

# Research and Infrastructure

## **Date of Report**

January 30, 2018

## **Theme Group Name**

Research and Infrastructure

## **Members**

Co-Chair 1: On-Campus Faculty: Syed Anwar

Co-Chair 2: Off-Campus: Shyla Buckner

Facilitator: Angela Spaulding

Resource: Kaaren Downey

External Stakeholder: Tony Freeman

External Stakeholder: Anthony Harris

External Stakeholder: Shona Rose

Faculty: Rajan Alex

Faculty: Brenda Cross

Faculty: Ashley Pinkham

Faculty: John Richeson

Faculty: Bonnie Roos

Staff: Mike Cook

Staff: Laura Seals

Staff: Rebekah Bachman

Student: Scout Odegaard

## **Introduction**

The WT 125 Research and Infrastructure Theme group engaged in an initial group meeting on Wednesday, September 27, 2017. At this meeting, a broad based discussion, on the topic of research, developed and became the springboard for looking specifically at key ideas for the WT 125 process. The discussion gave both external and internal group members a chance to ask WTAMU research and infrastructure questions and to begin sharing perspectives related to personal and professional experiences. The group was tasked by the committee chairs to further reflect on key ideas and email responses to the team facilitator. The team facilitator collected and consolidated the responses via email and returned the responses to the group, via email, for further reflection. Additionally, the Basecamp Community was set up and group members were invited to share thoughts or review WT 125 materials through this online tool. On 10.23.17, the group met on the WTAMU campus to discuss the group's consolidated key

## Research and Infrastructure

ideas. The key ideas were reviewed and further discussion, refinement and development occurred. The facilitator took notes and, following the meeting, updated the key idea document and assisted in placing the information into the requested WT 125 format for the initial draft report submission. On 10.24.17, the updates were emailed to the group for further edits and review. On 10.27.17, the facilitator submitted the initial draft report to the WT 125 Office, with all group edits included.

WT 125 membership, including the theme group, Research and Infrastructure, met at the Amarillo Club on November 14<sup>th</sup> for a WT 125 Leadership Council lunch meeting. WTAMU President Wendler provided updated guidance and theme group members participated in a question and answer session. As a follow-up to the November 14<sup>th</sup> meeting, the Research and Infrastructure theme group conducted a face-to-face meeting on the WTAMU campus on November 30<sup>th</sup> to discuss innovation and measurable outcomes. WT 125 white papers were shared in late December and added additional resource and discussion for the group. Additional feedback and conversation within the group occurred via email and through the Basecamp Community leading up to the February 2<sup>nd</sup> deadline for submission of second report. The team facilitator collected and consolidated responses and returned the responses to the group for further reflection and edits prior to submission of the February 2<sup>nd</sup> report to the WTAMU WT 125 Office.

### WTAMU Mission Statement (WTAMU, 2017)

West Texas A&M University is a diverse and inclusive student-centered community of learners that:

- provides a technology-rich, academically rigorous educational experience at the undergraduate and graduate levels;
- cultivates opportunities to develop critical thinking and problem solving skills, information literacy, and ethical behavior;
- directs resources in support of empowering co-curricular experiences;
- maintains focus on the development of future leaders for our community, the state, the nation, and the world; and
- serves through education, research, and consultation as a catalyst for economic development and enhancement of the quality of life for the region.

# Research and Infrastructure

## **Innovation**

In the context of the Research and Infrastructure Theme Group, innovation includes knowledge, insight, and creative pursuits of every type, used to fuel local communities with a passion for progress while understanding that WTAMU is preparing for a future, and future research, that is still unknown and developing (Wendler, Spaulding, & Henderson, 2017, pg. 6). WTAMU will continue to have world-wide reach, affirmed through the transferability of regional innovation, while understanding that:

*"the world's challenges do not fit neatly under a single subject area; rather, they are interdisciplinary and transdisciplinary, and require diverse thinking to develop solutions. . ."* (DeNisco, 2016, para. 6.)

Innovation resources required to achieve innovation include the entirety of the WTAMU community, from students, staff, faculty, administration, alumnus, and community members. Broad based, long range, measurable outcomes include:

- Identifying and participating in partnerships with Panhandle communities so that economic success of the region is sustained and further developed.
- Producing research trained students that move into the regional labor market and provide needed economic resources.
- Producing faculty research publications, presentations, commissioned research, grants and sponsored research, seminars and regional conversations that support innovation.
- Hiring and employing faculty experts in various specific fields based on the regional context and environment.
- Development of regionally beneficial intellectual property (licenses and patents)
- Development of new models on how generated knowledge is applied to rural research settings.
- Interfacing with technology, including artificial intelligence (AI), internet-of-things (IoT), cybersecurity and big data to engage the future of research and economics.
- Building needed funding sources, including those within community partnerships.

## **Key Idea (1)**

# Research and Infrastructure

## **Key Idea (1)**

### Building an Infrastructure to Support Research

In higher education, funding resources remain on the decline (Tugend, 2016). It is important to have enough financial resources for research and its related infrastructure (Knowledge@Wharton, 2016). The goals and action items listed below are designed to build a research infrastructure that has funding source opportunities.

#### **Goal 1:**

Develop a research center for each WTAMU college and school. Each center should be visible and communicate at the regional, national, and international levels; provide opportunity and support for faculty and student research development; provide research training, including specific assistance with research compliance (e.g., IACUC, IRB, IBC policies and procedures); and revolve around each college's or school's unique capabilities, synergies, and niche areas. The function of each center will be to create publishable research and, as disciplinary appropriate, to seek grant and sponsored funding combined with fee for local service work that supports research in a variety of areas.

#### **Action 1.1:**

Each WTAMU college or school will conduct a review process to determine unique capabilities and niche areas for developing a research center – or expanding a current center. The process should include the college's or school's external advisory committees and regional partners. A short-term (1-2 years) and a long-term (minimum 5 years) research plan should be developed, inclusive of operational funding needs for the center. These plans should specify regional research needs, funding sources (local, regional and national), and college-specific research requirements, facility needs, personnel needs, marketing, and Texas A&M University System required approvals. Sponsored research should also be pursued in collaboration with local and regional firms (Piper & Wellmon, 2017). Additionally, each college or school would seek to connect with their associated alumni who are continuing research for master's or doctoral

## Research and Infrastructure

work, as well as those alumni who conduct research in their workforce field, and collaborate, as appropriate, to publish and present research and provide alumni mentors for students.

**Measurable Outcome(s) 1.1.1:** Following completion of this action, each WTAMU college or school will have at least one established research center and have identified unique research capabilities and niche areas that have the capacity to serve the Panhandle region. Each center will be recognized through the association of publications and presentations, and, as disciplinary appropriate, will secure grant and sponsored research and fee for local service work. A short- and long-term research and marketing plan, for each center, will be completed and include input from community/regionally based advisory committees. Additional measurements could include: number of business and community partnerships established; number of research hours achieved; number of research papers published and presented; number of faculty research sabbaticals awarded, number of research grants awarded and total grant dollars calculated on an annual basis before and after establishment of each center.

### **Action 1.2:**

Identify a research director for each WTAMU research center whose responsibility will be to facilitate the operation of the center and represent the center to both internal and external communities. The directors will be included as members of the WTAMU Killgore Research Committee. The primary function of the director will be conducting research, grant and sponsored research execution, research publication, research training, research mentorship for faculty, and center administration. Teaching responsibilities will be minimal and will reflect research related content.

### **Measurable Outcome(s) 1.2.1:**

Following completion of this action, each WTAMU research center will have a director who will supervise and manage the center and who will facilitate research opportunity and output, including

## Research and Infrastructure

faculty and student research training and mentorship, develop and disseminate publications and presentations, and, as disciplinary appropriate, secure grant and sponsored research and fee for local service work. Directors will work with the administrative support committee (Action 1.3) and development officer/grant writer (Action 1.4) to secure funding equal to the cost of the center's operational needs minus funding provided by the university. Additional measurements could include: number of valedictorians and salutatorians coming to WTAMU from the Panhandle, as well as overall; number of transfers to WTAMU; number of masters and doctoral student enrollment numbers, research staff and faculty turn-over rates, and number of faculty sabbaticals awarded in terms of research.

### **Action 1.3:**

An administrative support committee for 'WTAMU Research Centers' will be formed and will include representatives from the research faculty, vice president for research, vice president of institutional advancement, vice president of business and finance, deans, and center directors.

### **Measurable Outcome(s) 1.3.1:**

Following completion of this action, an administrative support committee will have established a written plan of action that supports and evaluates WTAMU research centers so as to increase research opportunity and output, including publications and presentations, faculty sabbaticals, and, as disciplinary appropriate, secure grant and sponsored research and fee for local service work. The committee will represent the research centers in the annual university budget process in order to review and strategically align the center's budgetary needs with the university budget. The administrative support committee will work with the center directors (Action 1.2) and development officer/grant writer (Action 1.4) to secure funding equal to the cost of the center's operational needs minus funding provided by the university.

## Research and Infrastructure

### **Action 1.4:**

Each WT research center will have a research development officer/grant writer to support external grants and sponsored research (sourcing, writing, and submission). This position could be shared between centers, as appropriate to workload.

### **Measurable Outcome(s) 1.4.1:**

Following completion of this action, research development officers will identify sources for funding, facilitate and assist in the writing, submission of and secure external funds to support the centers. The research development/grant writer will work with the center directors (Action 1.2) and the administrative support committee (action 1.3) to secure funding equal to the cost of the center's operational needs minus funding provided by the university. Additional measurable outcomes could include external research dollars received from government sources, nonprofits, and for-profit industries and businesses; number of faculty sabbaticals awarded in terms of research, and invited research presentations made by faculty.

### **Goal 2:**

Restructure WTAMU faculty research environment in order to accommodate research productivity and support research.

### **Action 2.1:**

Review the current appointment process whereby faculty are hired for percentages of research. Does this assignment accommodate research or does research effort become overwhelmed by college or school teaching priorities? Hire or identify 'research faculty' in each college who will focus on conducting research. For these 'research faculty', provide research support: time resources, travel funding, library investment, facilities, equipment and the accompanying research production and evaluation expectations.

# Research and Infrastructure

## **Measurable Outcome(s) 2.1.1:**

Following completion of this action, the revised faculty appointment process will identify research faculty in each college or school who will focus primarily on research production and will be provided time resources, sabbaticals, travel funding, reduced teaching load, equipment and other research resources, as comparable to disciplinary peers at aspirational peer universities (Decker, 2017). Identified faculty will produce publishable research and presentations and, as disciplinary appropriate, secure grant and sponsored funding as comparable to disciplinary peers at aspirational peer universities (Decker, 2017). Additional measurable outcome could include attaining the Carnegie R3 Doctoral Classification status.

## **Action 2.2:**

Develop a faculty research mentorship program that includes mentors from within and outside the researcher's discipline, including industry research mentors, as appropriate. Take into consideration the childcare and family needs of faculty researchers. Each school or college will create a mentorship program that meets the associated disciplinary needs.

## **Measurable Outcome(s) 2.2.1:**

Following completion of this action, research mentorship programs will increase the number of and quality of faculty research publications, presentations, commissioned research, grants and sponsored research, seminars, sabbaticals and regional conversations that support innovation to the level comparable to disciplinary peers at aspirational peer universities. Additional measurable outcomes could include staff and faculty turnover, specifically, the proportion of faculty that achieve tenure and promotion versus those that leave or receive a terminal contract; faculty retention rates; number of research hours achieved; and number of research papers published and presented.

## Research and Infrastructure

### **Action(s) 2.3:**

Restructure the WTAMU facilities and administration (F&A)/indirect cost (IDC) formula for WTAMU research centers to financially support faculty research, including course reductions, travel funding, research sabbaticals, equipment and supplies.

### **Measurable Outcome(s) 2.3.1:**

Following completion of this action, the current distribution F&A/IDC will be restructured whereby the largest percentage of F&A/IDC will be returned to the research primary investigator (PI) or research center to support continuation of research efforts.

## **Key Idea (2)**

### **Key Idea (2)**

Quality Control in Research Activities

The higher education industry and its sectors are going through "*seismic*"/structural changes (Chronicle of Higher Education, 2016). Quality assurance is critical in higher education and applies to national and regional universities (Belkin, 2015).

### **Goal 1:**

Focus on quality and innovations in research.

### **Action 1.1:**

Each college and school should annually review research standards and consider their value as well as continuously review and adjust the predictions of what research standards will look like in the future. Research standards should provide specific criteria for evaluation of research faculty in colleges where this does not exist or is not clearly delineated. Focus on quality research as defined by each discipline, for example, some disciplines measure quality by the impact factor of journal publications.

## Research and Infrastructure

### **Measurable Outcome(s) 1.1.1:**

Following completion of this action, research standards of each college of school will be comparable to disciplinary peers at aspirational peer universities (Decker, 2017).

### **Action 1.2:**

Utilize, as appropriate, new digital and delivery models: Digital models and technologies are always on the move. Quality control can be a problem when new technologies are introduced because of diffusion of innovation. The same applies to today's universities which need to stay up-to-date to teach and deliver the 'right' knowledge (Tugend, 2016). Annually, a digital models and technology conference should be provided in collaboration with WTAMU divisions of IT, Research, Academic Affairs (including the Teaching Excellence Center), to discuss and evaluate new research related technologies. WTAMU laboratory and field researchers would engage in laboratory and field equipment demonstrations, in collaboration with industry, other institutions.

### **Measurable Outcome(s) 1.2.1:**

Following completion of this action, an annual 'new digital technology' conference will be sponsored by the following WTAMU divisions: IT, Research and Academic Affairs. From the conference, faculty and the associated division administration will evaluate and, as appropriate, identify one or more new technology initiatives to implement each year. The technologies will support both teaching and research efforts.

## **Key Idea (3)**

### **Key Idea (3)**

Dissemination of WTAMU Research Activities

Today's universities and their roles in the process of dissemination of research are important. Colleges or schools and their faculty should be involved in this process. This

## Research and Infrastructure

can help in “marketing and branding” the institution (Hanover Research.Com, 2014). In addition, fast changing technologies and digital models require the involvement of universities, funding agencies, and other stakeholders (Bowen, 2015; Lupton, Mewburn & Thompson, 2017). A proper infrastructure should be developed to implement these complex changes (EduCause Review, 2009).

### **Goal 1:**

Create a marketing plan for WTAMU research that is inclusive of each WTAMU college and school and the actions listed below (Gunn & Mintrom, 2013):

#### **Action 1.1:**

Website development: In collaboration with the Office for Institutional Advancement and the WTAMU Library, regularly list all faculty publications, specialized reports and surveys, monographs, and related material and research projects on the WTAMU website.

#### **Measurable Outcome(s) 1.1.1:**

Following completion of this action, each college or school will have an updated web listing of research output and recognitions (facilitated by the WTAMU library) to market and disseminate research findings at the regional level and beyond. WTAMU Institutional Advancement will market this information in comparable formats utilized by disciplinary peers at aspirational peer universities (Decker, 2017). By being in the “connected world” and “connected markets” (Porter & Heppelmann, 2014; 2015; Parker & Van Alstyne, 2016), dissemination of faculty publications, reports, surveys, monographs, and related material will bring academic and research visibility to WTAMU. Additional measurable outcomes could include number of research papers published or presented.

#### **Action 1.2:**

WTAMU Institutional Advancement will develop an annual research video and podcast for each WTAMU college and school as well as work collaboratively with each college and school to facilitate marketing opportunities via newsletters, webinars, seminars, radio (utilize the WT 91.1

## Research and Infrastructure

FM station), presentations (inclusive of the Amarillo Center), invited lectures, advertisements in select conference proceedings, newspapers, and research periodicals

### **Measurable Outcome(s) 1.2.1:**

Following completion of this action, the developed video and podcast will be utilized on the associated college's or school's website, as well as in other marketing opportunities identified by each school and college, and in comparable marketing utilized by disciplinary peers at aspirational peer universities (Decker, 2017). To support the effort, Institutional Advancement will utilize student resources, including Media Minds and Maroon Productions.

### **Action 1.3:**

Create a more strategic and sustainable process for marketing and recognizing faculty research achievements, including research that falls within the creative works classification (Pike, 2014). Creative arts (music, dance, radio and TV, theatre, visual arts, etc.) are major areas in higher education and add a tangible value to today's digital economy and its creative industries (GuildHE, 2016). Marketing and recognizing faculty research, performances, exhibitions, and related creative activities will publicize the University and its programs in the region and beyond.

### **Measurable Outcome(s) 1.3.1:**

Following completion of this action, Institutional Advancement will work with WTAMU creative arts disciplines to create and implement a strategic plan for marketing creative arts (music, dance, radio and TV, theatre, visual arts, etc.) in comparable marketing utilized by disciplinary peers at aspirational peer universities (Decker, 2017).

### **Action 1.4:**

Create a regional faculty research conference at WTAMU to showcase regional research. A steering committee would include industry and university stakeholders. This will help publicize the University's research programs regionally and will involve outside stakeholders.

## Research and Infrastructure

**Measurable Outcome(s) 1.4.1:** Following completion of this action, the WTAMU Divisions of Academic Affairs (including the library), Research, IT, and Institutional Advancement will provide logistical support and work with faculty on the Killgore Research Committee to host an annual faculty regional research conference, potentially in collaboration with the WTAMU student research conference. This will help publicize the University's research programs regionally and will involve outside stakeholders. Additional measurable outcomes could include: number of business and community partnerships established, and external research dollars received from government sources, non-profits, and for-profits industries and businesses.

### **Key Idea (4)**

#### **Key Idea (4)**

Increase Industry Partnerships and Contract Research

#### **Goal 1:**

Increase research connection to regional communities with the understanding that this regional focus does not limit WTAMU's world-wide reach; instead, it reaffirms, through transferability that by focusing first on the Panhandle region, the needs of similar regions across the nation and world will benefit from its attention, research, and resolution of the challenges and opportunities that characterize the region (Wendler, Spaulding, Henderson, 2017). Research what is relevant/needed/market-driven.

#### **Action 1.1:**

In collaboration with industry and regional stakeholders, develop a

## Research and Infrastructure

funding mechanism to create research support for faculty and students who are interested in proposing studies to address identified needs in the Texas Panhandle. Include students in the research projects. Identify third-party partners and industries (e.g., government, private businesses, other schools, churches, museums, etc.), both local and those who have similarities to local ones for research partnerships. Create MOU's for research partnerships that also include student research projects or internships. Leverage connections within the community and with industry contracts to develop research partnerships.

**Measurable Outcome(s) 1.1.1:** Following completion of this action, the offices of Institutional Advancement and Research will work collaboratively with the Killgore Research Faculty Committee to form a steering committee to conduct and produce a written review of industry/university partnerships and their associated models at aspirational peer institutions (Decker, 2017). Additionally, as part of the process, each college and school will seek and submit ideas to the steering committee from their associated advisory committees and faculty. Ideas will be ranked by the steering committee and the top ranked model, approved by the WTAMU President, will be implemented at WTAMU.

### **Action 1.2:**

Market and cross-sell the 100+ teaching and research labs already on WT campus. Develop faculty/industry sponsored or partnership labs that already exist on campus.

### **Measurable Outcome(s) 1.2.1:**

Following completion of this action, a steering committee of teaching and lab faculty and students, in conjunction with the Divisions of Research and Institutional Advancement, will produce and implement a marketing plan for current teaching and research labs. Industry/lab partnerships will be developed in comparable numbers to those at aspirational peer institutions (Decker, 2017). Additional measurable outcomes could include: number of business

## Research and Infrastructure

and community partnerships established and external research dollars received from government sources, non-profits and for-profit industries and businesses.

### **Action 1.3:**

Evaluate what more is needed in/from the development office and sponsored research office to obtain research grants, i.e., staffing, expertise, a need for more competitive salaries.

### **Measurable Outcome(s) 1.3.1:**

Following completion of this action, the director of the Office of Sponsored Research will chair a committee that includes a member from the post-award office; the development office; grant faculty and staff representatives from each school and college (selected by the associated dean); the director of West Texas Evaluation and Research; the vice president of research; the deans from the School of Engineering, Mathematics, and Computer Science; the college of Agriculture and Natural Science; and representatives from community partners to create a report that reviews resources and future university needs for competitive success in achieving research grants and external funding (and includes comparative data from aspirant peer universities). The recommendations will be reviewed by the WTAMU president and considered for implementation. Additional measurable outcomes could include: number of business and community partnerships established and external research dollars received from government sources, non-profits and for-profit industries and businesses.

## **Key Idea (5)**

### **Key Idea (5)**

Increase Graduate and Undergraduate Student Involvement in Research

## Research and Infrastructure

Students involved in research have better retention and graduation rates than those who are not involved in similar activities. Students involvement in research also provides support for student's vitae building, future educational work, scholarship attainment, and workforce success.

### **Goal 1:**

Provide increased opportunities for student involvement in research

#### **Action 1.1:**

Seek to endow the current university student internal grant research programs and a graduate research assistant for each college and school. Build scholarships for research assistantships for undergraduates in each college and school. Continue to build this infrastructure with additional endowments and scholarships. This action will help attract quality students to the University and assist faculty in their research activities, data collection, lab work, creative activity, exhibitions, etc. This action will help attract quality research students to WTAMU.

#### **Measurable Outcome(s) 1.1.1:**

Following completion of this action, faculty researchers, Institutional Advancement, the Division of Research and the dean of each WTAMU college and school will work with local, regional, state and national businesses to secure named, endowed graduate research assistantships and scholarships comparable in financial cost and number to aspirational peers (Decker, 2017). Additional measurable outcomes could include: number of valedictorians and salutatorians coming to WTAMU for the Panhandle, as well as overall and number of student transfers to WTAMU.

#### **Action 1.2:**

Develop a website for pipeline programs to Texas A&M University and other institutions that includes research opportunities for WTAMU students.

#### **Measurable Outcome(s) 1.2.1:**

## Research and Infrastructure

Following completion of this action, WTAMU Graduate School, led by the dean of the Graduate School, will facilitate, create, publish and implement a WTAMU website for pipeline programs to Texas A&M University and other institutions that includes research opportunities for WTAMU students. Additionally, a pipeline program of implementation will include selecting a pipeline coordinator at WTAMU who creates an annual program of events marketing the pipeline programs.

### **Key Idea (6)**

#### **Key Idea (6)**

Build Flexible Research Infrastructure: Creation of New Research Spaces

To handle future research needs, given the paradox that we don't know what labs will be needed or what technology will be on the cusp, WTAMU needs to create flexible spaces to grow with needed future research directions.

#### **Goal 1:**

To accommodate future research needs, given the paradox that we will not always know what future research and associated labs and resources will be needed or what technology will be developing, WTAMU needs to create flexible spaces to grow with needed future research directions. Create a continuously evolving cross-disciplinary, technological campus where new discoveries and initiatives can be explored.

#### **Action 1.1:**

Creation of a Center for Innovation: IT-based initiatives and the IoT-related gateway are critical in today's changing higher education environment and its associated digital models. These IT-related activities can help WTAMU

## Research and Infrastructure

to differentiate itself from other institutions. This action can be WTAMU's 'first-mover advantage' in the region. An implementation team consisting of research faculty, vice president of research, chief information officer, vice president for academic affairs, vice president for institutional advancement, Killgore Research Faculty Committee, and industry partners will create the planning documents; seek appropriate approvals, funding and location; and implement. The location of the center will be determined during the master planning process. The Division of IT will provide the technology infrastructure, software, Internet connectivity, and associated support, as well as the IoT gateway equipment needed for the campus to connect devices.

### **Measurable Outcome(s) 1.1.1:**

Following completion of this action, WTAMU will have a Center for Innovation. The facility will incorporate the currently developing (2018) IoT innovation lab/center and be a partnership between all WTAMU Academics and WTAMU Information Technology (IT). The focus of the center will be seeking grant funding combined with fee for local service work, which includes Internet of Things, artificial intelligence, robotics engineering and repair, customized data analytics, visualization applications, and various other emerging technology applications. A cross disciplinary approach will be utilized to conduct research that includes all disciplines within IoT.

### **Action 1.2:**

Creation of Experimental/Behavioral Applied Science Research facility/Labs: There is potential to integrate the applied research/researchers on campus, including those from the areas of psychology, business, behavioral economics, communication, social work, sociology, criminal justice, nursing, among others. This would be a facility designed with the nuances of multiple disciplines in mind. An implementation team consisting of faculty trained in experimental/behavioral science applications, vice president of research,

## Research and Infrastructure

chief information officer, vice president for academic affairs, vice president for institutional advancement, Killgore Research Faculty Committee, and industry partners will create the planning documents, seek appropriate approvals, funding and location, and implement. The location of the center will be determined during the master planning process.

### **Measurable Outcome(s) 1.2.1:**

Following completion of this action, WTAMU will have Experimental/Behavioral Applied Science Research Facility. The focus of the center will be seeking grant funding combined with fee for local service work that supports cross disciplinary research in a variety of experimental, behavioral applied science methodologies. Additional measurable outcomes could include external research dollars received from government sources, non-profits, and for-profit industries and businesses.

### **Action 1.3:**

WTAMU Collaboration with the Texas A&M Veterinary Medical Diagnostic Lab (TVMDL) will include relocation of TVMDL from Amarillo to the WTAMU campus. A shared research plan to integrate WTAMU research with the TVMDL will be created so as to include external grants and sponsored research. The location of the center will be determined during the master planning process and be led by the master planning implementation team. The TVMDL will help attract sponsored research projects and external grants and enhance research analytical capabilities for WTAMU faculty.

### **Measurable Outcome(s) 1.3.1:**

Following completion of this action, the TVMDL will have relocated from its location in Amarillo to the WTAMU campus and a collaborative research MOA will be established between WTAMU and TVMDL.

### **Action 1.4:**

## Research and Infrastructure

Renovations and updates need to occur to current capabilities at the WTAMU Research Feedlot, Nance Ranch, and various campus research labs: The current capabilities at the WTAMU Research Feedlot are pen- or animal-replicated cattle research trials with minimal diet complexity. In order to conduct multiple ration comparisons or ensure highly accurate feed delivery, the feedmill, which is currently inoperable, must be revitalized. WT feedlot researchers have implemented monitoring/data collection technologies; but, need more for sustaining future research . . . with the dual goal being to enhance research with novel data collection capability and to provide a platform of trial/error and insight for commercial feedlots considering adoption of new technologies. These technologies include remote early disease identification systems, remote rumination and animal behavior monitoring, rumen pH and temperature logging using a bolus, and feeding and watering behavior using a UHF tag and transponder system. Most of these research capabilities require some degree of facility configuration (IT, electrical or minor structural additions). Feedlot researchers need to finish out the pens and equipment installation of the animal health area to the south of the feedlot, consider revitalization of the feed mill as previously mentioned, and consider expansion of pen space on the north side of the feedlot where the dirt work has already been completed. There is also need to consider adding shade to pens in the future for various reasons of compliance, animal welfare and performance during heat stress. WTAMU's feedlot renovations will make a tangible contribution to the College of Agriculture and Natural Sciences regarding its reputation and visibility in the region and beyond. The WTAMU Ranch has current research capabilities related to multi-species forage and grazing systems, limited capacity for small scale livestock feeding projects, and limited capacity for small-plot crop research. The University's Nance Ranch additions will make an important addition to the College of Agriculture and Natural Sciences. Current research planning anticipates increased emphasis on forage and grazing systems. Facility additions needed in order achieve this include:

- ✓ Development of a water storage and distribution system at a current windmill (solar pump to replace the windmill, storage tank, and

## Research and Infrastructure

pipeline to distribute water to multiple pastures). This would allow better use and research options for pastures that cannot be fully utilized due to the water limitations.

- ✓ Construction of a basic livestock handling facility (pens, scale, chute, water, electricity) adjacent to remote grazing areas, which would allow collection of research data (weights, treatments, etc.)
- ✓ Installation of net wire fencing so that small ruminants (sheep, goats) might be used in grazing research to better utilize forages not palatable to cattle.
- ✓ Purchase of a no-till grain drill/seeder for planting cover crop mixes.

Additionally, there is need for review of the current inventory of WTAMU labs, throughout the campus, including Killgore Research Center and Palo Duro Research Facility, for updating to research and compliance standards. A comprehensive review of labs will identify WTAMU's strengths and weaknesses (SWOT analysis) and its research infrastructure.

### **Measurable Outcome 4.1.1:**

Following completion of this action, an implementation team consisting of the associated agricultural research faculty, vice president of research, chief information officer, vice president for academic affairs, vice president for institutional advancement, WT Research Feedlot and Nance Ranch managers, and industry partners will create the planning documents; seek appropriate approvals and funding; and implement the Feedlot and Nance Ranch renovations. The master plan recommendations, led by the master plan leadership team, will be completed for WTAMU laboratories and be in process according to the scheduled stages of implementation.

## **References**

## Research and Infrastructure

- Basken, P. (2016). Is university research missing what matters? *Chronicle of Higher Education*. (January). Accessed from <https://www.bu.edu/sph/files/2016/01/Is-University-Research-Missing-What-Matters.pdf>.
- Belkin, D. (2015). Where great research meets great teaching. *The Wall Street Journal*. (September 27). Accessed from <https://www.wsj.com/articles/where-great-research-meets-great-teaching-1475029920>.
- Blumenstyk, G. (2014). American higher education in crisis? What everyone needs to know. New York: Oxford University Press.
- Bowen, W. J. (2015). Higher education in the digital age. Princeton, New Jersey: Princeton University Press.
- Christensen, C. M. (2011). The innovative university: Changing the DNA of higher education from the inside out. San Francisco, California: Jossey-Bass.
- Christensen, C. M. (2016). Disrupting class, expanded edition: How disruptive innovation will change the way the world learns. New York: McGraw Hill.
- Craig, R. (2012). College disrupted: The great unbundling of higher education. New York: St. Martin's Press.
- Decker, B. (2017). Comparison and aspirant peers. Accessed from <https://www.wtamu.edu/webres/File/About/Aspirant%20Peers.pdf>
- DeNisco, A. (2016). Why the university of the future will have no classrooms, no lectures, and lots of tech. *TechRepublic*. Retrieved from 11.27.17: <http://www.techrepublic.com/article/why-the-university-of-the-future-will-have-no-classrooms-no-lectures-but-lots-of-tech/>
- Dickeson, R. C. (1999). Prioritizing academic programs: Reallocating resources to achieve strategic balance. San Francisco, California: Jossey-Bass Publishers.

## Research and Infrastructure

*EduCause Review*. (2009). The University's role in the dissemination of research and scholarship. (March 20). Accessed from <https://er.educause.edu/articles/2009/3/the-universitys-role-in-the-dissemination-of-research-and-scholarship>.

GuildHE, Ukadia, TheHeadTrust & Emsi. (2016). The economic value of creative focused universities and colleges. (November). Accessed from <https://www.guildhe.ac.uk/wp-content/uploads/2016/11/Econ-Impact-Executive-Summary-Final.pdf>.

Gunn, A., & Mintrom, M. (2013). Global university alliances and the creation of collaborative advantages. *Journal of Higher Education Policy and Management*, 35(2), 179-192.

Hanover Research.com. (2014). Trends in higher education marketing, recruitment and technology. (March). Accessed from <http://www.hanoverresearch.com/media/Trends-in-Higher-Education-Marketing-Recruitment-and-Technology-2.pdf>.

Howard, D. J., & Laird, F. N. (2013). The new normal in funding university science. *Issues in Science & Education*. (Fall). Accessed from <http://issues.org/30-1/the-new-normal-in-funding-university-science/>.

*Knowledge@Wharton*. (2016). Why we can't afford to ignore higher education's financial problems. (November 8). Accessed from <http://knowledge.wharton.upenn.edu/article/why-we-cant-afford-to-ignore-higher-educations-financial-problems/>.

Lupton, D., Mewburn, I., & Thompson, P. (eds.), (2017). The digital academic: Critical perspectives on digital technologies in higher education. New York: Routledge.

Parker, G. G., & van Alstyne, M. W. (2016). Platform revolution: How networked markets are transforming the economy - and how to make them work for you. New York: W. W. Norton & Co.

Pike, P. (2014). Engagement with higher education. Missoula: The College Music Society. Accessed from [https://www.music.org/index.php?option=com\\_content&view=article&id=1937&Itemid=2069](https://www.music.org/index.php?option=com_content&view=article&id=1937&Itemid=2069)" [https://www.music.org/index.php?option=com\\_content&view=article&id=1937&Itemid=2069](https://www.music.org/index.php?option=com_content&view=article&id=1937&Itemid=2069)).

## Research and Infrastructure

- Piper, A., & Wellmon, C. (2017). How the academic elite reproduces itself. *Chronicle of Higher Education*, (October 8). Accessed from <http://www.chronicle.com/article/How-the-Academic-Elite/241374>.
- Porter, M. E., & Heppelmann J. E. (2014). How smart, connected products are transforming competition. *Harvard Business Review*, 92(11): 64-88.
- Porter, M. E., & Heppelmann, J. E. (2015) How smart, connected products are transforming companies. *Harvard Business Review*, 93(10): 96-114.
- Selingo, J. J. (2016). College (Un)bound: The future of higher education and what it means for students. Las Vegas, Nevada: Amazon Publishing.
- The Chronicle of Higher Education*. (2016). The decade ahead: The seismic shifts transforming the future of higher education. Accessed from <https://dental.ufl.edu/files/.../The-Decade-Ahead-Chronicle-of-Higher-Education1.pdf>.
- Tugend, A. (2016). How public universities are addressing declines in state funding. *The New York Times*. (June 22). Accessed from <https://www.nytimes.com/2016/06/23/education/how-public-universities-are-addressing-declines-in-state-funding.html>.
- Tugend, A. (2016). Educators discuss the future of higher education. *The New York Times*. (June 22). Accessed from <https://www.nytimes.com/2016/06/23/education/educators-discuss-the-future-of-higher-education.html>.
- Voosen, P. (2015). For researchers, risk is a vanishing luxury. *Chronicle of Higher Education*. (December 3). Accessed from <http://www.chronicle.com/article/For-Researchers-Risk-Is-a/234437>.
- Wendler, W., Spaulding, A. & Henderson, E. (2017). A regional research university – The needs of the Panhandle. Accessed from [https://www.wtamu.edu/webres/File/About/White%20Papers/1\\_WT125\\_white\\_paper\\_regional\\_research\\_university.pdf](https://www.wtamu.edu/webres/File/About/White%20Papers/1_WT125_white_paper_regional_research_university.pdf)

# Research and Infrastructure

West Texas A&M University Website (2017). Mission statement. (<http://www.wtamu.edu/about/statements.aspx>).

# Research and Infrastructure

## **Appendices and Additional Facts and Analysis**

No information submitted.