

THE PENNSYLVANIA STATE UNIVERSITY
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SCHOOL OF ENGINEERING DESIGN, TECHNOLOGY, AND PROFESSIONAL
PROGRAMS

THE UNIVERSITY AS AN EPICENTER OF SOCIAL INNOVATION:
DEFINING ROLES AND PATHWAYS

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ABSTRACT

The traditional role of the university is to prepare students to fulfill the needs of the current society. American land-grant and public universities have a duty to better these societies through open collaborations with local and international. The 1996 Kellogg Commission's report *Returning to Our Roots* reiterates the need for land-grant and public universities to sustainably realize this mission while simultaneously responding to the effects of globalization. Through collaborative efforts, universities and their partners develop ventures to promote social innovation and increase their levels of engagement, both locally and internationally, in order to improve the human condition. My research identifies and articulates seven comprehensive roles the university can play in order to realize this change. These roles are synthesized from previous literature articulating the definitions of social engagement, and are followed by real-world examples of application. The roles are then compared using a number of criteria, including overall level of engagement, the nature of resources utilized, and the level of impact. The typology created from this work provides the university with direct practical insights as to how they can reorganize their tripartite mission to one of learning, research, and engagement, thereby becoming the epicenter of social innovation. This research and role adoption can also be applied to other entities/industries that are working towards improving the lives of those in developing communities.

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Introduction

Entering the modern age of globalization brings forth opportunities and challenges to be faced by all sectors of society. The way in which our society adapts to a world filled with growing economies, new technologies, and an increasing population will define the generations of today and tomorrow. With these new variables, the human condition around the world is in a state of flux; those living in resource constrained countries struggle to navigate this newly interdependent environment. Today's society finds itself at a crossroad; through the United Nation's Millennium Development Goals, nations have pledged their efforts in supporting global poverty reductions (United Nations, 2000), instituted laws to cut down on corruption, and have begun the challenging process of working together to enact sustainable development. One element however, is essential on this path towards a brave new world: the university.

The university holds the key to implementing successful ventures aimed at improving the human condition thanks to its ability to adapt quickly, fill necessary roles, and most importantly, its capacity to leverage a large base of people. The engagement of its student body is the prominent feature that underlines its success and, as a student at Penn State University, I offer a first-hand perspective as to what it truly means to be engaged. My definition of engagement starts with me. In my undergraduate career I have worked on local political campaigns, given over three hundred hours of volunteer time, organized a community-campus environmental celebration, studied abroad in Germany, held two internships and two jobs, worked on an organic farm in Costa Rica, and led a development venture in Kenya. Although my rigorous academic path has been one I have strongly fought for, I owe credit for my success in part to the university that as afforded me these wonderful opportunities. In each of my experiences, Penn State has adopted a much different role in order to allow me to pursue these opportunities. In an increasingly

interconnected world, as various sectors begin to converge, it is increasingly important to identify the various roles a university can play, much like Penn State, to effect socio-economic development locally regionally, and globally.

Major Trends

The traditional role of the university is to prepare students to fulfill the needs of the current society. American land-grant and public universities have a duty to better these societies through open collaborations with local and international communities. There are two distinct trends that are redefining the modern university and reaffirming its principles of community engagement: globalization and the advent of the knowledge economy.

Globalization has the potential to bring science and knowledge together for communities and people in all corners of the world (Altbach, 1996). In recent decades, the shrinking of the world due to technological advances has created an environment for better collaboration with greater efficiency. No longer are professors and students at universities gearing their findings solely towards local communities, but the addition of international perspectives and opportunities have allowed universities to bridge the gap even further, producing research and innovative work that far exceed any other form of collaboration. Universities have begun experimenting with their structure in order to adapt more quickly to the era of globalization; the fast-paced nature of exchanging knowledge, particularly in recent years with the popularity of social media, creates a chain reaction that reverberates in the classrooms of universities around the world. Students of higher education can be the epitome of world citizens, and their push for innovation compels the university to move further ahead.

The advent of the knowledge economy has also redefined the scope of the university. In a sense, education has become a commodity and today forms the base of our economies, due in large part to the new globalized nature in which it spreads. Knowledge is the engine behind economic development. The entity that controls access to knowledge, and its subsequent dissemination throughout the ranks of society, ultimately holds the power for greater innovation and development throughout the world. The university, therefore, epitomizes this process. We attribute the onset of the knowledge economy to the advent of technological innovation stemming from the 1950s. The scientific method opened up all forms of research to greater transparency; scientific innovation led to technology that now dominates the economy. This means that key sectors of our society have an enormous reliance on the institutions that create the goods and services defining our consumer generation. Changes in knowledge are now a fundamental aspect of economic growth. Innovation and entrepreneurship both stem from the knowledge gained and nurtured at the university level. One method of quantifying the knowledge economy's connection to the university is through the increase in university approved patents in recent years, nearly eightfold in the period between 1976 and 1998 (Powell & Snellman, 2004). This growth was catalyzed by the Bayh-Dole Act of 1980 that granted universities the ability to take ownership of inventions that were sponsored by government funds (Mowery, Nelson, Sampat & Ziedonis, 2001). In order to generate positive economic growth and social development, it is clear that an overlap between university knowledge and industry must exist (Leydesdorff, 2012).

These patents demonstrate the versatile capabilities of universities around the world and the need for these institutions to be at the forefront of social innovation. Land-grant institutions were founded upon the ideals of stewardship for their communities, a tripartite mission of teaching, research, and outreach which composed the first notions of social innovation in the 1860s. Their mission statements today are scattered with phrases such as “tackle some of the world's toughest problems”, “service with pride and focus on the future”, and “extension for the

benefit of the citizens". These universities continue to push their students to participate in academic engagement and in order to do so, must play the necessary roles for lasting success.

Social Innovation and Social Entrepreneurship

It is important to define and then articulate the relationship between social innovation and social entrepreneurship as it relates to the university. These "buzzwords" are synonymous with the advent of the engaged university, to be discussed later, and the trends of a quickly globalizing world. Social innovation, as defined by Oxford University's Skoll Center for Social Entrepreneurship (Mulgan, 2013), is simply new ideas that work, ideas that create sustainable solutions. Furthermore, they articulate that, "innovative activities and services are motivated by the goal of meeting a social need and that are predominantly developed and diffused through organizations whose primary purposes are social" (pg. 8). Many different fields fall under this generalized description, the inclusion of "social needs" reiterates the notion that whatever the activity or solution, it is solving a problem faced by modern society. One example of this is Grameen Bank, a bank for the poor. The innovative design behind this venture was to create a credit delivery system to provide banking services targeted at the rural poor (History, 1998). By offering microcredit loans, Grameen Bank has helped thousands out of poverty. Grameen Bank also serves as an example of a social entrepreneurship. Dees, Haas, and Haas (1998) define social entrepreneurship as a field that has been around for years but is only now being identified as such. A social entrepreneur "plays the role of the change agents by adopting missions to create and sustain social value, pursuing new opportunities to serve that mission, and engaging in a process of continuous innovation" (pg. 4). Essentially, they seek out ways to innovate. Professor Muhammad Yunus exemplified this definition as he identified a common problem facing many in poor areas of India, their lack of access to financial loans. He was the driving force behind the

research into potential credit options and the eventual creation of the Grameen Bank. For his work he received a Nobel Peace Prize in 2006. (History, 1998) The connection between social innovation and social entrepreneurship is evident in this example. In regards to the university, its faculty, staff, and students act as the entrepreneurs seeking out new projects that can create innovative solutions to society's needs.

Goals of this Thesis

This thesis will address seven comprehensive roles a university must adopt in order to exemplify its mission of community outreach, but to also adapt and effect change in a modernizing world through social entrepreneurial ventures and innovation. It is the goal of this thesis to first stress the importance for universities to transform into versatile fractals, in other words leveraging all entities within the university, including students, faculty, and staff in order to support a wide array of ventures, and second to understand the roles it can play to effectively do so. The university will then be an entity of highly-engaged individuals, adding enormous wealth and knowledge to the realm of social innovation. I will begin with a brief history of the modern university and transition into the reasons *why* the university should work on social innovation projects. From there I offer definitions and examples for the seven unique roles, and will conclude with cross-comparisons and overall analysis. The examples contained within this document relate exclusively to the university; however, it is important to note that each of these roles can be considered relevant to all sectors (i.e. non-profit, for-profit, NGO, or government) that have chosen to strive for international development.

Chapter 1

A Brief History of the Modern University

The establishment of institutes of higher education throughout history has provided scholars the opportunity to expand human knowledge in a vast range of subjects. As Altbach (2007) points out, it has consistently been the role of the university to teach students about the essential roles society needed at the time. Originally, in the formal societies of the wealthy European elite, universities were created for three distinct purposes: seminaries for priesthood, agricultural schools for farming, and instruction of the classics for re-teaching. Throughout the centuries, students who sought a form of higher learning had the intention of bettering their communities and those around them. In addition, professors held positions of respect in society and culture. They were seen as modern advocates, intellectuals, and advisors regarding much of the day's politics, challenges, and needs.

The classics, as mentioned above, were a prime subject of learning in the older universities; these Enlightenment ideals reemerged and as Altbach argues became the base for the nationalist resurgence throughout much of Europe. Once nations were firmly established, Germany became the first country to begin introducing research and scientific studies into its curriculum under the reforms of Wilhelm von Humboldt at the University of Berlin in 1810. These developments in scientific knowledge and research led to the further advancement of their societies.

Shortly after, American colleges and universities followed suit, adding secondary science components to their teachings of English, rhetoric, and the classics. First vetoed by President Buchanan in 1859, the Morrill Land-Grant Acts were signed into law by President Lincoln in 1862 shortly after a number of states succeeded from the Union. This law allocated public land to each state based on their individual number of Congressmen at the time. Thirty thousand acres

were given to each Senator and Representative, and the proceeds from selling this acreage was then put towards the creation of public universities dedicated to the teaching of agriculture and engineering, the “mechanic arts” as it was referred to at the time (Nevins, 1962). This wave of support for such an endeavor was over twenty years in the making; scholars during this time noted that during their undergraduate careers at institutions such as Harvard and Columbia, there was a clear change in their education from reserved to modern applications of knowledge. As Nevins iterates, this new push for science came from a desire to “put nature and things, meaning applied science and the land, into the forefront of the university scheme, thus effecting a revolution.”

The Morrill Land-Grant Act of 1862 was a champion of the age. As seen in Figure 1, the goals of the newly formed land-grant universities included a tripartite mission of education, research, and outreach. Not only was the act backed by a desire to increase scientific knowledge, but it was committed to providing education to a vast number of people for the betterment of society. Altbach considers this development in higher education to be a catalyst; the university now acted as a key function of change within society.

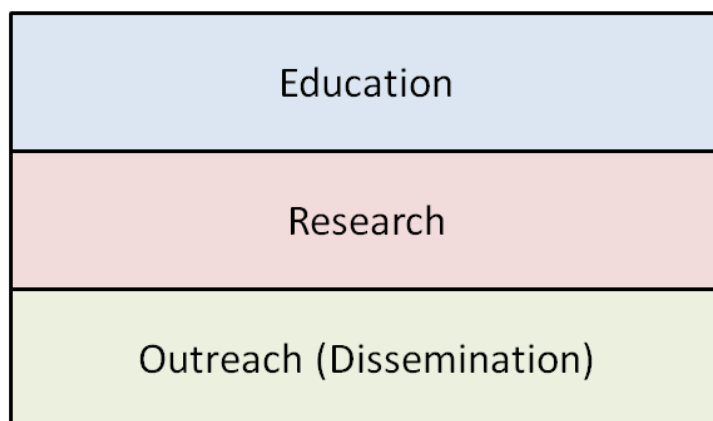


Figure 1: Traditional Tripartite Mission of Universities

Universities and the notion of science have become synonymous in the century and a half since the passing of the Morrill Land-Grant Act. However, even this aspect of the university has evolved with time. It was not until 1907 that an American university used the specific phrase “research” in its curriculum, and since that time it has flourished and evolved to fit the needs of society. In today’s fast paced world of technological engagement, Ernest Boyer (1996) argues that research and scholarship have now become too closely related, a critique of a relationship that has been solidified in our culture over the past century. He argues that scholarship has become too rigid of a process, focusing on the critical functions of the university and not allowing room for innovation and student expression outside the limits of the classroom. Boyer’s ideas have formed the basis for the development of academic engagement over the past twenty years and have pushed past the perceived notion of “teaching versus research” to define a university based on four aspects of scholarship. His third principle, the Scholarship of Application, is one of the premiere references for academic engagement and has set a framework for universities to build upon his model and to begin asking questions such as, “How can my knowledge be applied to problems facing today’s society?” His revolutionary question and the ultimate aim of his work predicted two decades ago is now slowly emerging in society today: the evolution of the university to be ever more engaged in social innovation and engagement around the world.

As Figure 2 illustrates, the reimagined organization of the university now falls under three categories: education and research remain, but in place of outreach is a more definitive notion of engagement. Engaged scholarship as defined by Van de Ven and Johnson (2006) is a “collaborative form of inquiry in which academics and practitioners leverage their different perspectives and competencies to coproduce knowledge about a complex problem or conditions of uncertainty found in the world” (p. 803). Within universities, engaged scholarship is the leveraging of the students, faculty, and staff to provide hands-on and real-world application of the skills they have learned in a variety of formal settings.

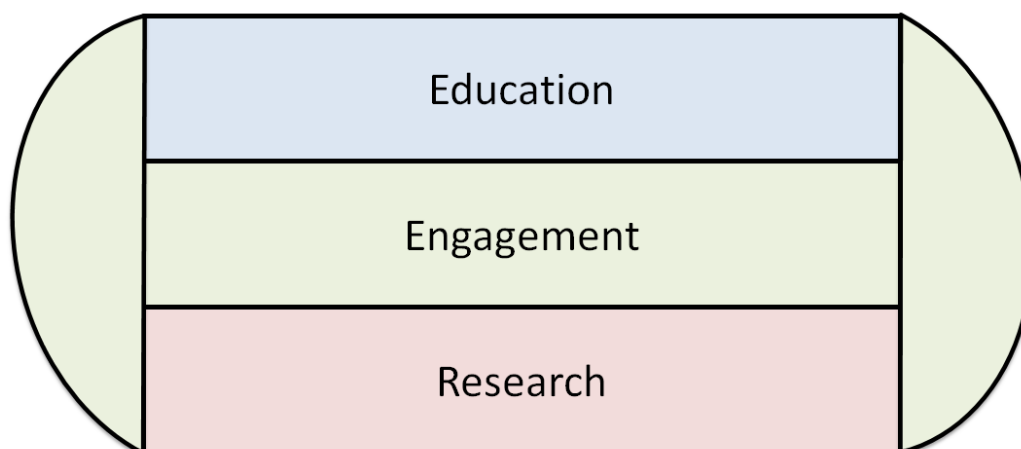


Figure 2: Engaged Tripartite Mission of Universities

Changing Expectations

The reasons for this academic engagement evolution compound back to the major trends our societies face today: globalization and interdependence, as well as an increasingly knowledge-based economy. Boyer's baseline for social innovation is reflected in the 1996 Kellogg Commission on the Future of State and Land-Grant Universities' comprehensive document *Returning to Our Roots: The Student Experience*. It has continuously been the aim of the universities who participated in this publication to strive for academic excellence through research and outward engagement, and throughout the document they reaffirm their commitment to a well-rounded university. This document also addresses Boyer's question regarding practical applications of knowledge to solve society's problems. These university presidents argue that within the next century a new university will be established, one "without walls", yet it will still remain true to its research oriented heritage. Modern institutions must commit themselves to not producing more graduates each year, but rather to producing graduates that are prepared and are able to adapt to the fast paced world. Universities have become a first stop before advancing to the quickly changing world, and they must remain leaders in helping to resolve the community's

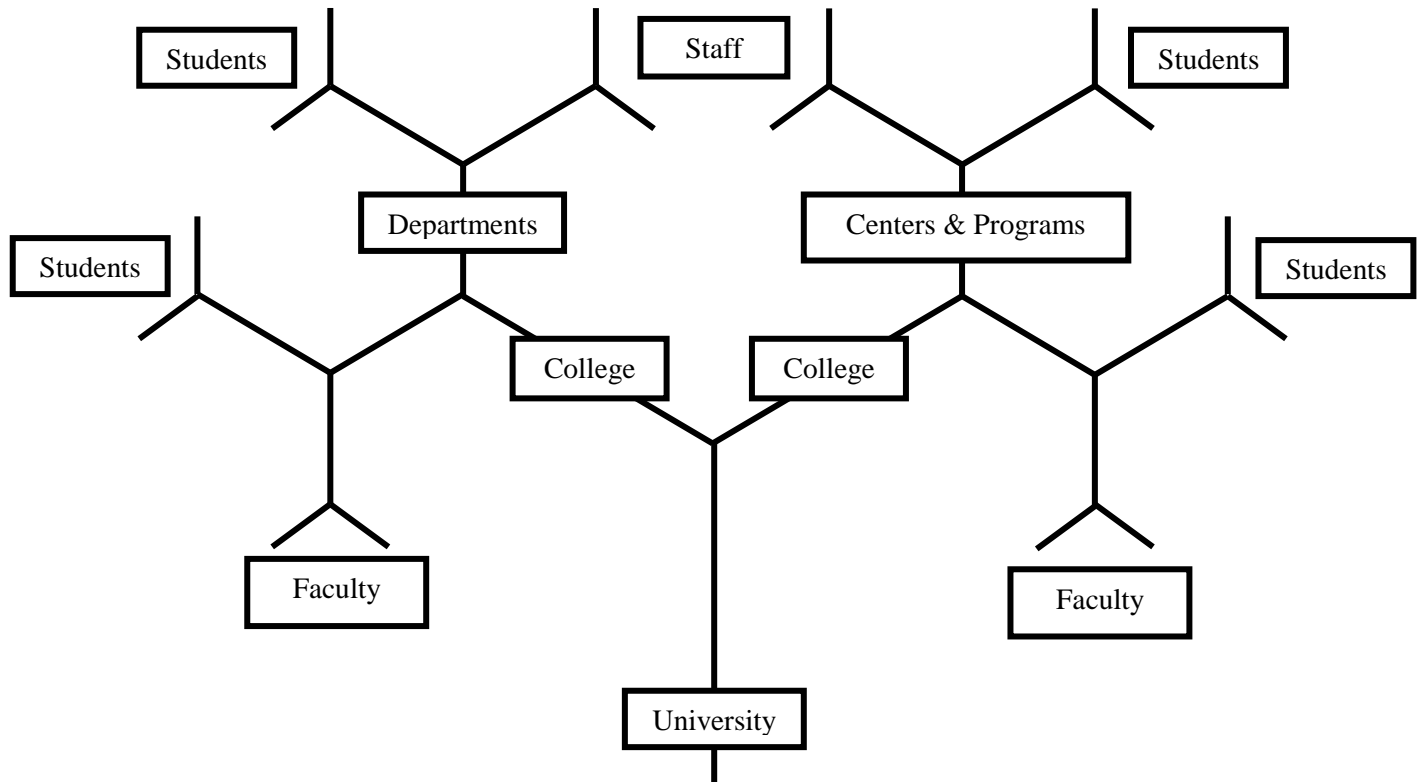
problems. The commission articulates that 1) all universities must offer outside-the-classroom experiences for engagement, 2) there is a need to reemphasize teaching that involves collaborative learning with the professor, and 3) additional opportunities should be created for all students to get involved in some type of research. President Lou Anna K. Simon of Michigan State University argues that when moving forward, universities must include international reach not only to communities but also to NGOs, businesses, and governments. There should be a connection between local and international issues, and a continuation of partnerships at home and abroad. Most importantly, there must be a commitment to mutual empowerment. This phrase describes the need for universities to allow their students the opportunity to engage in experiences that enrich their own education, and also for the enrichment of the community members they come in contact with (Simon, 2011).

As land-grant and state universities throughout the country confirm their dedication to increasing opportunities related to social innovation, the number of studies, reports, and journals of engaged scholarship have also increased over the past two decades. In 1996 for example, the *Journal of Higher Education Outreach and Engagement* was founded by the Vice President for Public Service and Outreach at the University of Georgia. The founding goal of the journal was to “be the leading journal dedicated to the field of public service and outreach in this era of unprecedented change, challenge, and opportunity.” Today, the journal strives to be a premiere peer-reviewed resource to advance all forms of “outreach and engagement between higher education institutions and communities.” It incorporates several sources of knowledge including research articles, field-stories, book reviews and reflective essays, dissertation reviews, as well as “projects with promise”, something it defines as early-stage university-community engagement projects with strong indications of future impact (“Journal History”, 2014). In addition, a more recently created journal related to engaged scholarship is the *Journal of Community Engagement and Scholarship*, founded in 2008. This peer-reviewed, international journal “integrates teaching,

research, and community engagement in all disciplines, addressing critical problems identified through a community-participatory process.” They argue that they bring authors and editors together in order to publish writing that is presentable to all sectors of society, not just academic scholars. This simple goal creates enormous impact around the world (“About”, 2014).

As these journals show, there is a new commitment to integrating learning, research, and engagement not only at the university level, but within society as well. It is reflected across faculty, students, and staff, and across units and functions. Today, the modern academic institution is seen as a living organism, a fractal of unique entities that intertwine and constantly interact to create a multiversity. The multiversity describes an institution that has not one area of expertise or one primary function, but several spanning a variety of disciplines. As can be seen in Figure 3, the university fractal is made up of administration, staff, faculty, students, and many other components that could work towards the betterment of communities around the world. Conceptualizing the university as a fractal refers to the nature of these unique university relationships rather than the actual structure of the university. No matter the scale, whether information is shared from one professor to another in the same department, or from college to college within the university, the tripartite mission must shine through. The fractal in that sense, is representative of the tripartite mission by its integration of all avenues of knowledge. This fractal model, a philosophy of university collaboration, can be replicated at any scale and at any university, thereby increasing the number of people and institutions working on social innovation projects.

Figure 3: The University Fractal



This multiversity fractal is a product of systems thinking, taking a holistic approach to solving complex problems (Dzombak, Mehta, Mehta, Bilén, 2013). Interdependence is a cornerstone of the university as each college, department, program, professor, and student work to reinforce the other. In order for the university to be the center of social innovation, it must understand the process through which an idea maneuvers itself through the various branches of the fractal. Once this is understood, the university can reorganize to effectively foster the development of a project that supports the initial idea. The idea, in this case related to societal needs and functions, begins in the outskirts of the fractal. Once the idea comes to life and one entity of the fractal supports its development, the idea works its way through the other

departments and collaborates with outside partners. At this stage, the university must utilize the relationships between the branches in order to turn the idea into a sustainable project. This results in the development of the seven roles the university can play in order to strive for the success of that project, and ultimately be the epicenter of social innovation.

Chapter 2

Universities as Epicenters of Social Innovation

The changing atmosphere of social innovation and its relationship to universities place institutions of higher learning at the forefront of this revolutionary movement. Table 1 outlines six key reasons why universities will remain epicenters of social innovation.

Table 1: Reasons for the University to Be Epicenters of Social Innovation

1	Large financial assets to leverage
2	Large amounts of people to leverage
3	Students are motivated to begin social innovation early
4	High concentrations of subject matter expertise
5	Advanced research capabilities
6	Universities are often the most stable structures, especially in developing countries

We examine each of these in more detail here. 1) The size and scope of large public and land-grant universities with strong financial assets allow them to marshal resources to particular areas of research and study. For example, Penn State University is currently operating on a 2013–14 fiscal budget of \$4.4 billion, 45.6% of which are allocated to “general funds”. The primary use of these funds is to support teaching, but general funds also include uses such as research (3.6%), defined as “all activities specifically organized to produce research outcomes, whether commissioned by an [external agency] or separately budgeted by an organizational unit within the institution”. In addition, these funds support public service (2.6%), detailed as “non-instructional services beneficial to individuals and groups external to the institution” (Penn State Budget Primer, 2013). 2) Institutions have large numbers of people they can easily motivate to enact swift and effective change. With a majority of the universities within the Kellogg Commission’s report having enrollment figures over thirty-thousand, there is enormous potential for recruitment into social ventures. 3) Such large student populations force universities to begin pushing for engaged scholarship in the first years of learning, thereby engraining in students’ minds the

importance of social innovation. With a core understanding of entrepreneurial ventures, it is the students of engaged universities that will continue these social missions after graduation. 4) The benefits of working in an academic environment allow for the concentration of expertise in a wide variety of genres. By having all knowledge in one location, a university can harness each sector to allow for effective collaboration. 5) Once collaboration is established, the university offers the premiere outlet for advanced research across a wide range of studies. For example, a student could participate in a laboratory experiment with professors from engineering, sociology, speech pathology, or even psychology. In other words, any type of research that needs to be completed for a social venture can essentially be done at the university. 6) Finally, universities are generally the most stable units in any society. They typically do not change hand with political turnover, and with constant donor and government funding remain relatively stable through economic hardships. Particularly in the context of the developing world, universities are often the most established entities and are able to create partnerships outside the country.










Although the university is suited in many ways to be the epicenter of social innovation, there are also challenges it will face as well. There is a constant threat of budget cuts and changes in funding allocations. Even the number of grants and prizes students win through competing in competitions will vary from year to year and affect the durability and pace of a project. Changing administrations could also jeopardize a university's goals by altering the direction and focus of the institution as a whole. Arguments could be made to counter the university's strive for engagement in that businesses and industry are more suited for project development and implementation due to their experience in product/service marketing and their own research capabilities. However, the remainder of this thesis will counter these arguments and show that the university should and can most definitely be the epicenter of social innovation.

Chapter 3

Ecosystems for Social Innovation

To incorporate the fractal model into the larger picture, the university becomes just one aspect of the larger framework of social innovation. The university's connection to other entities takes a bottom-up approach, working from inside the base of the pyramid, the roughly four million people who live on less than \$2 a day, to understand the context and then moving to higher strata to find support (Davis, 2012). First, a problem is identified within a community in a developing country context. The university works to understand this problem and find solutions, recruiting other entities throughout the process, thereby solidifying the ecosystem. This system of partners, including even small representatives such as an individual community member, participates in a mutually beneficial relationship that fosters discussion, innovation, and development, all with the purpose of improving the human condition. Clark Kerr (1963) argued that the university itself, as well as its partners, was only loosely connected by name and purpose, that purpose being to serve the community. Although the purpose is the same, today's ecosystems suggest much stronger connections that extend beyond industry mores to include social innovation. These ecosystems rein in the varying interests of each partner in order to develop the most comprehensive and sustainable ventures. Table 2 outlines the key partners with which a university must align in order to create an ecosystem for innovation, thereby following through on its mission and goals for engagement and positive impact.

Table 2: Ecosystem Partners

Representation	Partner	Examples
	Universities/Entrepreneur	The driving force behind understanding topics relevant to societal needs and functions and finding solutions. In the case of the university it can be: private, public, or land-grant.
	Community	The community “cloud”. Incorporates all those who feel they are a part of the community.
	Local leaders	Priests Elders Mayors
	Local organizations	Borough Council Co-op
	Local governments	State College, USA Nyeri, Kenya
	Large institutions	United Nations EPA USAID
	Non-profits	Inside or outside home country
	For-profits	Companies Manufacturers Businesses
	People	Ordinary citizens of the communities at home and abroad.

The community is the key element; a working definition for community, whether within the United States or internationally, is as follows: a group of people, not defined geographically, who share a common connection. This connection could be spatial, ethnic, religious, familial, or other such affiliations (McMillian and George, 1986). A university needs to first understand who is a part of a community, next to understand the problems the community faces, and to then develop a solution so that a venture produces a positive improvement in their livelihoods. The second key element of a social venture is the entrepreneur. In regards to a university, this person can be any number of individuals, or a larger group/organization. However, regardless of the physical nature of the entrepreneur, certain characteristics define this entity. An entrepreneur is motivated, determined, creative, and innovative. They are often confident, not bothering with those who doubt the end result, and are impatient, taking direct action and constantly challenging the status quo. The other entities detailed in Table 2 outline other partners that are critical for social missions to move forward. A university cannot manufacture products, fully tackle start-up costs, or gain support of local communities without the added benefit of working together as a part of the ecosystem. Each of these partners contributes to the creation of the university fractal, adding subsequent elements and encouraging the continuation of mutual collaboration in the quickly modernizing world.

Chapter 4

Roles of the University

Roles

It is the responsibility of the university to act as a key player in the cultivation of knowledge and the creation of engagement opportunities in the arenas of social innovation and entrepreneurship. In order to enact effective and sustainable community improvements, it is important for the university to understand the various roles it can adopt in order to do so. Figure 3 replaces the tripartite goal of engagement with the seven roles in order to portray the need for the university to utilize the unique functions of each role to truly fulfill engagement. The roles of proactive educator and engaged researcher act as bookends of engagement, compounding the traditional goals of education and research by adding an additional element of hands-on work. Connector, facilitator, and undertaker result in product and service provision as will be exemplified in the definitions.

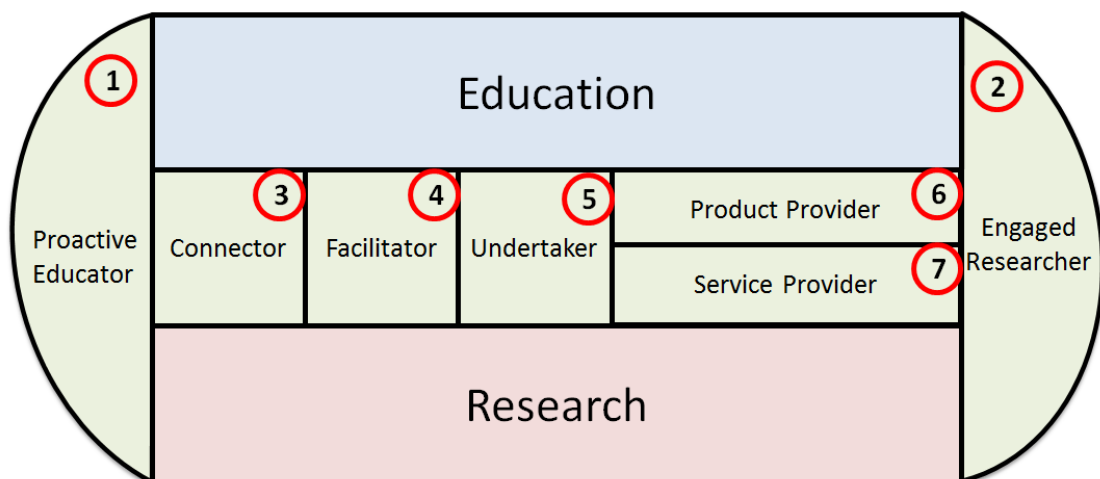


Figure 4: The Roles that Define Engagement

The university must weigh the costs and benefits of assuming these roles depending upon the individual circumstances surrounding the project/venture as well as their own resource availability. By playing the different roles, the university supports the various elements of the academic fractal and pushes them to pursue ventures that have not previously fallen under the scope of academia. The following seven roles define the particular actions a university must take in order to assume each specific role, and the subsequent reasons why the university is best suited and equipped to do so. Following each role is a real-world example detailing the ways in which a university can approach the role.

Table 3: Summary of University Roles

Role	Criteria
1. Proactive Educator	<ul style="list-style-type: none"> Creates environment for engaged experiences across different disciplines
2. Engaged Researcher	<ul style="list-style-type: none"> Conducts rigorous research into topics with relevance to societal needs and functions
3. Connector	<ul style="list-style-type: none"> Brings together various entities to create a “social network” of diverse partners
4. Facilitator	<ul style="list-style-type: none"> Takes proactive role in lowering barriers for multi-sectoral teams to accomplish their goals
5. Undertaker	<ul style="list-style-type: none"> Tackles various roles and becomes the sole initiator and executer behind a project
6. Product Provider	<ul style="list-style-type: none"> Commercializes university research for marketing/sale
7. Service Provider	<ul style="list-style-type: none"> Offers services to a community for free or at a price

Proactive Educator

Definition

As a **proactive educator**, the university creates opportunities for engaged learning experiences across a variety of disciplines. Although typically student-centered, this role extends the classroom and offers learning environments for those inside and outside the university. The

proactive educator adds an additional element to the typical lecture style of teaching and introduces hands-on components for their learners. The “students” in that sense can be university learners, policymakers, business executives, etc. The aim is to offer a learning experience tailored to the needs of the learners and simultaneously engraining within them a desire to take this new knowledge into the field and improve upon existing structures. As opposed to the traditional educator, it is the proactive educator who creates a new equilibrium with their audience as he/she directs their attention to societal needs. The professor does not simply teach their students about a topic, they connect this topic to the modern world and advocate for a better understanding of the problem so that effective solutions can be developed.

Table 4: Outputs and Outcomes | Proactive Educator

OUTPUTS	Talks, videos, plays, conferences, etc.
OUTCOMES	Provides newly educated individuals with better informed decision making skills.

Why the university?

The university can leverage numerous educators that provide hands-on classroom/out-of-classroom experiences across a variety of disciplines. The tools for such engaged experiences already exist within the university in the form of learners, classrooms, resources, etc. and it is up to the university to utilize these tools to educate a wide array of people. The university can host guest speakers with the confidence that their lectures will reach a wide base (students).

Example

A professor of theater at a university spends a majority of their time collaborating with playwrights and staging sets as part of their traditional duties. This professor becomes a proactive

educator when they reach out to students, professors, and community members to talk about social issues using plays and improvisations. Topics such as global warming, normally a focus of the sciences, can be better understood in a less-formal setting where actors discuss in everyday language the key points of the debate. The professor's audience, comprised of key individuals who can collaborate for change, now has a stronger grasp on the arguments behind climate change and can make better decisions when it comes to helping their communities strive for greener futures.

Engaged Researcher

Definition

As an **engaged researcher** the university conducts rigorous research into topics with relevance to societal needs and functions. Faculty members conducting research bring in students and other learners to participate in and to even lead research projects. The entities working on this project must understand all aspects of the community's needs and functions so that new findings and potential solutions can be developed. The Carnegie Foundation for the Advancement of Teaching (2010) outlines and regularly updates its definition of universities that can be classified as research oriented; under these guidelines the university must give a high priority to research and offer concurrent baccalaureate degrees in a variety of fields, thereby allowing a wide range of topics to be explored by the institution. As opposed to the traditional researcher, an engaged researcher does not stay in the laboratory. Some professors are more interested in the technical aspects of their research and never enter the field. Engaged researchers see the impact of their research, how it can be improved, and strive to develop ecosystems of partners to create sustainable solutions that incorporate the research they have conducted.

Table 5: Outputs and Outcomes | Engaged Researcher

OUTPUTS	New data findings, publications, etc.
OUTCOMES	The discovery of knowledge regarding topics with relevance to societal needs and functions and the creation of an ecosystem of partners.

Why the university?

As the Carnegie Foundation points out, universities hold a unique position in regards to engaging multiple entities in research concerning socio-economic development. Social innovation combines numerous disciplines and therefore requires multiple avenues of research. As opposed to many businesses or industries that focus on one primary sector, the university, through its different departments, can conduct several experiments at once. As the primary sources of learning, universities can offer engaged opportunities in laboratories and the field in order to provide its learners with research relevant to their own degrees. According to the Carnegie Foundation, several land-grant institutions such as Penn State, Ohio State, Rutgers, and Oregon State fall under the category of *very high research activity*, solidifying the claim that universities are particularly suited to conduct extensive and varying research.

Example

At the university, malaria research can be approached from several different perspectives. On the one hand, students and faculty conducted technical research and discovered a new protein that is critical to the development of the malaria parasite. This new protein could lead to new opportunities of finding an effective way to break the chain of malaria transmission (Kennedy, 2014). However, this type of research was completed solely in the laboratory with no direct

community contact. On the one hand, a professor and his/her students approached the problem by comprehending the sociological aspects of malaria prevention. The goals of this type of research focused on prevention, finding the best methods that could be widely diffused. This team traveled to a community and worked with locals to find out which mosquito repellent products they preferred. This exemplifies an engaged researcher because they left the lab to understand the scope of their research from the community's point of view. This new understanding could then be transferred to honing in on the best prevention practice and aligning partners for the dissemination of this product.

Connector

Definition

The university has the ability to **connect** and bring together various entities from inside and outside the university to create a “social network” of diverse partners with an interest in topics related to societal needs and functions. Institutions surround themselves with partners who offer unique resources and expertise concerning particular ventures; by collecting these disparate entities the university has created a trusted network of partners all acting under the same objectives. It is likely to assume that these industries and organizations would not have previously collaborated for a variety of reasons. These reasons include: 1) differing industries, 2) differing business objectives, 3) differing business models, and 4) competing businesses or industries/markets. Although this is not an exhaustive list, it represents why different partners (for-profits, non-profits, government, NGOs) would not first initiate collaboration were it not for the encouragement of the university. These types of connections can be fostered through lectures, conferences, cross-discipline meetings, and more.

Table 6: Outputs and Outcomes | Connector

OUTPUTS	Increasing the number and diversity of entities within a university's network.
OUTCOMES	Creating new conversations and partners and the building of trust and social capital.

Why the University?

The scope of established and recognized universities is the key reason why academia should act as the initial connector among a variety of interests. The university need not only connect varying entities, but can with its solidified reputation quickly transition from introduction to collaboration. Social networks today form the basis of social and economic transactions in the developing world; it is important for the university to reflect that process in its initial stages of a venture in order to penetrate the various networks in the region within which they are working. Universities are constantly involved in the international exchange of ideas and find themselves at the forefront of discussion. They have the ability to breathe new life and energy into the social networks they are surrounded by.

Example

Indigenous knowledge resource centers are based in many locations around the world, including South America, Europe, Asia, Africa, and Oceania. The focus of these centers is to share indigenous knowledge from around the world and in doing so, capture the essence of the connector role. The centers find practical and innovative ways to bring together unique sets of partners and entities in open discussions and forums, leveraging their unique knowledge bases. However, it is not the goal of the centers to undertake indigenous knowledge research. They

instead build collaborative relationships that *lead* to interdisciplinary research addressing issues within the communities they are connected with. This creation of a collaborative environment is the epitome of the connector, it cultivates the right set of individuals to catalyze on problems related to societal needs and functions and begins work on finding a solution.

Facilitator

Definition

As a **facilitator**, the university has a proactive role in lowering barriers for a multi-sectoral team to accomplish goals related to compelling societal needs and functions. It is the key role of the university when acting as facilitator to provide coordination for the various players, offering guidance and support when developing game plans for project development (Heaton, 2005). The university provides the teams with numerous outlets for a variety of functions; these outlets are determined by the mission of the team. The role of facilitator can vary in degree of directness. The university can be more reserved, allowing its students, faculty, and staff the opportunity to engage in mutually beneficial relationships without intervention. On the other hand, it can take a more direct approach and engage in these discussions, not only with its students and faculty, but also with other players involved in the project. Whereas the connector simply forges networks of partners to create an ecosystem, the facilitator has a more active role in providing support, guidance, and advice to these teams. Although the facilitator may not be a member of the team, or have had a role in its creation, they play a key role in moving the venture forward.

Table 7: Outputs and Outcomes | Facilitator

OUTPUTS	The development of stronger and more focused teams
OUTCOMES	Greater access to a variety of tools and therefore a stronger trajectory for the project and goal of the team.

Why the University?

As a facilitator, the university acts as a central ally among those affiliated with the institution (faculty, staff, and students) but additionally with those outside the university (businesses, entrepreneurs, government sub-contractors, etc.). The university acts as an overseer of a vast number of projects and can exclusively offer feedback and provide planning strategies for a player to achieve their mission. The university, in this sense, forms an overarching umbrella encompassing several concepts into one. Other entities outside the university do not have this capability due to lack of resources and connections.

Example

The university has a variety of outlets for becoming a facilitator, most notably in its resources for start-up entrepreneurs. Exclusive spaces for collaboration can be dedicated within the university to provide support for these new businesses. As a facilitator, the university acts as a champion for these start-ups; entrepreneurs can be supported in building a vast network of advisors, coaches, and mentors who can help in a variety of situations. The facilitator explicitly listens to the needs of the entrepreneur, and seeks out the right entities for them to build relationships with. As opposed to connector, once these partnerships are established, the facilitator remains with the team to aid in other aspects of the business as well. Inside this connection of facilities, a new company can conduct research, perfect their product, and hone

business skills, thereby providing them with a more compelling business strategy and a clear plan for moving forward.

Undertaker

Definition

As an **undertaker**, the university adopts multiple roles simultaneously in order to become the sole initiator and executer behind solutions regarding topics related to societal needs and functions. In recent years, as Brugmann and Prahalad (2007) from the Harvard Business Review point out, businesses and banks have been increasing their involvement in the social sector, tackling projects that may not produce a profit, but improve the lives of marginalized peoples. In regards to long-term projects however, the university is more suited than its counterparts in industry due to its ability to leverage resources. The university can utilize other roles in order to innovate and find solutions to these aforementioned societal problems. In other words, the university essentially acts as industry, adapting to new functions that are not traditional for an academic institution. It is important to note that the role of undertaker will vary greatly depending on the project, and in each instance different roles will be chosen over others in order to create a sustainable solution. As it stands currently, the university is not accustomed to assuming such a heavy-handed role. However, in order to reach a higher equilibrium and solidify the university as the epicenter of social innovation, more projects must be undertaken that cross barriers and lead to sustainable solutions.

Table 8: Outputs and Outcomes | Undertaker

OUTPUTS	Products, services, publications, etc.
OUTCOMES	Sustainable solutions to topics relevant to societal needs and functions.

Why the university?

In order for the university to become an undertaker, a topic/problem related to societal needs and functions must be presented that industry alone cannot handle. This could be due to lack of finances, expertise, time, etc. Although the university may not find itself an expert in this particular area either, its unique ability to leverage its resources allows it to reorganize to tackle a difficult project. Student engagement in a project can provide enormous insight as turnover is frequent. If a project is proving to be successful, it is likely that the university will invest additional resources for its continued success. One of the biggest barriers to project implementation is its acceptability on the ground. Faculty can offer advice concerning local populations as well as other aspects of the venture.

Example

A greenhouse venture in central Kenya serves as a perfect example of the undertaker role. More than five years ago a number of different parties expressed a need for affordable greenhouses. A development project like this would take enormous resources and a number of years to complete; at first there was no clear champion. However, it was clear that the people truly wanted the greenhouses and although it would have traditionally been the role of a company to provide these products, the margins and long-term profits would be too small for the venture to be sustainable. The university stepped in to fill this gap and provided product design, legal, social, technological, scientific research, and a comprehensive business design to develop these greenhouses. After working on the ground, the university is now able to step back as its local partner will continue operations. As an undertaker, the university saw the project from beginning to implementation and has provided local Kenyans with the ability to support themselves.

Product Provider

Definition

Products fall under a variety of categories including publications, recorded lecture series, and new drugs. Markham, Kingon, Lewish, and Zapata (2002) argue that there are four main ways a university will approach product development. First, through non-competitive means, i.e., through students and publications, and second, through competitive means such as licensing, which allows the university to act on its own in regards to delivering products to the people. On the other hand, the university can align itself with industry partners, thereby fostering a third way: sponsored research and development, such as contracts or consultation. A fourth way is through pre-competitive research, centers, and consortia. In summary, the university has three options: own its products, licensing its products, or aligning with industry for sponsor-driven products.

Table 9: Outputs and Outcomes | Product Provider

OUTPUTS	Publications, technologies, drugs, etc
OUTCOMES	Sustainable products that can help solve topics relevant to societal needs and functions.

Why the university?

In regards to product provider, the larger question is why industry should not tackle product development itself. Markham, Kingon, Lewish, and Zapata (2002) list four barriers industry faces in product development. 1) Often businesses lack the resources, both financially and personnel-wise, to fully carry out development activities. 2) Companies often choose to merge with other businesses that can offer them appropriate technologies needed for a new product, thereby causing additional problems such as reorganizing, differing goals, etc.

3) Companies often do not have the capabilities or skills needed to proceed through the development phases effectively, and thereby produce poor products. 4) Some companies choose to ignore available information, such as indigenous knowledge or already available research, and create a product that is not desired or effective in real-world situations. The university can utilize its funding and competitive nature to find additional financial resources. Additionally, it has committed students and faculty who will see the product through to development.

Example

Although there are several types of products the university can produce under this role, the following offers insight into one particular development: cancer drugs. A professor, working with dedicated students and a partnership of faculty, has developed a new form of cancer drug that has revolutionized the options for cancer treatment. This new drug will soon be on the market for potential acquisition but also for the consumer. With the collaboration of students and faculty, as well as state of the art research facilities at the university, this new drug and product will be able to save the lives of many around the world. The professor and his team worked under the safety net of the university and were able to pursue their research free from the constraints of business, as mentioned above.

Service Provider

Definition

Under the role of **service provider**, the university offers a service to a community in order to offer solutions to some of the community's needs and functions. This service can come

in a variety of forms such as conferences, lectures, or more hands-on approaches such as clinics, consulting, etc. William Cummings (1998) notes that in recent years many elements of the university fractal have been renaming themselves under the heading services: student services, health services, library services, etc. Therefore, it is important to clearly determine a distinction between a university's practical services and the services associated with different outreach programs. Outreach services will utilize various entities within the university and will have an ultimate mission to improve the human condition.

Table 10: Outputs and Outcomes | Service Provider

OUTPUTS	Conferences, research facilities, consulting, etc.
OUTCOMES	Sustainable products that can help solve topics relevant to societal needs and functions.

Why the university?

As opposed to industry where many companies or non-profits focus on one area of development, the university can simultaneously provide services that fall under several headings. Funding and accessibility to grants and donations allow the university the opportunity to provide these services for extended periods of time. If the university does not receive revenue from the service itself, it can chose to contract the service out to locals, thereby improving their livelihoods, or can search for additional funding to source the service for an extended period of time.

Example

Headed by the university, a local community health worker program in East Africa provides an example of just one type of service that can be provided by the university. Health

workers provide medical services to local patients at a lower cost than travelling to a clinic. Community members are provided with a quick service to check their vitals and know if travel to a hospital is necessary. This program not only provides a small revenue to the university, but betters the lives of its service providers on the ground (the health workers) and provides many with the ability to understand their own health.

Chapter 5 Connecting the Roles

As expressed in Figure 2, the seven roles complement the tripartite goal of engagement and provide the university with guidance as to how engagement can be optimized. Figure 5 rearticulates this relationship by offering a second look. This diagram does not offer a top-down approach because each role utilizes various entities and resources within the fractal. Each role compounds on the next, resulting in mutually beneficial connections among all seven. With clear definitions supporting the various roles, there is now a better understanding of how the proactive educator and engaged researcher act as the bookends of the university's goals.

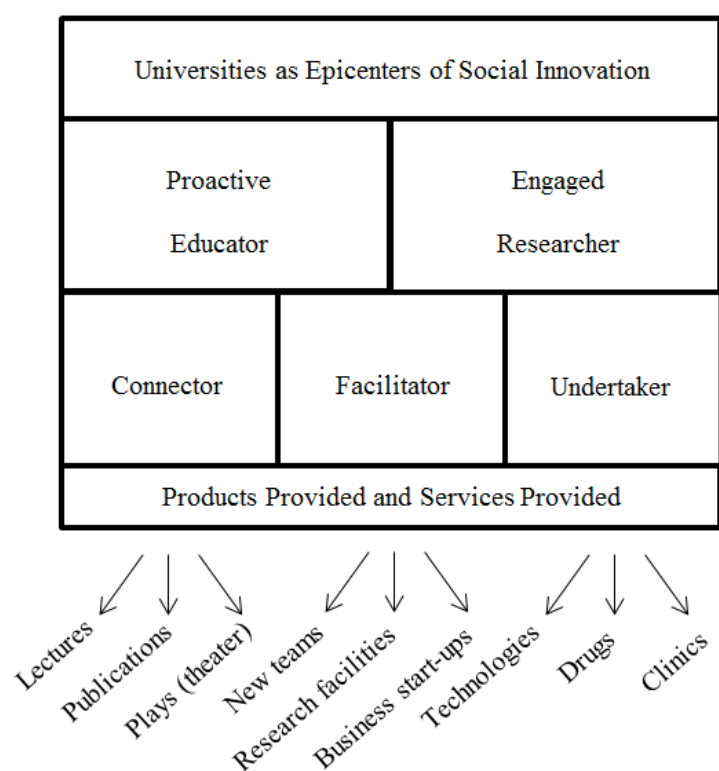


Figure 5: Roles of University Engagement

As the yin and yang of social innovation at the university (Figure 6) the roles of proactive educator and engaged researcher find themselves in a mutually beneficial relationship in which

education leads to research, and research leads to education. They encircle engagement (the red dot) much like education and research support engagement in Figure 2. However, in this advanced state of interaction, the two roles heighten the extent to which engagement can be reached by actually adding elements of engagement early on. As mentioned in the definitions, these elements include out-of-classroom opportunities and directly applicable research, as well as other experiences. Out of this symbiotic relationship comes the need to do more, to act on what is learned or discovered by the bookends and to actually tackle society's needs. The roles of connector, facilitator, and undertaker then emerge.

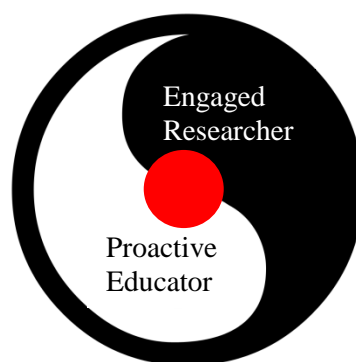


Figure 6: Yin and Yang of Roles

Referring back to Figure 5, connector, facilitator, and undertaker fill engagement and see it through from initial project brainstorming to action. They result from education and research and engage a new level of partners in creating the aforementioned ecosystem of innovation. This newly formed ecosystem works towards providing the means to understand society's needs and functions and to find practical and sustainable solutions. These three roles play off each other, but are uniquely different. The connector begins as a forger of networks and ecosystems, but then takes a step back and does not directly engage in the work of the team. The facilitator reaches further by providing advice and consultation for a team, while still not being a member. Finally, the undertaker is fully engaged, working sometimes as not only the member of the team, but as the sole initiator and executer.

Out of these three roles, the results are products and services. In Chapter 4, product and service providers are defined as separate functions of the university. This remains true if the products and services must be delivered on the ground or in person by entities of the university, as seen in the examples of these roles in Chapter 4. However, more often than not they are the results of connections, team collaboration, and undertaking. This relationship is portrayed in Figure 5 as products and services are not their own category, but rather spread from connector, facilitator, and undertaker. There is a progression of products and services from left to right in conjunction with the appropriate role, but also in terms of resources needed. For example, technologies, or one specific technology, as a product of the undertaker role will use fewer resources overtime than an ongoing service such as a clinic. Therefore, technologies fall to the left and clinics to the right. Although Figure 5 does not offer an exhaustive list, it is evident that the products and services can either be tangible, such as drugs or facilities, or more abstract. Classroom learning and conferences do not always result in essays or publications; however, the knowledge gained and outlooks considered lead to increased awareness about society's needs and additional ways to initiate projects that can solve them.

Chapter 6 Conclusion

Land grant and public universities have proud histories that encourage them to move with society and adapt to its needs and functions. For more than a hundred years they have transitioned themselves from the study of classics to the study of present and persistent threats to society. These universities stand as monuments of research, learning, and outreach. However, globalization is occurring quicker than universities are able to adapt; incremental change is not enough to affect change in communities around the world. The university must utilize its resources and manpower and recommit itself, as the Kellogg Report announces, to fostering a learning environment that benefits both its students and the people and communities they touch. For the university to become the epicenter of social innovation they must first reorganize their structures from the tripartite mission of research, learning, and outreach and instead replace outreach with engagement. Academic engagement in all forms forces students and their teachers to think outside the box, to focus on how their work can directly affect a particular group of people and improve their livelihoods and conditions. Second, the university must reach a higher equilibrium in regards to learning and research and become proactive educators and engaged researchers. As the cornerstones of the university, it is essential for this mutually beneficial relationship to be cultivated and leveraged to support engaged activities. Finally, in order for the university to fulfill its new tripartite mission it must adopt the seven roles and strive to be an undertaker in as many outlets as possible. The engaged activities supported by these roles support the development of products and services that will change the lives of many around the world. Engaged activities supported by these roles support the development of products and services that will change the lives of many around the world. The university is no longer a monument. It is a living, breathing entity of motivated individuals who have the power to enact real change in real time.

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