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Universities' third mission and the entrepreneurial university and the challenges they bring to higher education institutions

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Universities' third mission and the entrepreneurial university and the challenges they bring to higher education institutions

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Abstract

Purpose – Over the past few decades, higher education institutions (HEIs) have become key players in regional economic development and knowledge transfer, which has led to a third mission for HEIs and the entrepreneurial university. The purpose of this paper is to assess the challenges of HEIs in fulfilling the third mission for economic development and the changing role of being an entrepreneurial university, and the changes that need to be implemented to fulfill this new mission.

Design/methodology/approach – The authors have drawn on current literature to examine academic entrepreneurism and the entrepreneurial university, and how universities are fulfilling their third mission.

Findings – The findings from our review of the literature demonstrated the varied economic and social benefit of universities conducting external third mission/entrepreneurial activities in the community, as well as how the changing role and expectations of universities to become more entrepreneurial, has not only changed the expectations and role of university administrators, faculty and staff but also the business community which they serve. The review also showed the varied challenges for universities in fulfilling the third mission of economic development.

Research limitations/implications – Although ample literature and cases about universities' third mission of economic development and the new entrepreneurial university (especially with research universities) were available, literature or research was limited on the specific challenges and obstacles faced by administrators, faculty and departments in fulfilling this mission, and few studies recommended changes that needed to be implemented in HEIs to support this new mission.

Practical/implications – The paper supports the potential role that HEIs play in implementing economic development in their communities or region. The paper also highlights some of the necessary resources and policy changes that policymakers and university administrators need to implement to reward and recognize faculty in conducting outreach activities as part of the university's third mission.

Originality/value – The findings from this study highlight the challenges and barriers for faculty, staff and HEIs in fulfilling the third mission and becoming an entrepreneurial university.

Keywords Entrepreneurship, Higher education, Community development, Economic and social development, University and community partnerships, University and economic development

Paper type General review

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Introduction

Historically, university faculty and their departments regarded their mission and responsibilities as threefold: teaching, research and service. This trilogy could be regarded

as a three-legged stool where teaching and research were the dominant legs of the stool and were regarded as key to the mission of the university's first and second missions of teaching and research. Service, the third leg of the stool, on the other hand, was traditionally regarded as less important and was given much less weight; it primarily consisted of service to the university such as serving on department and college committees with very little service being conducted in the community aside from a few select disciplines. However, over the last few decades a number of events changed this perception of service. First, university faculty and departments recognized their responsibilities went beyond service to the university and that they were part of the communities in which they resided, and thus, had a commitment to serve them. Second, members of the communities started to recognize the human capital and assets that resided within the university and requested their support and help. Third, businesses started to partner with universities, faculty, and departments on varied economic development projects. These events, and most significantly, financial and economy insecurities in the greater economy, led to a third mission for the university and the advent of what has been called the entrepreneurial university (Clark, 1998; Anders, 1992). More recently, we have seen the development of a fourth mission in some universities with a focus on sustainability and sustainable development. This new focus started within universities through varied programs and activities (Kurland, 2011; Krizek *et al.*, 2012), and has spread outside the university through a variety of service and sustainability programs performed in the university community and beyond (Laninga *et al.*, 2011; Molnar *et al.*, 2011).

The emergence of the third, and sometime, the fourth missions in higher education has created a new movement by universities to become engaged with the community. This new engagement is being embraced by both the community and the institutions. For too long, universities worldwide were not "engaged" with their surrounding community – they lived, as some have said in their "ivory tower", where both students and faculty operated in a protective bubble. However, over the past few decades, this has changed. Students increasingly are being measured by their civic engagement and administrators demand a more engaged faculty with the community. Even in the area of scholarship where faculty scholarship required rigor and were judged only by their peers, a new paradigm of "engaged scholarship" has been proposed, where what is considered scholarship should be expanded to include a whole array of civic and community activities (Boyer, 1990, 1996).

This new university service focus includes a wide variety of activities ranging from community-based research projects to service learning activities, and community-based training programs to different shared programs with the community. On the surface, this new arrangement/engagement between universities and their communities appears like a "win–win" situation: Universities can reinvigorate their academic missions and communities can advance their social agenda. However, it also brings new challenges and expectations from both the community served and the university providing these services. Multiple tensions and conflicts can easily arise because of the diverse expectations of the respective groups in the university and the community. Thus, service activities in the community while encouraged and mandated can present significant challenges to the institution and the community. The impact of this external engagement is most dramatic for the university, its faculty and how they operate, with the emergence and recognition of universities third mission for economic development and the "institutionalization of entrepreneurialism" in higher education institutions (HEIs).

The impetus behind the emergence of the third mission came from forces both external and internal to the university. Externally, hard economic times resulted in reduced tax dollars to the government which subsequently reduced funding to universities. Internally, because of reduced funding, universities needed to generate more revenues during tight

financial times. In addition, companies and organizations started to recognize the expertise within the university, and see the synergy and benefits of working together. However, some scholars and others have seen this as a shift to a new "academic capitalism" (Mars and Metcalfe, 2009; Rhoades, 2006). Rhoades (2006) says this new form of academic capitalism is in essence, "not-for-profits institutions behaving more like private enterprises as the relationship between public and private entities shift", which for some could ultimately be seen as a potential conflict to academic values and intellectual integrity (Mars and Metcalfe, 2009). Mars and Metcalfe (2009) speak of this sort of "neoliberalism" as a reminder of the potential corrupting impact of putting economic gains first. Conversely, we can see how academic entrepreneurship and innovation go hand-in-hand, through the many innovations, spin-offs, and technology transfer that has initially started in university labs. Gurău *et al.* (2012), for example, see this shift towards this type of "academic entrepreneurship" as a natural path and outlet for technology transfers and innovative discoveries, and ultimately, as a means to increase the competitiveness of national economies. However, due to these changes, institutions are faced with changing incentives and policies. For some, this shift in mission and funding has come at the expense of the arts and humanities (Slaughter and Rhoades, 2004; Washburn, 2006), and that ultimately it challenges the social contract that universities have to a more corporate-style management structure in academia (Bleiklie and Kogan, 2007; Rhoades, 2006).

The deep economic recession of 2008 and 2009 and the long, slow recovery have left many countries deep in debt, and there remains a growing sense of despair among businesses, political leaders and policy makers that this economic crisis (even though the stock market has improved) will continue (Elliott, 2011; Financial Forecast Center, 2015; Eurostat, 2015) well into the future. This pessimism has led to many governments, both in the USA and abroad, to reduce funding for higher education and the adoption of nationwide and/or state-wide austerity programs. The net result is that HEIs are frequently not filling faculty lines, and administrators at all levels of the university are asked to reduce their budgets. These reductions not only impact having sufficient faculty to teach courses, but also the many functions and services that support the faculty member's teaching, research and outside activities.

The cutbacks in funds have also produced many challenges for university administrators, at both research and teaching institutions; however, it can often be the greatest at non-research/liberal arts institutions, as their workload and primary mission is teaching. The challenge for research and non-research institutions is how to motivate faculty and staff on this mission for economic development when the funding to complete the two primary missions (teaching and research) is so severely impacted.

The aim or intent of this paper is to move beyond the literature and discussion of the university's third mission of economic development to an examination of some of the greatest challenges for HEIs in fulfilling the third mission for economic development and transformation of the university into an entrepreneurial institution. In pursuit of this, the paper will provide a brief review of the evolution of HEIs and the emergence and growth of the third mission. Following this, we will present some of the foremost challenges and barriers confronting universities in their efforts to respond to the third mission, as well as providing some recommendations for HEIs in being an entrepreneurial university.

Evolution of the third mission and the entrepreneurial university

The foundation for university education has been on teaching or liberal arts from the earliest recorded university in Bologna in 1088. In fact, the word "university" is derived from the Latin *universitas magistrorum et scholarium*, which means *community of masters and*

scholars (Dictionary.com, 2015). In many universities, especially colleges and universities in the USA, the first two years of an undergraduate baccalaureate student's education, are focused on learning the arts and science: humanities, language, math, science, etc. Teaching was regarded as the "primary mission" of universities, and faculty's principal duties and responsibilities were focused on this task. During the nineteenth century, what has been called the "first academic revolution" occurred, where research was integrated into the universities' core activities. Hence, research, predominately applied in nature, became the second mission for universities. This model of conducting applied research can be traced back to the agricultural extension programs which encouraged faculty to conduct research that could be translated into practice (Anders, 1992).

In the 1980s, another turning point in the evolution of universities mission occurred with the emergence of a third mission (Etzkowitz, 1998) which focused on external service. This new focus has been called the "second academic revolution". It is from the second academic revolution that the entrepreneurial university was born. In this model, the university enters into a type of "triple-helix model or partnership" (Etzkowitz and Leydesdorff, 2000): industry and government works with academia in contributing to innovation-driven strategy aimed at regional or national economic growth strategy (Yarime *et al.*, 2012). In principle, the third stream activities, as part of the university's third mission, refer to the bundle of activities that generate, use, apply and exploit knowledge and other university capabilities outside academic environments (Molas-Gallart *et al.*, 2002). Essentially, it encompasses all activities that are not covered by first and second missions (absent of university service), and is principally promoted as economic contributions (Trencher *et al.*, 2014a, 2014b). The incentive for universities to engage in these activities was further enhanced in the USA by the passage of the Bayh–Dole Act or "Patent and Trademark Law Amendments Act" (Pub. L. 96-517), which gave USA universities intellectual property rights on patentable inventions that originated from government sponsored research (Goldstein, 2010). Many other countries in Europe and Asia have enacted similar legislation providing for incentives to universities for technology transfer and entrepreneurial spin-offs (AUTM, 2016). For example, Germany has the German Employed Inventor's Act, and Sweden has allowed universities to form "Patent and Exploitations Office" (Siepmann, 2004).

Over the years, we have seen almost every type of HEIs (public, private, etc.) embrace the third mission in some form or the other, using a variety of different approaches or models to promote economic development in their communities and beyond. Etzkowitz (1983), who coined the term the "entrepreneurial university", saw the implementation of this new mission as being one of the entrepreneurship and entrepreneurial activities. Following this approach, universities would promote an environment of academic entrepreneurship and the commercialization of the university natural science or resources, i.e. knowledge through spin-offs, patents and licensing (Grimaldi *et al.*, 2011). Similarly, Cook (1992) saw universities developing regional innovation systems (RIS model), where universities would be the center or nucleus for innovation and exchange of knowledge for the region. Conversely, Boyer (1990) ascribed to a much broader role for universities in the fulfillment of the third mission. He felt that universities should serve their local communities and promote economic development based on the specific regions' needs through engagement in the community, and not solely through a knowledge-generative role. Other universities used a combination of all of the above, which could range from training programs, to providing direct services and helping with business funding, to creating innovative solutions to complex economic issues.

Generally, it has been found that the implementation of the third mission in the Doctoral Research institutions usually comes in the form of some type of knowledge transfer and

commercialization of a product: economic patents, spin-offs and technology transfer. Some of the leading examples for economic patents, company spin-offs and technology transfer can be traced to select centers and programs in many of the major universities in cities and regions across the USA and the world: cities like Boston, San Francisco, Atlanta, Austin and Chapel Hill in the USA or Cambridge, Berlin, Paris, Auckland, etc. outside the USA. Universities like MIT and Stanford in the USA, the University of Cambridge in the UK or University of Auckland in New Zealand are known as leaders in innovation and technology transfer (Graham, 2014).

Implementation of the third mission at smaller universities generally promote a much more regional or local approach to economic development. Many universities have Centers for Excellence, Entrepreneurship, Business Development, etc. from which they provide a myriad of economic development activities in support of the college or university's third mission in the local community or region. For example, at the Northern New Mexico College, they work with distressed rural area, while at the University of Alaska University Center they build capacity in communities and tribal organizations. In contrast, the University of Nevada in Reno and the University of Arkansas in Little Rock, leverage broad partnerships in support of local and regional economic development institutions, while the University of Kentucky Von Allmen Center for Entrepreneurship and Texas A&M University Corpus Christi Coastal Bend Business Innovation Center create programs to cultivate local sources of venture and angel capital (SRI International, 2013).

Aside from research and teaching universities, community colleges in the USA have played a vital role in local and regional economic development. Community colleges in the USA are frequently seen as the catalysts, working jointly with local economic organizations, small business development centers, community development financial institutions and local partners in promoting small businesses and creating economic development opportunities for individuals and promoting small business development. During the economic recession of 2007, President Obama pointed to community colleges as the potential saviors of the economy (McClure, 2010). In Europe, Australia and other regions, you have networks of "technical colleges and universities" which provide similar supportive training and activities in the communities.

Although universities started to become involved in third mission entrepreneurial activities in the 1980s, it was more in the 1990s when the role of HEIs dramatically changed as a result of political and financial pressures and calls for increased accountability. Udell (1990, p. 29) stated:

> [. . .] as state economies have faltered or declined, state officials and the citizenry they represent have begun to look to their institutions of higher education for assistance in shoring up sagging sectors of the economy and building new ones.

These pressures to not only engage with the community but also demonstrate their contribution to the local economy became even greater during the recent economic downturn in 2007. This increased pressure on third mission initiatives by universities post the economic downturn is being seen in countries throughout the world. In the UK, for example, universities are under increased pressure to engage with their local entrepreneurial "milieu" and to translate academic research into industrial use (Collini, 2012). In Germany and Denmark, as well as Belgium, research institutes are actively licensing, and creating cooperative agreements and partnerships between academia and industry (Siepmann, 2004). In Germany, for example, the *EXIST* (Existenzgründungen aus der Wissenschaft) program focuses on improving entrepreneurial environment at German universities by promoting networks between universities, venture capital and service companies (EU/EPC, 2003).

France has subsidized a host of incubators and "technology research and innovation networks" to connect university researchers with private industry (European Commission/France, 2003), while Italy in 2001 enacted legislation to award ownership of university research property rights to researchers (European Commission/Italy, 2003). Beyond Europe, and particularly in Asia, we are seeing a number of programs with a focus on training entrepreneurs (Dana, 2001). In India, the National Institute for Entrepreneurs and Small Business oversees the formal training of small business managers. In Indonesia, there is the Small Industries Development Program, which provides technical training and assistance, while in Malaysia and the Philippines, the Malaysian Entrepreneurship Development Centre (MEDEC) and the Small Enterprises Research and Development Foundation (SERDEF) respectively provide training and assistance to entrepreneurs (Dana, 2001). However, most notable is the country of Singapore where the Hakka clan associations have built private schools where students are taught cultural values related to entrepreneurship and eventually owning a small business (Dana, 2001).

The role of university administrators and especially administrators of universities with a primary teaching focus has gone from one that managed the internal university faculty and affairs, to one where he/she engages in partnerships and promotion of the university in the community and beyond. Similarly, the role of the faculty has gone from one that teaches his/her classes and who may or may not engage with his/her local community, to one where the faculty is expected to both teach and engage in his/her outside community.

Betts and Lee (2004) provides a list of some of the new roles that universities must play in fulfillment of the third mission:

- *Trainer*: University's role in providing to local economy an ample supply of skilled young graduates.
- *Innovator*: Generation and commercialization of academic knowledge;
- *Partner*: Provision of technical know-how.
- *Regional talent magnet*: Using the presence of a university to increase the attractiveness of the region to talented academics, entrepreneurs and engineers.
- *Facilitator*: Facilitate networking between private and public sectors.

Gurău *et al.* (2012) have said that academics select from three types of the academic entrepreneurship:

(1) founder-manager of an entrepreneurial firm;

(2) project manager in an existing firm; or

(3) scientific advisor to the board of directors of one or several firms.

Regardless of the type or form of entrepreneurship the academics pursue, the individuals engaged in these activities are faced with challenges ranging from time constraints to a lack of business or marketing knowledge. In addition, adding to these challenges (as noted earlier), is the growing emergence of the fourth mission for HEIs. This fourth mission, as Trencher *et al.* (2013) has said, finds universities collaborating with government, industry and civil society to advance sustainable development and create sustainable transformation in these industries and communities. According to Trencher *et al.* (2013), a "co-creation for sustainability" represents a radical paradigm shift in HEIs, where HEIs not only contribute to economic and social development via technology transfer and entrepreneurialism, but it also collaborates with different stakeholders with the aim of materializing sustainable development.

Table I below shows the chronology of HEIs evolution from the first to the fourth mission and the triggering event that has led to these mission changes (Table I).

Fulfilling the third mission: barriers and challenges

Universities' missions are changing – they have moved from one of teaching and research, with some service to the university community, to one of entrepreneurship, community engagement and sustainable development. No longer are they regarded as islands or bastions that are estranged from the communities; it is now mandated that they become part of the community. In addition, their operations and existence, as well as their worth and value, are being questioned and challenged by their community, politicians and government. This path brings many challenges to colleges and universities, both large and small.

Table II below show some of the challenges that must be considered by universities in pursuit of fulfilling their third mission and becoming an entrepreneurial university.

Faculty attitude toward third mission and entrepreneurship

In the past 20 years, most research universities in the USA, as well as many outside of the USA, have added economic development and entrepreneurship to their core mission. Legislation in the USA such as Bayh–Dole or national policy institute laws and regulations in the UK has given universities intellectual property rights and created university commercialization policy (Trippi *et al.*, 2015) which ultimately have led to a greater acceptance by university faculty to entrepreneurial activities and the entrepreneurial

Table I.
Timeline of emerging universities' four-mission model

Mission	First	Second	Third	Fourth
Mission focus	Education	Research	Economic	Sustainability
Triggering event	Expansion of Catholic Church	Humboldtian reform	Knowledge economy	Sustainability crisis
Timeline	1150-1170	1810	1980	2010-on

Source: Adapted from Trencher *et al.* (2014a)

Table II.
HEIs challenges to the third mission

Focus	Example activities	Challenges/Barriers
Economic development	Technology Transfer	Faculty attitudes toward third mission
	Spin-Offs	Skepticism toward academic commercialization
	Consulting	Attitudes toward value of arts/humanities degree
Community: non-commercial	Internships	Overriding focus on science, technology, engineering and math (STEM) courses and degrees
	Service learning	Faculty assessment process and lack of focus on external service activities
	Community-based training	Decreased funding to universities to support primary mission
		Rising role (financially and organizationally) of administrators
		Limited support and resources to third mission activities
		Mission drift and ethical and conflict of interest issues
		Conflicts and expectations by the community
		Not meeting perceived or real expectations of community

university. Although many faculty within these institutions not only recognize this new core mission and have embraced it (Gurãu *et al.*, 2012), faculty have also voiced some concerns about this new academic model, especially the commercialization aspect of it (Goldstein, 2010).

Goldstein (2010) conducted a survey of faculty from the USA from public (land grant and non-land grant) and private universities and found that although most faculty agreed that universities should be involved in regional economic development activities they were much less supportive of "commercialization of knowledge". In particular Goldstein (2010, p. 107) found that faculty in the humanities and social science have, as he said, "not acquiesced to the entrepreneurial turn". In a similar study by Goldstein *et al.* (2013) of EU universities, attitudes towards engagement were generally positive, while faculty attitude toward commercialization were much less enthusiastic (Goldstein *et al.*, 2013). Thus, faculty, on both sides of the Atlantic, although supportive of regional engagement, appears to be concerned with academic commercialization, which can not only take away from basic research activities conducted by faculty, but also potentially could lead to conflicts of interests.

Although every university is different, the key to the success of academic entrepreneurism and the entrepreneurial university is having faculty buy-in. If universities, especially top-tier research universities, wish to become entrepreneurial universities they must alleviate the concerns by faculty on the commercialization of products.

Changing attitudes toward traditional teaching institutions

In the past decade in the USA and elsewhere, the educational community has increased their focus on science and math education. The acronym for this new educational focus in the USA is STEM or Science, Technology, Engineering and Math. Accompanying this is a growing belief, especially in the USA, that these subjects are much more important than the humanities or arts in today's digital economy (Klebnikov, 2015). Coupled with this, we are seeing attacks by politician and others (greatest in the USA) on the value of a humanities and arts education and degree. For example, the Governor of the state of Florida (shortly after he was elected), said he supports students getting college degrees, but "only if the degrees are useful to corporations and don't teach students to question social norms [. . .] they need to get education in areas where they can get jobs" (Weinstein, 2011). This way of thinking has been voiced by others: USA Governors from the state of Texas, WI, North Carolina, as well as the former Republican candidate for President in the USA, Mitt Romney have all been known to question the value of humanities and arts education. Even USA President, Barack Obama questioned the value of an art history degree (Klebnikov, 2015). Although the USA President elect Donald Trump has not weighted in on this topic, it could be surmised that his views as a businessman would trend to business education over a degree in the humanities and arts.

However, this focus on STEM and attitudes by some politicians towards arts and humanities education is being challenged and rebuked. Wadhwa (2011) conducted research on 652 USA-born chief executive officers and heads of product engineering at 502 technology companies. Wadhwa (2011) found that only 37 per cent held degrees in engineering or computer technology, and just 2 per cent held them in mathematics. The rest had degrees in a variety of other fields including the arts and the humanities. Steve Jobs is a point in case. Wadhwa (2011) says Jobs taught the world that good engineering is important, but what matters the most is good design. Jobs often cited his calligraphy class at Reed College, which taught him about typefaces, letters, spaces and sense of artistry that science could not, which ultimately helped him create the design that Apple is famous for (Jobs, 2005).

In a recent article by Anders (2015), he cites numerous examples of how tech start-ups, as well as established companies, are hiring non-science, arts majors. When we think of entrepreneurship, we often associate creativity and critical thinking, and not that science programs do not teach these areas, but education in the arts and humanities can provide a good foundation in this way of thinking.

Some educational institutions are finding how humanities and arts, and science can work together. At the State University of New York (SUNY) New Patz, public and private support is sponsoring a center to support local manufactures and local artisans (Fairweather and Gifford, 2014). While in Australia, the Royal Melbourne Institute of Technology has created a cross-disciplinary approach to design for local industries by bringing together a variety of design related programs (Dimech, 2012). In pursuit of bringing new creative forms into the classroom and elsewhere, we have been seeing a rise in the use of improvisational training at select universities in the USA, such as Stanford, Duke and Columbia, as well as in corporate boardrooms, e.g. Google, PepsiCo, McKinsey (Ratten and Hodge, 2016). This training leads to a renewed focus on areas such as self-awareness, interpersonal skills and the idea that work is fun, which ultimately can result in increased creativity.

Examples like this, as well as others, highlight how the arts can increase creativity and become an integral part economic development and the entrepreneurial university.However, for this to be successful, attitudes have to change regarding the value and worth of an education and degree in the humanities and arts.

Faculty assessment process

Another challenge facing HEIs, and in particular HEIs with a primary focus on teaching in the implementation of the third mission for economic development, is the current method of faculty assessment. Faculty assessment, as previously mentioned, follows a three-legged stool model: teaching, scholarship and service, although the third leg, service, gets short-changed at times. The primary focus, especially at non-research institutions, has been on teaching, where larger doctoral research institutions primary focus is on research. Debate within these domains, be it teaching institutions or doctoral granting research institutions, occurs primarily with validity of measures. For example, how do we assess teaching and what measures do we use; instructor evaluations, course content, peer teaching, etc.? In scholarship, what academic works of the individual meets the rigors of accepted scholarship? However, as abundantly discussed, "the mission of HEIs has changed", yet the assessment and evaluation process for faculty has not evolved to be consistent with these changes. Therein lies a significant challenge for universities, both doctoral granting and those with a primary focus on teaching. However, the challenge appears greatest for the teaching institutions.

For example, in doctoral granting institutions, substantial funding for the support and operations of the university is dependent on activities generated by external grants and projects. Thus, frequently research faculty will have a significantly reduced teaching load to devote their time to these revenues generating activities. In addition, these activities can produce academic scholarship, thereby positioning the faculty member in good standing and on track for tenure and promotion. Conversely, this is not always the case for institutions with a primary focus on teaching. The nature of their third mission is often community driven which traditionally does not produce significant external funds or vast opportunities to convert these activities into scholarship. With an assessment process that remains focused on assessing the primary and secondary missions, it leaves faculty from these institutions in particular at an extreme disadvantage. Adding to this, the overall

workload for teaching is often not reduced to allow faculty members to conduct these activities.

Scholarship in most institutions is required for promotion. Scholarship activities associated with third stream activities by faculty might involve intellectual property creation, white papers or technical reports. However, these contributions generally get much less weight and value by peer review committees, where academic success is based on the journals the scholarship/research papers are published in, the journals impact factors, the number of academic citations, etc.

Although, as noted earlier, there has been some expansion of what constitutes scholarship as put forward by Boyer (1990) in Scholarship Reconsidered, where scholarship would include teaching, discovery, integration, application, etc., many of the outreach activities performed at teaching institutions. However, many institutions have not adopted this model or incorporated it into their assessment process.

Yarime *et al.* (2012) feel that for HEIs to move more effectively and consistently toward external activities such as sustainability (fourth mission), the university appraisal systems must provide a more holistic assessment process that includes not only traditional academic responsibilities, but also collaboration with stakeholders. These authors go on to say, "the slow pace in HEIs' movements towards sustainability has been particularly influenced by the conventional university appraisal systems that do not seriously consider sustainability perspectives in their evaluation methodologies" (Yarime *et al.*, 2012, p. 104).

Fadeeva and Mochizuki (2010a, 2010b) postulates that for HEIs, especially non-research, teaching institutions, to move forward on their third mission, they must recognize that integral to the success of these mission is changes to the universities assessment and appraisal systems process. If modified appropriately, they could be a significant force for transformation towards a more sustainable direction.

Funding to universities and growth of administration

Over the past decade, HEIs have experienced budgetary constraints on hiring new full-time faculty and there has been a move to a greater presence of non-teaching faculty. Marcus (2014) citing a joint report by the New England Center of Investigative Reporting and the nonprofit, nonpartisan social-science research group, the American Institutes for Research, reports that from 1987 to 2011-2012, universities and colleges collectively added over one-half million administrators and professional employees. Campos (2015) in a report for the New York Times, said, "According to the Department of Education data, administrative positions at colleges and universities grew by 60 per cent between 1993 and 2009, which Bloomberg reported was 10 times the rate of growth of tenured faculty positions". Campos goes on to cite a report from a professor at California Polytechnic University, Pomona on a study that was done on the California University System (state college system of California). This research found that between 1975 and 2008, the total number of administrators grew from 3,800 to 12,183, which is a 221 per cent increase. At the same time, the total number of full-time faculty members in the California State University System grew from 11,614 to 12,019 (Campos, 2015).

Some of the rise in administrators can be attributed to the increase regulation that is put upon institutions of higher education as they (the institutions) are more accountable for the money that they spend by state and federal legislators. Also, increasingly more services are required to support students (academic and adaptive services) and the traditional role of the university to attract students has expanded to include an array of student and service activities. However, these additional services do not negate the presence of increase administration in HEIs. In a book by Ginsberg (2011), he says that we have moved to a new

era of the "all administrative university" (Ginsberg, 2011). Regardless of why, these trends in hiring more administrators and non-teaching staff and having less full time faculty, present challenges for higher education to fulfill their new mandates.

Limited support and commitment to third mission

Many universities have recognized their commitment to the third mission of economic development and as noted, have included "economic development" into their core mission. However, with no rewards or recognition given in the academy and national assessment systems and no criteria to measure the contribution of faculty members, many universities, especially smaller, non-research universities, must rely on the faculty personal willingness and sense of good will to be involved in the implementation of the university's key economic initiatives. Also, although many faculty members recognize the university's role in regional economic development, some still see the third mission as a waste of time or something that can only be done after they have completed their academic duties. This attitude, coupled with the lack of resources at the local level to give to the university, as well as the limited resources that the university allocate to the third mission, results in significant challenges for the university in fulfillment of their third mission.

Universities cannot any longer be viewed as estranged from the community; they are part of the greater community in which they reside. Just as our global world has connected the various economic and financial institutions of the world, so too is the university part of this greater interconnected world. Jongbloed *et al.* (2008) have stated that universities everywhere must reconsider their role in society and evaluate their relationship with their stakeholders and various constituencies.

Conflict between community and university expectations

Over the last decade there has been an increase in community-based social and societal entrepreneurship, where entrepreneurs in pursuit of being "good citizens" focus on various community initiatives (Ratten and Welpe, 2011). Similarly, this focus on being "good citizens" applies to HEIs. The third mission by definition is "universities engaging with the community". This engagement although service oriented, primarily involves economic development or third stream activities. You will find this engagement present in private, non-profit and public institutions. This engagement, although sought by both parties, communities and universities, can lead to differing expectations, especially in public institutions. Consequently, multiple tensions and conflicts can easily arise due to the diverse expectations of the respective groups in both the university and the community. Strier (2014), for example, refers to the university/community partnerships as a "field of paradox" which can be fraught with conflict which can impact the collaboration between the various partners. This paradox is inherent and according to Strier comes from issues such as top-down institutional presence vs grassroots orientation; unequal power relationships; issues of trust and goal differences. Strier (2014, p. 161) says that "success depends on the ability to overcome changing political circumstances, shifting funding preferences, and competing social agendas", as well as living with frequent disappointments. Thus, such relationships, while encouraged and sometime mandated, present significant challenges to the institution as well as the community. As expected, the impact of this external engagement is most dramatic for the university, its faculty and how they operate, with the emergence and recognition of universities third mission for economic development. Inherent with the "institutionalization of entrepreneurialism" in higher education institutions is an expectation for economic gain or benefit, both in the university and community. However, in public universities in particular, community members may feel that all contributions by the

university should be unpaid, as the faculty and others performing these activities are public employees. Community members could feel that faculty members who charge for their services are "double-dipping", being paid by the tax payer and the community. Also, community members could feel that their needs should take precedence over university related duties; e.g. teaching, research, etc., as they are, in essence, paying for the faculty member through their taxes. Another area of differing expectations is that there can be confusion between what resources and/or skills the universities possess and what is perceived as needed by the community. For example, community members may need trained engineers for a project, thinking the university has this vast array of talent, but without an engineering school or graduate students these individuals are frequently not available. Similarly, typical third stream activities that promote economic development such as technology transfers or business spinoffs are frequently not present in predominately teaching institutions. These types of perceptions or expectations, as noted, can lead to conflicts at both the university and community levels.

Mission shift and potential conflict of interests

In many universities and colleges, the faculty's primary duties and charge is teaching and research. However, as funds to support these functions are reduced, administrators and faculty look to external sources of fund. In doctoral granting institutions, in particular, a faculty member continued employment and longevity is tied to the level and amount of external funds received. This shift in mission focus can result in several challenges for both faculty members and institutions. First, the allure of outside industry money could lead some administrators and faculty researchers to selectively pursue ideas and research that have commercial value, and disregard other potential research areas. Second, working on external privately funded activities require a great deal of the faculty member time, thus faculty engaged in such projects, could consciously or even unconsciously neglect their other duties of teaching, committee work, etc. Third, there is a fear or suspicion by some in and outside the academy that ties with industry and pursuit of private funding can influence the academic integrity of faculty and the institutions. Fourth, working for outside interests, industry, companies, etc., can potentially impact the perceived objectivity of public institutions, where the general public could either not believe or doubt the results of academic research due to the institutions relationships with their donors and funders.

Although the third mission of academic entrepreneurism creates new opportunities for HEIs and their faculty, the integrity and perception of objectivity and absence of real or perceived conflict of interests is essential and must be maintained. Academic entrepreneurism can result in institutions and individuals drifting from their primary missions to one of academic capitalism, where the profit motives take precedence over the public interest.

Recommendations and final thoughts

Higher education is a major industry throughout the world. Although there is no agreed upon number, it is estimated that there is somewhere between 20,000 to 50,000 colleges and universities in the world (Quora, 2016). In the USA alone, there are over 4,000 colleges and universities (public, private, not for profit, for profit, regional, public, independent, community and technical colleges), with over 1,500 being proprietary, for-profit colleges and universities.

As discussed, over the past few decades, the mission for HEIs have moved from one of teaching and research, with some service to the university and outside community, to one of entrepreneurship and sustainable development. HEIs can no longer reside in the ivory towers estranged from their surrounding communities. Increasingly, their operations and

existence, as well as their worth and value, are being questioned and challenged by their community, politicians and government.

Most universities recognize their dual role in their community: as institutions that deliver education and as centers and facilitators for economic development. Florida (2002) says that universities not only play a powerful role in generating innovation and attracting and mobilizing talent in the community, but also serve as a magnet to bring in people and businesses into the community in which they reside – businesses want to move where there are highly educated people! In addition, the presence of a research university has a positive effect on a region's annual earnings (Goldstein and Drucker, 2006). Correspondingly, it has been shown that where you have human capital and institutional intellectual capital, it leads to greater economic growth and development in the community (Pink-Harper, 2015).

Academic entrepreneurship and the entrepreneurial university are here to stay. Community-based social and societal entrepreneurship are increasingly being recognized as being part of contemporary society (Ratten and Welpe, 2011). Academics, governments and policymakers worldwide have embraced this new mission and direction for universities. Terms such as valorization, transfer, third stream and third mission are identified and associated with university research. Entrepreneurial university is increasingly seen as the anchor institution in their communities and the first port of call for individuals, businesses and organizations (public and private), with varied business and research activities. Etzkowitz (2014) says that the entrepreneurial university campus located in the heart of the region is now seen as the primary center to support and encourage innovation amongst SMEs in the area.

However, the long-term success of the third mission and the entrepreneurial university depends on addressing a variety of both internal and external challenges. Figure 1 provides some short recommendations that universities might do to better facilitate the new role of the entrepreneurial universities and fulfill and continue their third mission activities.

Recommendations

Mission overload. HEIs need to avoid "mission overload" and recognize that they cannot be all things to all people. Most importantly, they must carefully evaluate their mission,

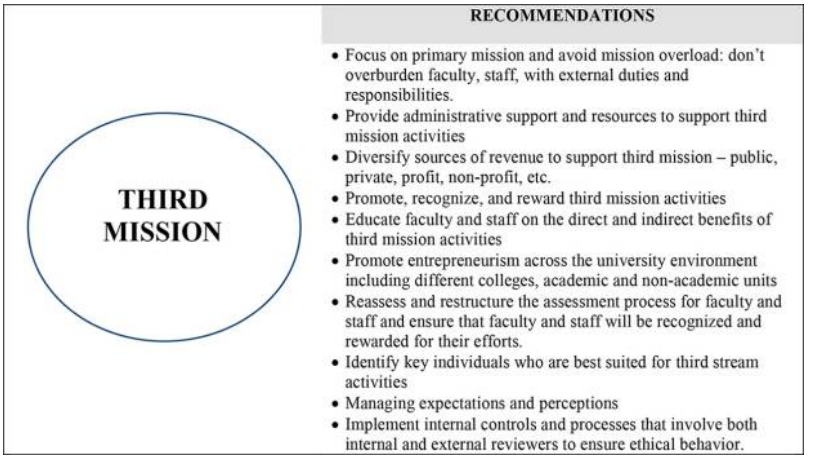

Figure 1.
Recommendations to improve the implementation of the university third mission

recognize their strength and resources and create activities and programs that complement their strengths.

Invest and develop support structure. HEIs need to invest and develop the organizational and governance structure that will support the third mission and promote entrepreneurial activities. These measures include human, financial and physical support.

Diversify sources of funding. HEIs must look beyond their institutions for support for their entrepreneurial activities. Sources of funding can come from individuals and business in the communities as well as state and federal sources. For example, grants programs such as Small Business Research Grants (SBIR) can be used to fund and support pilot and demonstration projects.

Promote entrepreneurial culture. A culture of entrepreneurship must be promoted in the university. This includes recognizing entrepreneurship in the university; incorporating it into the university mission and strategic plan; developing role models and reward systems to reward all who engage in these activities, etc. As noted earlier, being a good citizen in an organization or institution involves not only caring about issues, but also actively participating in activities and solutions. In HEIs, the faculty must understand the importance and role of the academic entrepreneur.

Market the benefits to departments, colleges, etc. HEIs must market and sell the multiple benefits of entrepreneurship to the faculty. Faculty must understand the multiple ways that engaging in entrepreneurial activities can benefit them. Beyond enriching and increasing private and total research funding for the university, third mission activities can serve to enrich the intellectual environment, potentially improve recruitment of faculty and students and provide applied, real-world examples that can be brought to the classroom. For example, the lead author of the paper wrote an article several years ago, on the benefits of a "university consulting center" (Rubens *et al.*, 2009) that focused on entrepreneurial activities. The authors found a variety of direct and indirect benefits ranging from: faculty scholarship, faculty service, faculty recruitment, university enrollment, student internships, career development, classroom examples, community partnerships and fund raising.

Develop alliances and partnerships in- and outside the university. The HEIs must develop alliances and partnerships not only with businesses and networks outside the university, but also within the university across various disciplines. Humanities, Arts and Social Science need to form alliances and partnerships with Colleges and Schools of Engineering and Business. Historically, universities are highly compartmentalized organizations, thus key to the success of the third mission activities is breaking down the barriers and walls across the institution and beyond. An important aspect of being an entrepreneur is the ability to not only innovate but also be proactive in forming partnerships. Partnerships help generate ideas and promote creative thinking, but these alliances also create an environment where knowledge and information can be shared. This sharing has led to a collaborative entrepreneurship which is being seen not only in the west but also in developing countries (Ratten, 2014).

Identify key individuals to implement third stream activities. HEIs must recognize that external activities associated with third mission activities are not ideal for all faculty and staff. Identify those among the faculty and staff who not only possess the skill set but also whose disposition, orientation and perspective are externally focused. After identifying these individuals, provide opportunities and a path for them to be successful.

Revaluate and restructure faculty assessment process. Very importantly, HEIs must reassess and re-evaluate their assessment process to create the proper and appropriate model for faculty evaluation. The HEIs must provide incentives for individuals who engage in commercial activities. This is critical for the success of any outreach program. However, it

is recognized that changing something so entrenched can be daunting, but it must be done to properly incentivize and reward faculty for their efforts.

Managing expectations and perceptions. Conflict and tensions can arise between the university and the community due to unrealized or ill-conceived expectations and perceptions. It is essential that the university is upfront in educating and informing the public to what its actual capabilities and resources are. As more and more universities adopt an active program for fulfillment of the third mission, the community needs to clearly understand not only what resources and capabilities the university has but also what the limit and extent they can devote to these third stream activities in the community.

Institute rigorous ethical standards. Commercial activities have the potential to compromise ethical standards in the application of the scientific method in research, as well as the potential for financial and personal interests to conflict with use of sound research techniques. Therefore, there is a need by the institutions to ensure that proper safeguards that promote ethical behavior are implemented.

Recognizing the social and economic value of entrepreneurial activities, extensive research is being conducted on the study of entrepreneurs (Dana and Dana, 2005). Third stream, economic and entrepreneurial activities are changing how universities operate now and in the future. Technology and knowledge management has created a whole new paradigm. For too long, universities positioned themselves outside of the community in their only separate world. This can no longer be the case. Universities are "part of their community" and have a mission not only to their institutions but to the larger community in which they reside. They, therefore, must create new models and new ways of thinking not only externally with the outside world in which they operate, but also new models and new ways of thinking internally with faculty and those that perform this new mission.

HEIs and especially smaller teaching colleges and universities must find ways and means within a very entrenched bureaucracy to find new ways and means to support the faculty and the institutions in their new missions of economic development and promotion of sustainability.

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