departure from the traditional perspective of global partnerships as being location-based, focused on a single area of study and limited to one partner. Whether referring to a specific region, a specific network or a specific task force, the intent is to engage all parties that can bring expertise to create a cluster in one specific focus area, with the goal of impacting on teaching, research and the social and economic environments of the stakeholders.

FINDINGS 4: Perspectives Of Global Partnerships And Initiatives Within Higher Education

The state of global partnerships and initiatives at Clemson should be considered within the broader context of Higher Education, particularly the prevalent perspectives on global partnerships and international engagement, and the relevance of internationalization for land grant institutions.

Perspectives of Global Engagement

The following perspectives on global engagement are all found in US Higher Education today, with the first three being more prevalent than the fourth.

1. **Global Learning Perspective**, wherein global engagement is seen as a process of student learning and design of curricula to support such learning. Most of Clemson University’s current relationships emerge from this tradition. They have been established with a view of allowing our students to “learn from the world”, as is the case of all the study abroad programs that are predicated on the assumption that their academic content advances student learning by bringing knowledge that can only be available from a foreign source or putting students in an active learning environment that only an international setting can provide.

2. **Grand Challenges Perspective**, which focuses on what students, or faculty and research can “bring to the world”, or how they can solve global challenges. This approach has been rather widely adopted in international education where we see a shift in student engagement projects and curricula toward addressing the U.N. Millennial challenges or working within the Grand Challenge paradigm. In this regard, they relate to the first category in that the direct teaching, the experiential learning or the service learning they provide highlight the benefits of international exposure for US students. However, such an approach also has the potential for the integration across mission areas and across the curriculum.
A prime Clemson example of this perspective is the Clemson Engineers for Developing Countries project in Haiti. This Creative Inquiry project has grown to include students from over 30 disciplines in a multipronged development project in Haiti conducted in collaboration with industry partners, as well as, NGO’s in Haiti and the US, with broad social and economic impact in Haiti.

3. “World Class” University Perspective that underlines the need for academic institutions to “become globally competitive”, or “world class”. This perspective is concerned with benchmarking, rankings, and research productivity, pitting one institution against the others in a battle for status and market share. In this perspective, branding the University internationally becomes a goal of global engagement, one that can only be achieved with some institutional strategic intent.

4. Economic Development Perspective, which integrates global engagement’s potential impact upon the economic competitiveness of the University, the State, and other stakeholders. This perspective is an integral part of the Land Grant mission of Clemson University, where the emphasis has been placed on research and innovation, entrepreneurship, business incubation and economic impact.

At Clemson, where no university strategy for Global Engagement currently exists, elements of these four perspectives are used, albeit unevenly, as justification/argument for various initiatives. The first two perspectives, with their focus on student learning and the application/translation of research are fairly well understood and integrated. The third and fourth are somewhat less prevalent and much less understood. The desire to be globally competitive in Academe runs parallel to a desire to improve Clemson’s participation into economic development for the State. Interestingly enough, the two goals never seem to be correlated on campus. While the University clearly values the local partnerships it establishes with industry and government, when it comes to international relations, it systematically reduces its relationship to a partner university, with disregard to the local partnerships that this university entertains in its own ecosystem.

**DISCUSSION OF FINDINGS**

Existing global engagement activities at Clemson while relatively widespread, do NOT represent any complex, coordinated strategies. International activities have to date been motivated by narrowly defined objectives and the outcomes or impact of these have been limited. This type of global engagement does not meet the potential of a University of Clemson’s standing and resources. Clemson has the opportunity to develop a portfolio of global partnerships and initiatives that would have impact across all the mission areas from teaching to research, from outreach to economic development.

**Assets**
1. The land grant mission, with its focus on extension, application and translation of research for social and economic impact.
2. A high level of direct foreign investment and international industrial presence in the state and the State’s commitment to furthering such investment, and the established partnerships between the State and Clemson University Office of Economic Development in this regard.
3. A robust infrastructure and network for collaboration with the State toward its economic development goals. This includes assets in the Colleges, as well as the offices of Research and Economic Development.
4. A motivated, entrepreneurial, research-oriented faculty with recognized research expertise and facilities, established scholarly reputations and research networks that can be leveraged in the development of complex global partnerships.
5. Research foci with high potential for international collaboration. The focus areas identified in the 2020 Road Map are all of relevance to Global Challenges and to international and state economic development.
6. A designated Director of Global Partnerships and Initiatives in the Office of Global Engagement with experience developing complex partnerships.

Challenges

1. Lack of articulated strategy for internationalization linked to university strategic goals.
2. Campus Understanding/Expectation of Global Partnerships. Most stakeholders hold a relatively narrow understanding and definition of “global engagement” that rarely extends beyond student mobility. There is a widespread lack of awareness of the potential outcomes of an intentional, coordinated strategy for global partnerships.
3. Culture of the State, region and institution. South Carolina, despite the high level of direct foreign investment, is still a relatively homogenous state with a similarly inward focused culture. Clemson’s institutional culture and rhetoric has continued to focus on its land grant mission and strong commitment to the students and economy of the state, with very limited recognition of global engagement as a contribution to that endeavor.
4. Lack of institutional recognition for international activities. Little is done to incentivize or recognize faculty or administrators for the accomplishment of activities in this area. Their career path does not value their international experience, efforts or achievements. Some faculty members even mention their participation to international programs as a negative factor in the progress toward tenure and promotion.
5. Structural or organizational barriers. Administrative distances and varied reporting lines seriously hampers collaboration across colleges or the administrative units, (research, economic development, PSA, and OGE).
6. Administrative obstacles to international research activities. Faculty encounter obstacles to travel for both themselves, students and visitors they would like to host; unclear procedures for managing grants in support of international activities;
7. Limited financial and human resources to support of global partnerships. Financial constraints are an objective limitation to the expansion of international programs. While some limited seed funding is available for international study abroad program development, that resource is scarce, and hardly adequate to support a voluntary policy of expansion for international programs. The major source of funding for international programs is derived from fees paid by students to the Study Abroad office or the International Student Office. This model entails that the effort to build partnerships has no adequate source of funding, other than the general budget allowed to OGE.

RECOMMENDATIONS

1. INTEGRATE GLOBAL ENGAGEMENT INTO THE UNIVERSITY STRATEGIC PLAN:
Global engagement should be a visible part of the strategic plan and the plan should take a broadened view of global engagement that recognizes the potential of global partnerships to contribute to the full spectrum of the university mission from student learning, research, public service and economic development; and, to serve the collective and specific goals of each college.

2. DEVELOP AN INSTITUTIONAL APPROACH TO GLOBAL PARTNERSHIPS AND INITIATIVES:
The University’s approach to partnerships should be one that serves the collective strategies of the colleges and the University, promotes synergies, shares best practices, leverages more powerful outcomes. This approach should recognize the potential and importance of:
   • Global networks as a means to advance student mobility, research and innovation, as well as social and economic impact.
   • Cross-disciplinary projects, as a means to promote a campus culture that builds interdisciplinary synergies and global perspectives.

3. ESTABLISH A BODY TO PROVIDE LEADERSHIP AND GUIDANCE IN THE DEVELOPMENT OF GLOBAL PARTNERSHIPS AND INITIATIVES. This body should include leaders of internationalization within the colleges as well as administrators supporting the development of partnerships and overseas activities, linking the university’s activities with those of the state, and should have discretionary authority to set priorities and distribute resources.

4. INTEGRATE ECONOMIC DEVELOPMENT AND COMPETITIVENESS INTO THE UNIVERSITY’S INTERNATIONALIZATION
Economic development is the one mission area that has to date been virtually absent from the objectives and foci of international activities and where significant potential is being missed. The assets mentioned earlier, make partnerships possible, whose aim would be to engage global partners into activities (teaching, research, business) that leverage opportunities in the area of economic development. The privileged approach for economic impact from global partnerships out to focus on talent, research and innovation, commodities that universities are prone to create, attract and retain, and the development
of startup activity creating economic impact rather than the “classic economic development” practiced by State agencies. Their model focuses on heavy foreign investments, large, employment based, low wages, manufacturing activities while the university’s global engagement model ought to focus on small investment, research-intensive companies with high paying jobs and a high multiplying effect.

5. FUND, INCENTIVIZE, AND RECOGNIZE

The funding of global activities is a major hurdle to expand current activities. In addition to internal investment in global partnerships, alternative tracks should be explored to bring private financial support to these activities, such as International Alumni networks, corporate research funding, joint international grants or EB5 Investment Treaty visas. In addition, mechanisms should be established to encourage faculty, departments and units to engage globally.

References:

- Innovation index used by EDA “Innovation in American Regions” website.
- June 2012 report from the “Partnership for a New American economy”
- “Assessment models for Engagement of Higher Education Institutions in Economic Development”, a report commissioned by the University Economic Development Association (UEDA), August 2010
- “Reimagining Citizenship for the 21st Century, Partnership for 21st century skills
• “States Go Global”: State Government Engagement in Higher Education Internationalization” (The Nelson Rockefeller Institute of Government Report, SUNY, June 2014)
APPENDIX A: INTERNATIONAL INSTITUTES & CENTERS AND ENTERPRISE CAMPUSES AT CLEMSON UNIVERSITY

Clemson campuses abroad:

- Archbold Tropical Research and Education Center, La Dominica
- Daniel Center for Building Research and Urban Studies in Genoa, Italy
- Clemson Architecture Center in Barcelona, Spain

Clemson international institutes
- Center for China Studies, Clemson, SC
- Clemson Canada Center, Clemson, SC

ENTERPRISE CAMPUSES

- CU-ICAR: Clemson University International Center for Automotive Research, in Greenville, SC. A 250 acres automotive and motorsports “technopolis” named 2009’s emerging technology park of the year. Building a business incubation facility. 203 students, including 160 international students (79%). Partnerships with foreign industry companies. Looking for relationships with Chinese and Mexican partners.

- CUICAT: Clemson University Innovation Campus and Technology Park (Advanced Materials and Fiber Optics), in Anderson County, SC. With state-of-the-art equipment including one of the nation’s most advanced electron microscope facilities and a high-performance computing infrastructure, currently ranked among the top five at academic institutions nationally. On site business incubation facility run by SCRA Applied Technologies.

- CURI: Clemson University Restoration Institute (Sustainable Environment and Energy) in Charleston, SC. Houses a unique wind turbine drivetrain testing facility – funded by a $45 million US Department of Energy grant – that could make South Carolina the hub of the wind energy industry. Looking for relationships with Canadian partners.

- CCHG: Clemson University Center for Human Genetics at Greenwood Genetic Center (Biotechnology and Biomedical Sciences), Greenville, SC. Business incubation program attached to it (CUBEmc: Clemson University Bio-Engineering Innovation Campus).

- CCIT: Clemson Computing and Information Technology (Information and Communication Technology)
APPENDIX B: EMERGING MODELS COMPLEX GLOBAL PARTNERSHIPS & INITIATIVES AT PEER INSTITUTIONS

Below are some examples of institutions that have launched complex global relationships. While the models differ, they all have in attempt to associate Global Engagement and Economic Development outcomes.

PURDUE UNIVERSITY: The PU-SEED Program

Purdue University made economic development an integral part of their research and globalization strategies, as illustrated by the 2008 white paper entitled “Purdue University and Economic Development: Defining the 21st century Land Grant University”.

The PU-SEED program (Purdue University Strategic Entrepreneurship and Economic Development) defined a next generation model for university-driven economic development. Today, Purdue has the largest University business incubator program in the US. One of the first University incubation programs to be designated as a “Soft Landing incubator” by the NBIA.

One of the rare universities to merge global engagement and economic development, the Office of Corporate and Global Partnerships is the point of contact for Purdue University’s global partnerships with academic partners, governmental agencies and NGOs, global businesses and corporations.

CORNELL UNIVERSITY: Cornell-NYC Tech

With Global Cornell, Cornell University has an established track record of global engagement, with initiatives such as the Cornell Global Forum for the environment, the Cornell Global Health Institute, the Cornell International Institute for Food, Agriculture and Development or the Cornell Global Labor Institute, or its participation into the Education City project in Doha. President David Skorton’s white paper, "Bringing Cornell to the World and the World to Cornell", started a process of internationalization that promises to make Cornell a top 10 global university. But the most innovative foray into global engagement is probably the new Cornell – NYC Tech, an international merger with Technion University, a partner from the Startup Nation to create a facility focused on technology and entrepreneurship, in a public private partnership with the city of New York.

GEORGIA INSTITUTE OF TECHNOLOGY: The Global Reach Program

With its Global Reach strategy, Georgia Tech has established global campuses in France (Georgia Tech-Lorraine), Ireland (Georgia Tech Research Institute), Singapore and Costa Rica (Georgia Tech Trade, Innovation & Productivity Center).
Started over 20 years ago with graduate and undergraduate dual degree programs, Georgia Tech-Lorraine recently evolved into a multitude of outcomes in academic, research and economic development, including the creation of a joint research laboratory with the French National Center for Scientific research (CNRS) in the area of secured communications network, nanomaterials, computer science and robotics. The laboratory was then mirrored in Atlanta and the next step was a business incubation program, under the name of the La Fayette Institute, to spin off joint research in the area of optoelectronics.

The partnership also spurred the signature of a “Soft landing” agreement between the international airport areas of Atlanta and Roissy in Paris, to facilitate the attraction of foreign companies on both territories.

**Virginia Tech: KnowlegeWorks Global Partnership**

With its Polytechnic focus on STEM, applied research, entrepreneurship and economic development, it is not surprising to see Virginia Tech put together a “Knowledge Works Global Partnership” program, which encourages creative entrepreneurship worldwide.

Virginia Tech established a network of 12 international partners from Mexico, Canada, Malaysia, Australia, Chile, Ecuador, Egypt, Italy, Belgium, Austria, England and France.

This Global Partnership is an ongoing, cooperative association of regions building permanent social and academic relationships with each other, for mutual long-term advantage. Members of the partnership gather each year in Virginia during a weeklong Global Partnership event hosted by Virginia Tech Corporate Research Center and regional business partners. The event has three tracks:

a) **A Student Track**: students and faculty from this global network compete in a Global Student Business Concept Challenge, pitching their business idea for a $25,000 prize; The idea is somewhat similar to the MIT TR 35 (35 innovators under 35)

b) **A University Track**: Virginia Tech hosts a global university-to-University relationship roundtable, focused on building cooperative networks, exchanging best practices, with a particular focus on fostering commercialization of innovative technologies;

c) **A Corporate Track**: A regional trade roundtable, offering business-to-business networking, strategic alliance meetings and local networking for visiting companies.

**MIT: The MISTI Program (MIT International Science and Technology Initiatives)**

The MISTI program connects MIT students and faculty with research and innovation in 19 “strategic countries” around the world through partnerships with 450 international partners, allowing for an internship or research project in a science and technology area. Industry workshops and study abroad in STEM fields build global connections in industry for students and faculty, building capacity for future economic impact.

The MIT also runs the MIT TR35 competition, through the MIT Technology Review. Participating in the global talent hunt by identifying the top 35 people worldwide under 35 years of age that make a difference in categories listed as: Inventors, Entrepreneurs, Visionaries, Humanitarians and Pioneers. A worldwide network of technologists identifies the best talent in several regions worldwide.
Examples of Strategic Alliances among Institutions

Within higher education globally universities are forming networks of similarly focused institutions to establish strategic alliances. For example, national networks such as the Polytech group of engineering schools in France bring together 15 schools and 17,000 engineering students, sharing the same international programs. Internationally, Nanyang University created the Global Alliance of Technological Universities, bringing together 9 of the best institutions worldwide. The Technical University of Denmark (DTU) created the network of The Nordic Five Tech, sharing programs in wind energy, while 4 Baltic States Universities specialized in Forestry, Veterinary and Agricultural science formed the BOVA network.
APPENDIX C: CHALLENGES THAT GLOBAL ENGAGEMENT STRATEGIES NEED TO ADDRESS

FOCUS ON NEW TERRITORIES: When it comes to international relations, we are still governed, to a large extent, by the ancient paradigm of countries. In today’s world, cities and regions, not countries, are the relevant actors of international relations, as well as of economic development. They are the places where talent, research patents and venture capital aggregate, creating hubs for innovation. They are the administration level where independent policies, strategies and collaborations are established. A true global strategy today would have to recognize this and adjust its collaboration model.

FOCUS ON A GLOBAL STRATEGY: The great majority of our collaborations with any given country suffer from a lack of intentionality. Very few, if any, of these one-on-one relationships produce any significant outcomes in terms of economic development. They are mostly limited to teaching and student learning, in some cases joint research. Together, all of these “point-to-point” interactions do not add up to form a coherent policy aiming at clearly identified goals.

FOCUS ON NEW COLLABORATION MODELS: If we want to focus on relationships producing economic outcomes, we may want to move towards other models that recognize that our partner institutions entertain the same regional collaborations and network connections (in research, business networks, local government, economic development, etc.) that we are entertaining within our own region and State. If we understand the value of creating regional hubs of collaboration with our local industry and economic development to create an ecosystem around a focus area (ex: CU-ICAR and the Millennium Campus), then we shouldn’t be content with establishing a simple relationship within the confines of a department or a campus, with the unique goal of exchanging students for a semester. We need to engage in more complex relationships, that establish and coordinate a dialogue from one ecosystem to another ecosystem in those focus areas.

FOCUS ON THE KNOWLEDGE ECONOMY: In today’s Knowledge Economy, some of the parameters that matter include undergraduate excellence, graduate research, commercialization of innovation, entrepreneurship, and business incubation. These should be at the forefront of our global partnership strategy.

FOCUS ON THE CHANGING NATURE OF RELATIONSHIPS: While competition is still very present among universities, the world today thrives on collaboration, not isolation, and it should be a goal of this institution to join powerful research networks in some of its focus areas to further grow its potential.

Today, the world is no longer “flat” to use Thomas Friedman’s analogy, or even “spiky” to use Richard Florida’s. It is both, as the “spikes” are connecting between one another, establishing a new “plateau”, on a different, higher level. That is where you want to be. This in turn will help with benchmarking, with becoming world-class or acquiring worldwide recognition and branding.

FOCUS ON THE CHANGING NATURE OF COMMUNICATION: “Social media shapes today’s participation of youth in politics, social Issues and causes” (Partnership for 21st century skills) In the span of a few decades, the world has gone from ascending relations within a
closed space (trans generational, chain of authority) to “horizontal” relations (age peers, social tribes) across the globe. The Millennials have more affinity between themselves across the globe than with their Baby Boomer co-workers within a traditional company.

They also have – and need to have for the 21st century – digital skills. What format of global engagement are we offering that makes any use of those skills? Are our current partnerships taking advantage of those skills in establishing and maintaining a global presence for our students or our University?
THE OPPORTUNITY: A NEW MODEL OF GLOBAL ENGAGEMENT

The Clemson Canada Center offers an opportunity to align several ongoing but otherwise unrelated projects on campus, around the strategic goals of the University and the State. With this type of project, a new model of partnership emerges, that can take the form of a “region-to-region” partnership to support long-term exchanges, providing a framework of reference and financial support.

The Clemson Canada Center is in a position maximize relationships with Canada and use these relationships to further opportunities for innovative course content, collaborative research, outreach and local partnerships, and to provide a model for global engagement of potential utility for other Clemson initiatives.

The project supports a simple strategy: departing from the classic model of “point-to-point” interactions in favor of a broader relationship with a larger pool of interconnected partners leading to an “ecosystem-to-ecosystem” interaction. This requires multiple agreements with complementary partner entities (i.e. academic institutions, research organizations, business entities).

THE ACADEMIC ASSETS: FORESTRY, MEDICAL TECHNOLOGY AND CLEAN TECH/ENERGY

Among the many areas of research and academic life, and associated international projects at Clemson, three stand out as strategically relevant to Clemson’s and the State’s relationship with Canada. These are: Forestry, Med Tech and Clean Tech. We will call these three foci “verticals” as they each intersect the three levels of teaching, research and economic activity.

These three verticals provide promising foci for the Canada Center as all three:

- Account for a sizeable portion of South Carolina’s economy,
• Represent areas in which Clemson has developed significant assets in teaching and research able to support the expected growth of these industry clusters in South Carolina; and,
• Represent a significant part of the Canadian economy, where they are supported by vibrant research and powerful business networks.

**Vertical 1: Forestry and Wood Products**

With an economic impact of $17 billion a year, and a 20% increase of exports in the last 5 years, forestry is a growing industry in South Carolina. It ranks #1 among the State’s manufacturing industries in jobs and payroll. Canada is the second largest importer of South Carolina forest products and several Canadian companies have set up operations in South Carolina.

At Clemson, the **WU+D Institute**, led by Dr. Pat Layton, sees an opportunity to assist these companies and the State industry cluster by becoming a “point of entry” into South Carolina for foreign wood related products companies. The WU+D Institute is a cross disciplinary platform that promotes teaching, research, and industry support in several critical areas, including advocacy for CLT, an innovative wood product for construction. The Sonoco Institute of Packaging Design and Graphics is likely to be involved in the relationship, as part of the value chain of wood paper products.

**Vertical 2: Med Tech and Life Sciences**

The SC medical device cluster represents over 800 companies, supporting 46,000 direct and indirect jobs in South Carolina. Canada’s export of medical devices to the US represents $1.2 billion while US exports of medical devices to Canada represent $3.6 billion.

Clemson **Bio-engineering Department**, led by Dr. Martine LaBerge, a Quebec native, is actively engaged in supporting innovation in the South Carolina medical device industry, particularly through **CUBElnc and SCMedTransTech**, innovative partnerships of academic, research and business organizations throughout the State as well as private industry partners. Dr. LaBerge and her colleagues are also interested in using these assets to create a “point of entry” into SC for foreign companies in the medical device industry.

**Vertical 3: Clean Tech and Clean Energy**

Dr. Rajendra Singh, from Clemson’s College of Engineering and Science, is a (Canadian trained) expert in clean energy, with a focus on smart grids, micro and nano grids. Dr. Singh is currently working with two Canadian companies on photovoltaic projects.

With his colleague, Dr. Kumar Venayagamoorthy, they are working on a collaborative project with Georgia Tech and UNC Chapel Hill and private businesses to develop a joint research group (RISE) on the future of smart grids.
With the Clean Technology Corridor, between Ottawa and Montreal, Canada is a valuable potential research and industrial partner for Clemson University.

VALUE ADDED: CREATIVITY, INNOVATION, AND ECONOMIC IMPACT

Each one of these “verticals” offers an opportunity to develop “transversally” (shared models, best practices):

Creativity in student education:
Projected learning outcomes through creative inquiry projects, innovative academic contents, joint academic programs, experiential learning opportunities, internships, entrepreneurship, job opportunities and more.

Innovation and research:
Projected outcomes in research collaboration opportunities, international grant opportunities, high tech innovation in targeted areas, identification of local and global talent (e.g. students, researchers, innovators).

Economic impact and growth:
Projected outcomes in industry partnerships, advocacy, executive education, strengthening of industry clusters, start-up creation, business attraction and job creation.

INNOVATIVE TOOLBOX: INNOVATION EXCHANGE, ECONOMIC INTELLIGENCE AND SOFT LANDING ZONE

To successfully develop this program, the Clemson Canada Center will use three tools, which offer a framework for the development of initiatives in the three areas of education, research and economic impact. These tools provide an opportunity to involve other areas of the University (i.e. College of Business and Behavioral Science through entrepreneurship, business incubators, REDC or the MBA program, and the Offices of Economic Development and Research) and off-campus partners (industry organizations, businesses, chambers of commerce, etc.) building stronger synergies and partnerships on and off campus.

Innovation Exchange
A series of regular online videoconferences and some face-to-face events designed to bring together the stakeholders, including students, faculty, researchers, entrepreneurs and innovators to brainstorm and share ideas for collaboration, identify opportunities and obstacles, and ultimately develop strategies for innovation and action.

Economic Intelligence
A tool designed to assist partner companies with the production of business related information, identifying industry niches, regulatory changes, market opportunities and
market research. Economic intelligence from all relevant locales – Canada and South Carolina, will help define mutually beneficial collaborations. Potential partners may need to be engaged, on and off campus (College of Business and Behavioral Science, Office of Economic development, local industry organizations, etc.), to make this tool effective.

**Soft Landing Zone**

Programs and services to assist foreign companies in their entry and relocation to SC. It may include incubation space, but more likely programs and services, and/or corporate sponsored research. Like Economic Intelligence, this would be a multi-sited service, to provide the same kind of “foreign market assistance” to US companies interested in the Canadian market.

**IMPLEMENTATION PLAN**

The Consulate General of Canada in Atlanta has been consulted on the project and is bringing its full support. Beyond symbolic seed funding of $10,000 that it will request from Ottawa for the launch of this program, and the regular funds that it can use to support the rental of incubator space for Canadian companies, the Consulate has access to large networks of innovators, in these and other areas (preliminary talks indicate a strong interest for CU-ICAR’s future incubator, and the inclusion of both an “automotive vertical” and an “Optics and Photonics vertical” in the future) and it is committed to facilitating exchanges with provincial and federal governments.

A visit by the Canadian Trade Commissioner in charge of Science & Technology Partnerships, Ms. Vanessa Podgurny, took place on October 17, 2014, during which the foundation of the project were discussed and a first event planned for January 2015.

This first event will focus on Forestry, with the WU+D Institute leading the charge and it will bring together experts in non-residential wood products and bio-products (such as cellulosic nanomaterials) from Clemson and FP Innovations (Quebec) and 6 to 8 Canadian and South Carolina SMEs, for a one-day technology-pitch session and business to innovator matchmaking.

From this first event, it is expected that areas of interest for the industry and a matching roadmap for future research collaborations will emerge. The areas most likely to come up include: nanocellulosic materials, solid wood construction (Cross Laminated Timber, CLT), bonding materials (glue, resins), biochemical waste products and non-pellet-based bio-energy. The dialogue with the industry participants will determine which priorities are set for the near future.

The new Canadian Consul General in Atlanta, Ms. Louise Blais will be attending. Her assignment started on September 15, 2014 and she is most likely to be in her position for the next four years, which sets a solid timeframe for this project. She will be presenting during the event, addressing the issues of the Canadian forestry industry, the focus of a recent national investment plan to spur innovation in this industry. She will also articulate her expectations for this collaboration with Clemson.
After the event, a timeline will be determined that incorporates the teaching (videoconference exchanges, experiential learning opportunities, internships, scholarships opportunities, creative inquiry projects), research (including joint research opportunities, identifying funding opportunities from the national Canadian plan) and business (innovators and entrepreneurs meeting Canadian businesses, capital investors, business relocation projects).

The other verticals will develop a similar approach, each one learning from the next, gradually building content within each vertical, supported by a common operational framework.

As the project develops, it is expected that on campus synergies (CBBS, RDIC, Office of research, Office of Economic Development, Business incubation program, etc.) and off campus alliances (industry, SC Upstate Alliance, Chambers of Commerce) will develop to facilitate anticipated economic outcomes.

The following diagram illustrates the global engagement model proposed for the Clemson Canada Center