3rd International Conference on Leadership, Technology and Innovation Management

A Leadership Model for the Research University

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Abstract

Research universities are crucial to the vitality of regional innovation ecosystems. To be successful, they need to adapt to meet new expectations spanning traditional roles of education and research in order to lead the translation of research and to drive economic development. They must anticipate the need to change and do so proactively. Alignment of vision and strategy, culture and beliefs, processes, plans, people, and desired outcomes is a critical success factor. Senior leadership must consistently and effectively communicate the vision and strategy (i.e., why the organization does what it does) and inspire a sense of urgency to focus the organization on desired results. Specific leadership models and behaviors are examined that are useful in guiding such change. The paper introduces a research leadership model that embodies the research strategy of the Georgia Institute of Technology and is used by its research leadership.

1. Introduction

   The work reported in this paper explores principles for strategic leadership based on a model for organizational adaptation described earlier in (Cross, 2013a). A key observation is that organizations that successfully adapt have (1) vertical alignment between vision, mission, and strategy with the beliefs and culture of the organization and (2) horizontal alignment between how work is done and the results. A further observation is that vertical alignment must precede horizontal alignment.   Equally important is a

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credible leadership style that incentivizes a willingness to change and to focus on desired organizational results. Given a rapidly changing environment and the expectations of sponsoring organizations such change needs to occur with a sense of urgency. The purpose for this paper is to articulate and illustrate actionable leadership principles necessary to achieve these kinds of alignment within a research university. The work reported here is part of an overall research program intended to codify a set of actionable principles in a staged process model to guide organizational adaptation and to enhance strategic leadership. This paper reviews the prominent leadership models and styles and then proposes key principles for strategic leadership. The author's research university is used to illustrate how these principles are applied and taught.

This work is conducted within a major research university in the Southeast United States, the Georgia Institute of Technology (Georgia Tech). As discussed in (Katz and Bradley, 2013: Clark, 2013), research universities are increasingly the nucleus of growth and impact for regional, urban-based innovation ecosystems. Such universities have a mission that transcends education and research to also transition research in order to achieve greater economic development impact. (Hage, 2011) explores six necessary functions that must exist for the successful innovation ecosystem: fundamental research, applied research, product development, manufacturing process, quality improvement, and extension services. As research universities are increasingly called upon to provide these functions, they must adapt. But adaptation is complicated by the fact that research universities, typical of any knowledge intensive organization, are populated by fiercely independent knowledge creators who exhibit a willingness to participate in overall institutional change programs only when the personal benefit is obvious and positive. Such organizations also expect efficient and effective support from various functions such as human resources, finance, and facilities management. (Lopez, 2012) describes how knowledge workers appreciate that their skills are applied every day and that they are valued by senior leadership. That is, they want to know that what they do is an integral part of the organization's future, that they are surrounded by colleagues who care for them, and that an exciting and credible vision is being communicated by senior leadership.

The paper will proceed with a brief review of pertinent literature followed by an overview of the Georgia Tech Research Leadership Model (GT-RLM) which is used by leaders throughout its research enterprise. This leadership includes senior administrators reporting to the President, associate deans for research; heads of direct support units such as contracting and start-up services; and faculty who lead research groups, centers, and institutes.

2. Review of literature

Two oft cited models of leadership are referred to as transactional and transformational (Charan, Drotter, Noel 2007). These are illustrated in Table 1. A transactional model is one in which the roles and responsibilities of people within the organization are clearly defined and routine. Work processes are designed for efficiency and personal innovation is often expected or tolerated. A rewards and punishment management approach guides personnel behavior towards achieving overall organization goals. An example might be a machine shop where individual machinists are essentially extensions of their machines and are expected to achieve certain quotas during each work shift. Salary bonuses might be offered for surpassing quantity and quality production quotas, while inferior performance might be dealt with through loss of benefits or even employment. Such a directive approach may be appropriate in some instances, but it does not fit the style expected by knowledge workers in research organizations. Yet, all too often university selections for leadership positions are based solely on reputation as an outstanding scholar (clearly a necessary condition) without consideration of their management experience or

Table 1: Leadership model contrasts

	Transactional	**Transformative**
Example	Machine shop	Modern factory
Characteristics	Well-developed hierarchical structure and disciplined processes	Open communication, less hierarchical
Motivation of people	Rewards and punishments tied to job performance	Deep desire to be appreciated and to be part of a winning team
People follow because	Management controls and provides clear direction	Shared vision and understanding of strategic intent

leadership potential. Such experience might typically involve great success with a directive approach (e.g., in supervision of graduate students), but there are many instances, for example with a new department head, where a transactional approach is instituted with predictably poor results over time. Recent studies, such as (Malik, Danish, and Munir, 2012) and (Ismail, Mohamed, Sulaiman, Mohamad, Yusuf, 2011), have shown that the transformational model is more suitable for the university environment.

A variant on the transformational model shown as quite applicable to organizational change is the adaptive model (Heiftiz, 2006). In this model a distinction is made between the kinds of problems leaders routinely face. One class deals with those for which there are known solutions that can be addressed through current management structures and work processes. The other class requires an adaptation or change in beliefs, priorities, habits, and sometimes even loyalties. In this model, leadership is not situational but process focused. The role of personal courage and risk taking is highlighted. Heiftiz describes actionable ways to lead and solve adaptive problems, such as the conduct of path finding experiments to guide organizational learning and to build support. (Randall and Coakley, 2007) has reviewed the applicability of this model to the university setting.

Recently, (Kotter, 2012) has contributed new ideas to his oft cited change management model that relate to both adaptive leadership and innovation. He describes the value of an "organization within the organization" to prototype new processes and practices and to serve as emissaries to the rest of the organization to motivate change. The ideas expressed are similar to practices pursued by large organizations like Whirlpool, Proctor and Gamble, and other Fortune 500 companies that have protected innovation venues outside their business units where disruptive concepts can be explored. Such practices are well codified in the innovation literature, for example in (HBR, 2005).

In parallel with the body of work in leadership models, there is a vast body of work on the behaviors and styles of successful leaders. For the purposes of this work, the servant leadership style is chosen as directly applicable. (George, 2007) describes this style from his own personal perspective of leading a Fortune 500 company. (Collins, 1996) also described this style of leadership, what he calls Level 5 leadership, as one of the distinguishing features between good and great companies. (Kouzes and Posner, 2002) define 5 behaviors that comprise the servant style: model the way, inspire a shared vision, challenge the process, delegate to others, and encourage the heart. More recently, (Grant, 2013) has shown the servant style combined with a focus on outcomes can lead to incredible success. (Linden, Wayne, Zhao, and Henderson, 2008) have shown that a servant leadership style and the social connections and exchanges it enables are as important as incentives and authoritative positions in enabling a focus on desired outcomes. Further they show that the hiring of others to leadership positions who subscribe to or are willing to adopt, the servant leadership style further enhance an organization's ability to achieve desired outcomes. Complementing the leadership models are the individual styles and behaviors exhibited by successful leaders. (Şen, Kabak, and Yanginlar, 2013) have proposed a model for

courageous leadership that integrates many of the concepts of adaptive leadership and the servant style based on the characteristics of famous leaders such as Mahatma Gandhi and Martin Luther King, Jr. Another such leader, Ivan Allen, Jr., the former mayor of Atlanta, Georgia (USA) during the 1960s, is memorialized through the Georgia Tech annual award for leadership based on social courage.[†]

   A leadership model published by the Ross College of Business at the University of Michigan (DeRue, Spreitzer, Flanagan, and Allen, 2013) integrates many of the transformational and adaptive leadership model concepts with the behaviors cited in the servant style. The motivation is to facilitate the creation of leaders within a university who seek to "make a positive difference in the world" and to support others.   For the purposes of this work, this model is augmented to include the focus on organizational adaptation addressed in (Cross, 2013a) and to include an explicit focus on strategic intent. (Zinni, 2009) describes strategic intent as a statement of vision and strategy by senior leadership that is so clear and compelling that everyone in the organization can easily understand the role they serve in fulfilling the vision and strategy. Zinni further describes the role of senior leadership in being proactive and in anticipating future needs and opportunities as a critical aspect of enabling a shared sense of urgency. Influencing and enabling a culture of innovation and change tolerance within an organization is based on many of the leadership concepts described. The model is shown in Fig. 1 and developed further in the next section where the research strategy and leadership principles of the Georgia Institute of Technology are used as an example.

3. Components of the Georgia Tech Research Leadership Model (GT-RLM)

   Georgia Tech was created in 1885 to develop an educated cadre of technical leaders to support industry growth in the southeastern United States. It consists of six colleges, an applied research institute, and an economic development organization that includes a state-wide incubator and extension services for

Achieve Results (measurable) outcomes expected of the organization		
Serve Others	**Build Community**	**Change Culture**
Get real	Build positive relationships	Seek efficiencies
Listen actively	Create shared visions	Improve continuously
Think boldly	Facilitate interdisciplinarity	Foster healthy competition
Act courageously	Enable teams	Experiment often
Encourage constantly	Provide incentives	Learn from failures
Be accountable		Celebrate successes
		Mentor others
Strategic alignment - vision, strategy, mission, and values		

Fig 1: Georgia Tech Research Leadership Model (GT-RLM)

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small to medium enterprises throughout the State of Georgia. The Institute includes support organizations that handle contracting and licensing, facilitate management, finances, human resources, and other support services. Fiscally, the Institute's budget is supported by the State of Georgia; tuition; sponsored research contracts with federal, state, and industry organizations; and philanthropy. A new strategic vision (Peterson, 2009) provides a 25 year roadmap for propelling the Institute forward in education, research, innovation, international programs, and internal processes. One focus in the vision is to align all research and economic development activities in order to significantly increase both the reputation of its research and its impact in driving a regional innovation ecosystem. Today, Georgia Tech is recognized as one of the top research universities in the world (Reuters, 2012). It includes the largest engineering college in the United States. Its innovation ecosystem has been described in (Cross, 2012; Breznitz, 2012). Georgia Tech's sponsored research awards have increased 12% per year over the past four years and commercialization has also advanced significantly (e.g., a 7x increase in start-ups). Major international corporations (e.g., AT&T, General Motors, Panasonic, ThyssonKrupp) have recently opened innovation centers on or in close proximity to the campus. The components of the leadership model, the GT-RLM will now be discussed.

3.1. Strategic intent

As previously defined, strategic intent is an explicit statement of vision and strategy from senior leadership that guides all work efforts within the organization. The strategic intent for the Georgia Tech research enterprise follows.

> *Research at Georgia Tech is led by faculty, powered by ideas, and supported by professionals. We seek to create synergy between our breadth and depth in discovery-focused and applied research coupled with our deployment expertise. The EVPR Office exists to support and celebrate all research with a concurrent focus on pursuing transformational interdisciplinary research, creating influential thought leadership platforms, strengthening collaborative partnerships, and maximizing societal and economic impact. The work of the office is guided by a bi-annually updated operations plan that is informed by faculty and administrators.*

Research is organized into core research areas and focused on grand challenges. Grand challenges are futuristic system descriptions that excite and motivate communities of researchers to work together to achieve some seemingly impossible capability. The key processes that create synergy between discovery, application, and deployment involve supporting curiosity, experimentation, and maturation. Each plays a key role in providing a bridge between two of the key research processes. The research strategy is further discussed in (Cross, 2013b). For the purposes of this paper, the leadership practices based on the GT-RLM are now discussed.

3.2. Core values

Core values describe immutable beliefs held by the people of an organization. At Georgia Tech the core values are integrity, excellence, impact, innovation, entrepreneurship, leadership, and community. They are summarized in Table 2. These values guide the actions of leadership in implementing strategy and in supporting work. Often there is a difference in an organization between stated values and real values. A key aspect of leadership is being faithful to the organizational values in word and deed. The four areas of the GT-RLM focus on providing an environment where individual faculty and students are well supported, and where creativity and curiosity driven thought can co-exist, thrive, and synergistically benefit application and deployment activities. The core values and the focus areas of the leadership model put emphasis on empathy, courage, innovation, and outstanding accomplishment. The research model

Table 2: Core Values of Georgia Tech

Georgia Tech Core Value	Definition
Integrity	Honesty, high ethical standards, openness, transparency
Excellence	High academic standards, embrace change, continuous improvement
Impact	Improve human condition, solve hard global problems
Innovation	Push boundaries, nurture curiosity within an interdisciplinary approach
Entrepreneurship	Promote an enterprising spirit within students, faculty, and staff
Leadership	Enhance thought leadership, prepare others to lead
Community	Welcoming environment, mutual respect, celebrate diversity

includes four focus areas that provide a linkage between strategic intent and core values. Each focus area is discussed in the following subsections.

3.3. Serve others

The first, and arguably most important, focus area of the GT-RLM identifies the individual behaviors the successful research leader must master. These are summarized in Table 3. While individual personalities vary (e.g., from introvert to extrovert), personal credibility must be established so that the leader has credibility that she "does what she says she will do" and that decisions are made in the best interests of the people within the organization. The leader needs to be himself (to get real) and build a reputation for putting the needs of others first. One key way this is done is through active listening. Accessibility and regular communication are important, but too often the new leader spends his time talking about what he believes needs to be done rather than inviting input from others. Bill Marriott, the CEO of the Marriott Hotel Corporation, tells a story from early in his career when he found himself at the home of a family friend who was entertaining President Eisenhower for a holiday weekend (Bryant, 2013). President Eisenhower earnestly asked Marriott several questions and showed genuine interest in his answers. Since that time, Marriott has spent time walking the halls of his hotels and asking all within the organization their opinions about how to achieve the company's vision and strategy. The successful leader also thinks boldly.   Earlier in his career, the author was a co-principal investigator (co-PI) with a neurosurgeon on a telemedicine project. The co-PI had a personal motto – progress begins when you deny the present concept.   This phrase can help one to think boldy (i.e., to think of new ways to better support research). One of the skills the leader needs to master is integrative thinking. This is the ability to hold two or more competing ideas in one's mind, to weigh the pros and cons, and to create a bold idea that is the fusion of the competing ideas. (Allio, 2003) describes practices to develop integrative thinking skills. Often these ideas will be risky to pursue. Hence, the successful leader must act courageously, that is to have the conviction to take risk and to encourage others to do so, too. In service to others, the leader is also a teacher and must be ever patient in this pursuit. The leader should encourage constantly. Research is an exciting endeavor, but it is also hard work and people can become discouraged easily. Everyone needs encouragement. Lastly, the leader should practice personal accountability.

Table 3: Serving Others Focus Area

Attribute	Description
Get real	Be authentic – trust dependent on integrity; beliefs/actions reflecting core values
Listen actively	Remember any stakeholder may have a better idea than you
Think boldly	Deny the present concept and explore underlying assumptions and consequences
Act courageously	Give permission to take risk; facilitate a culture of experimentation
Encourage constantly	Celebrate success and learn from failure
Be accountable	Be open to and seek critical feedback

The author does this through activities such as regular email posts and surveys as well as hosting town hall meetings and informal discussions with faculty designed to facilitate information sharing and to obtain feedback. The six behaviors of the first focus area can be developed through practice and are necessary for successful support of the research enterprise. New leaders at Georgia Tech are selected both because of their research competence, but also because they have demonstrated these traits and a willingness to improve their mastery of them.

3.4. Build Community

A key aspect of successful leadership within the research university is to build a sense of community internally and with strengthened partnerships with other entities. These communities must believe they "own" the problems they are trying to solve and that they have freedom to pursue innovative approaches to solving them. At Georgia Tech, communities are organized around core areas of research that include biomedicine, health systems, manufacturing, materials, electronics and nanotechnology, and energy systems. This focus area is summarized in Table 4. It is important to build positive relationships by creating a climate of open communication and trust with stakeholders across the university. This can be done through regular communications (e.g., email posts, surveys, town hall meetings, informal meetings with faculty) where active listening is practiced visibly and often.   One intent of the regular email posts is

Table 4: Building Community Focus Area

Attribute	Description
Build positive relationships	Communicate frequently, be positive, show genuine interest in others
Create shared visions	Envision the future; enlist others by discussing their enabling role
Facilitate interdisciplinarity	Charter task forces to explore hard problems that include many disciplines
Empower teams	Encourage risk taking; share decision making
Provide incentives	Ensure faculty and staff recognized

to show how ideas submitted by faculty are enacted. Two related leadership skills are creating shared visions and promoting interdisciplinarity. At Georgia Tech, task forces are commissioned on a regular

basis to define a shared vision to a hard global problem (e.g., sustainability in the future city, improving the quality of life for the elderly) in which faculty define both a vision, often encapsulated as a grand challenge statement, and a roadmap and proposed plan for pursuing the problem. As an example, a new institute was announced in June 2013 to focus on computationally designed materials. A faculty led task force held offsite meetings with over 75 materials researchers during the past two years. An exciting plan was created, one that garnered attention by the White House. The new institute was announced in a White House press release on 24 June 2013. The materials task force also shows the value of empowering teams to pursue their visions. The task force had the authority to make decisions about its future, though at times it was encouraged to take more risk. "Giving permission to take risk" is a recurring theme across many of the leadership skills. Lastly, it is necessary to provide incentives. At Georgia Tech this includes purposeful recognition of faculty leadership (e.g., annual awards for research accomplishment that includes leading teams), provision of discretionary funds to faculty and administrative units supporting faculty, and consideration in the promotion and tenure process. The leadership skills discussed here for internal team building are also applicable to external partnerships with sponsors and other stakeholders. A recent example includes the strategic partnership with the Children's Healthcare of Atlanta, the largest pediatric care organization in the United States. The community building leadership skills have been applied over the past two year period to build a very strong and trusted relationship where teams of faculty and clinicians work together to address grand challenges ranging from implants that can grow with a child, to finding a cure of single defect diseases like cystic fibrosis, to significant reduction in the cost of pediatric care (the State of Georgia covers approximately 40% of such care to over 1 million children).

3.5. Change Culture

   As mentioned in the beginning of the paper, research universities are called upon to accomplish expanded missions and this requires them to adapt and to embrace cultural change. The leadership skills for this focus are summarized in Table 5 and developed in more detail in (Cross, 2013b). Key changes required in the Georgia Tech culture are 1) the pursuit of a concurrent strategy to support leading edge research in concert with increasing economic development impact, 2) the movement from the typical single PI model to working in interdisciplinary teams, and 3) an ongoing change in the support functions of the Institute based on a renewed service mentality and a systems approach to serving those conducting research. For example, the contracting and licensing functions have adapted, becoming more service and innovation oriented from a past stance on compliance. While compliance is a necessary and critical function, the people assigned to the contracting and licensing functions accepted the challenge to provide more industry and faculty friendly services. They pursued process improvements in the contracting process which they seek to continuously improve. As part of a faculty task force on innovation, they adopted an approach to experiment with new and creative approaches for supporting faculty in pursuit of start-up companies. They learned from some missteps, but also have celebrated their successes. The criticality of a faulty tolerant culture is explored more in (Farson and Keyes, 2002).   All research leaders are encouraged to regularly think how work can be done better in support of faculty. Competitions are used regularly to guide selection of proposals for internal research funding (called seed grants and used primarily to "seed" or initiate new work where initial research results and data are required for significant external awards). In addition costs centers have been created around large and expensive equipment and clean rooms to facilitate shared use, provide services to industry, and to share costs.

Table 5: Change Culture Focus Area

Attribute	Description
Seek efficiencies	Keep asking what can be done better
Improve continuously	Encourage everyone to improve how work is done
Foster healthy competition	Use merit selection process for seed grants and equipment
Experiment often	Admit we don't know all answers, discover them
Learn from failure	No fear of failure as long as something valuable is learned
Celebrate success	Give credit to others and recognize them
Mentor others	Help create the next generation of leaders

3.6. Achieve Results

Lastly, leadership skills are indeed related to expected outcomes. The successful leader focuses on these outcomes when she considers the leadership skills undertaken in service to others, building community, and changing culture. Arguably the most important is enhancing scholarship and the reputation of the faculty. Scholarship is enhanced not only through pursuit of research, but by using research results and the research infrastructure itself to enhance education. Innovation competitions as part of student capstone courses are supported by industry. In these courses, students explore disruptive concepts on behalf of local industry partners. As Georgia Tech's interdisciplinary focus becomes more prominent, new thought leadership platforms have been created such as the previously mentioned materials initiative. A reputation for defining and solving hard problems has increased, for example through the publication of a national robotics roadmap. Significantly, Georgia Tech is recognized increasingly for its economic development impact as a partner in facilitating the transition of research results into industry use. All of this has helped increase and diversify external support for research. While the leadership principles in this section also deal with measurable outcomes, the successful leader keeps in mind the desired organization outcomes, and related plans to achieve them, in concert with the leadership focus areas related to serving others, building community, and changing culture.   The leadership practices are summarized in Table 6.

4. Discussion

The leadership model presented and leadership focus areas are used in the selection and development of research leaders at Georgia Tech. Continuous improvement of one's leadership abilities is an ongoing process. The College of Business includes an institute focused on leadership and entrepreneurism. It conducts a leadership roundtable that consists of a weekend retreat for small groups of faculty as well as networking sessions throughout the year. This is a primary means through which younger faculty are introduced to leadership principles. For the past two years a variant of this offsite has been provided to newly tenured faculty.   In addition, the author teaches a seminar on leadership and emphasizes one of the leadership focus areas in each staff meeting with direct reports and research center directors.   A new area

of applied research is the development of an online repository of "leadership stories" based on the focus areas briefly described in this paper.   Interested members of the research community are encouraged to

Table 6: Achieve Results Focus Area

Attribute	Description
Enhance scholarship	Seek ways to enhance scholarship, improve education
Create thought leadership platforms	Position faculty into positions of influence within their communities
Define and solve hard problems	Gain a reputation as the place that sets the research agenda
Support adoption across the ecosystem	Facilitate translational research and transition to use
Increase and diversify the sponsorship base	Grow the resource base to support research

submit stories to the author for dissemination for inclusion based on the focus areas briefly described in this paper. While perhaps new in the context of research leadership, this is not a new idea. For 13 years, a grass roots movement within the US Army has supported Company Command.[‡] This online resource for officers new to command leadership positions provides a community that shares experiences and advice. While the situations faced by an Army unit preparing for, or engaged in, combat are different from that in a research organization, many of the leadership principles (e.g., serving others, building teams) are common. This online service has been credited with helping young officers master leadership principles.

5. Summary

The research university is expected increasingly to not only support research and education within its university, but to drive its regional innovation ecosystem. This often means adapting to new internal and external realities.   Leadership must guide the adaptation and inspire the need to change with a sense of urgency. The paper argues that an adaptive model and a servant style are most effective in providing a leadership process that is shared across the organization in support of faculty and research goals. Georgia Tech has adopted a model of leadership called the Georgia Tech Research Leadership Model that encodes leadership principles into four focus areas: serving others, building community, changing culture, and achieving results. With each focus area, specific leadership principles are described. Leaders are chosen based on a predisposition to these principles, along with their demonstrated research competence. Mentoring and leadership development are expected from everyone in a leadership position. Use of this model is a major way in which Georgia Tech is pursuing its strategic vision.

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