

**EXTENSION, OUTREACH, KNOWLEDGE TRANSFER, TECHNOLOGY
TRANSFER: WHAT IS IT THAT WE DO — OFFICIALLY?**

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Presentation Track: Research

This study traces the history of the third mission of higher education from *service to engagement* and examines 19 university strategic plans to ascertain the extent to which the original programs for *extension* and *outreach* and their subsequent terms are still present in contemporary official policy documents.

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Introduction

Higher education institutions widely agree that they have three fundamental missions. In traditional terminology, they are *teaching*, *research*, and *service*. More recent expressions are *learning*, *discovery*, and *engagement*. Although the first two missions are relatively well defined and understood, the third mission has many expressions: *outreach*, *service*, *lifelong learning*, *partnerships*, *economic development*, *etc.* In a larger study, the author developed a four-category framework and studied university strategic plans to better understand the official policy standing of the third mission. This study goes on to examine in more detail Category One of the framework, the original intention of the third mission. At first termed *extension* and *outreach*, these efforts expanded to include variations of terms like *knowledge transfer*, *technology application*, and *workforce development*. This study ascertains the extent to which this traditional segment of the third mission of higher education is represented in contemporary strategic plans and how it is officially defined.

Literature Review

The third mission of higher education began as service to community in the 1800s, veered toward research in the mid 1950s, then merged with a new form of service in the late 20th century emphasizing partnerships or two-way relationships between institutions and society.

When America was a collection of colonies, higher education consisted of seminaries to prepare religious leaders and liberal arts colleges to prepare the wealthy to become the leaders of society (Bringle, Games, & Malloy, 1999). As the 1800s unfolded, higher education's endeavors escalated to speed the building of the nation. A political entity, the government through its legislative powers, changed higher education tremendously from religious and liberal education

for the few and the elite to practical arts for the masses. Key (1996) carefully traced the changing public policy position regarding the government's disposal of public lands – either directly through sale of land or indirectly through donations for public purposes such as canals, railroads, and land-grant colleges – to bring about economic expansion and thus more federal revenue. This argument was compelling that acquiring revenue for the young federal government was the motivation for establishing the land-grant institutions by passing the Morrill Act of 1862, not educational value. In order to accomplish this political purpose, many people needed to be educated in agricultural and practical arts. The Morrill Act encouraged prosperity so that the government could raise more revenue to pay war debts and expand. Education was the means; revenue was the end.

The Morrill Act created the land-grant institutions to assist with the agricultural, mechanical, and technological changes affecting America, establishing the mission of public service. (Boyer, 1997; Thompson & Lamble, 2000). At the time, a majority of Americans were engaged in agricultural work. To build agriculture was to build America. The shift in philosophy was great, conveying much more of a craft view of scholarship and teaching than an expert one (Boyte, 2000). As the country recovered from the Civil War, 67 land-grant institutions emerged (Bender & Schorske, 1998), producing knowledge critical to the development of the country, expanding to include technical and engineering areas as the industrial age developed. Higher education was meeting the significant needs of the public (Singleton, Hirsch, & Burack, 1999). The Hatch Act of 1887 created the agricultural experiment stations as part of the land-grant mission, further connecting the common man and woman with the services of higher education (Thompson and Lamble). Academic institutions and the nation flourished as mass communication and transportation and the development of electricity and steam power

transformed the country. Needs for developing technology and transferring the new skills to an ever-eager public were immense.

The support for the land-grant service mission continued in prominence with the passage of the Smith-Lever Act in 1914, which gave permanent funding for the Cooperative Extension Service through the land-grant colleges for the purpose of distributing the results of research to the public (Thompson & Lamble, 2000). *Extension* was “the provision of learning opportunities to people who were unable, or unwilling, to attend and participate in the regular programs of universities . . . deliberate efforts to extend learning opportunities to people in the larger community” (Thompson & Lamble, p. 52). *Outreach* was a close synonym for extension.

The land-grant tradition of service declined significantly during the 1950s (Boyte, 2000) as research and scientific inquiry came to the fore to meet the needs of the democracy at that time (Richardson, 1996). *Technology transfer* became “the full array of stored know-how, expertise, hard and soft technologies, and problem-solving capacity that can be applied to and adopted by a range of private businesses, units of government, and nonprofit organizations in the regions” (Goldstein & Luger, 1997, p. 535).

Then as the business model infused higher education and as funding became more scarce, a dichotomy developed. Extension practitioners were divided into those who worked for social change (older purpose) and those who believed that they were selling products in a marketplace (newer purpose) (Thompson & Lamble, 2000). This profit-motif enabled universities to secure more funding and businesses to obtain the latest product, process, or service information to maintain their competitive positions in the marketplace.

In recent decades, another movement emerged: *economic development*. Economic development ventures emphasized *partnerships* between academic and business interests,

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promoting the business model for higher education and enhancing the two-way interaction trend (Bringle & Hatcher, 1996).

Thus the third mission had evolved from serving the community, to extending and reaching out to it, to engaging it in bi-directional relationships and interactions.

Method

The method for this study was content analysis, a research technique to analyze the written word in quantitative groupings to pull meanings into focus that the prose format did not readily emit. Researchers have developed the methodology over several decades, notably Berelson (1952), Krippendorff (1980 & 2003), Weber (1990), and Neuendorf (2002).

In selecting a group of universities likely to be active in the third mission of higher education, public universities emphasizing service, research institutions producing knowledge and technology to transmit to the society, and land-grant institutions with a specific purpose of improving the agricultural, mechanical, and practical arts of the populace were best choices. In researching such institutions, the author discovered studies of two already-formed groups where some research existed regarding the missions of higher education: The Kellogg Commission (1999 & 2001) and Southern Growth Policies Board (Tornatzky, Waugaman, & Gray, 2002) studies. The 11 members of the Kellogg Commission that provided profiles of their university programs functioned as one group. The 12 institutions singled out for excellence by the SGPB formed another group. Because The Pennsylvania State University and The Ohio State University were in both groups, 21 different universities emerged as the sample to be studied. These 21 universities represented, not a random sample, but institutions on the leading edge regarding the third mission, trendsetters who voluntarily created profiles or case study materials to document their activities.

University official web sites and contacts with university officials produced 19 strategic plans or components of plans. The researcher confirmed that neither plans nor components existed for Stanford University and the University of California, San Diego. This process produced Table 1 with 19 viable universities, 15 of which had strategic plans and 4 of which had components of strategic plans (mission, vision statement, goals, objectives, long-range-plan, etc.).

Table 1: Engagement Universities for Study

University	Kellogg Profiles	So Growth Bd	Dates	Strat Plan Components	
Arizona State University	1		2004-2008	yes	
Carnegie Mellon University		1	1998	yes	
The Georgia Institute of Technology		1	2002	yes	
Iowa State University	1		2000-2005	yes	
North Carolina State University		1	2002-2007	yes	
The Ohio State University	1	1	2000	yes	
Pennsylvania State University-Univ Park	1	1	2003-2006	yes	
Portland State University	1		2003	yes	
Purdue University		1	2001-2006	yes	
Rutgers, State University of New Jersey	1		1995	yes	
Salish Kootenai College	1		online 7/16/03	no	yes
Stanford University		1		no	no
Texas A&M University		1	1999	yes	
Tuskegee University	1		1996	yes	
The University of California, Davis	1		2000	no	yes
The University of California-San Diego		1		no	no
The University of Illinois-Chicago	1			no	yes
The University of Utah		1	online, 05/17/03	no	yes
The University of Vermont	1		2003-2008	yes	
The University of Wisconsin-Madison		1	2003	yes	
Virginia Polytechnic Instit. & State Univ.		1	2001-2006	yes	
Total	11	12			

Note: Penn State and Ohio State are members of both groups.

Using content analysis, the author employed the Kellogg and SGPB studies, other research, and experimentation to develop and test a coding form to organize third mission topics into a four-category framework entitled “Third Mission Category and Topic Coding Scheme.”

(See Appendix.) Category One was labeled “One-way efforts, sustaining, improving existing business”:

This category encompasses the original intention for creating the land-grant college system: assisting the citizenry in obtaining and using practical applications produced by the federal-and-state-funded college system, those things that derived from both the teaching (learning) and research (discovery) missions. It was primarily a one-way delivery system – halls of academe to populace – which in large part explains the derivation of the ivory-tower concept. It is the historical, traditional third mission of higher education.

The strategic plans were analyzed, producing statistics for number of topics found in each category. The findings below provide the results for Category One.

Findings

The varying lengths of the plans meant that the number of occurrences for any category for one university compared to another produced no meaningful result; therefore percentages were calculated to describe the varying emphases that universities revealed in the writing of their planning documents. The count of topics for each category was divided by the total count of third mission topics in strategic plans to produce percentages. The result was Table 2.

Table 2: All Institutions -- Categories 1 - 4

University	Type	Total	Category 1		Category 2		Category 3		Category 4		Date
		Cnt	Cnt	%	Cnt	%	Cnt	%	Cnt	%	
Arizona State	SP	51	5	10%	12	24%	12	24%	22	43%	2004
Carnegie Mellon	SP	33	6	18%	5	15%	8	24%	14	42%	1998
Georgia Tech	SP	65	6	9%	10	15%	30	46%	19	29%	2002
Iowa State	SP	144	33	23%	68	47%	9	6%	34	24%	2000
N.C. State	SP	39	10	26%	7	18%	5	13%	17	44%	2002
Ohio State	SP	111	25	23%	21	19%	22	20%	43	39%	2002
Penn State	SP	30	9	30%	2	7%	4	13%	15	50%	2003
Portland	SP	119	14	12%	62	52%	8	7%	35	29%	2003
Purdue	SP	77	17	22%	23	30%	11	14%	26	34%	2001
Rutgers	SP	118	21	18%	16	14%	7	6%	74	63%	1995
Salish Kootenai	MVG	7	1	14%	0	0%	1	14%	5	71%	
Texas A&M	SP	114	18	16%	37	32%	25	22%	34	30%	1999
Tuskegee	SP	61	17	28%	5	8%	1	2%	38	62%	1996
UC-Davis	M	12	7	58%	1	8%	1	8%	3	25%	2000
U. Illinois	MV	13	3	23%	5	38%	1	8%	4	31%	
U. Utah	M	9	3	33%	1	11%	0	0%	5	56%	
U. Vermont	SP	8	2	25%	0	0%	0	0%	6	75%	2003
U. Wisconsin-Madison	SP	49	20	41%	12	24%	5	10%	12	24%	2003
Virginia Tech	SP	113	46	41%	19	17%	12	11%	36	32%	2001
Mean				25%		20%		13%		42%	
Standard Deviation				12%		15%		11%		16%	

Cells filled with light gray represent institutions more than one standard deviation below the mean and those with dark gray fill are more than one standard deviation above the mean.

One caution is necessary. Salish Kootenai College, The University of Utah, and The University of Vermont each had fewer than 10 total occurrences. With such low numbers, dividing the total into four categories left little room for error in category placement because a switch of one topic to another category would have a considerable impact on the resulting percents.

The author examined whether the variation in plans regarding Category One was more or less than could be expected in a normal population, where 68% of the data points would fall within +/- one standard deviation from the mean. For these 19 universities, 13 were in this range, precisely the expected 68% (Table 2 non-filled cells for Category One). The percent of

occurrences among universities varied by 49% (from 9% in the Georgia Tech Plan to 58% for The University of California, Davis). In other words, a particular university presented a considerably different profile of interest in Category One from certain other universities.

The means in Table 2 showed varied emphases for the categories for the “average” university in the sample:

Category One: One-way efforts, sustaining, improving existing business	25%
Category Two: Two-way efforts, sustaining, improving existing business	20%
Category Three: Initiating efforts, creating and developing new business	13%
Category Four : One-way efforts, sustaining, improving society and community	42%

Another view of third mission programs emerged by ranking universities within each category. Table 3 gives each university’s percents for Category One, ordered from high to low with the mean highlighted. The filled cells show universities that were one or more standard deviations above or below the mean.

Table 3: Category One for All Institutions

<i>Institution</i>	<i>Category One by Percent</i>
UC, Davis	58
U. Wisconsin, Madison	41
Virginia Tech	41
U. Utah	33
Penn State	30
Tuskegee	28
N.C. State	26
MEAN	25
U. Vermont	25
Iowa State	23
Ohio State	23
U. Illinois	23
Purdue	22
Carnegie Mellon	18
Rutgers	18
Texas A&M	16
Salish Kootenai	14
Portland	12
Arizona State	10
Georgia Tech	9

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Remarkable among the three universities giving the most emphasis to this traditional, one-way category of assistance to business (Table 3) was the University of California, Davis at 58%. The other two were the University of Wisconsin, Madison and Virginia Tech, both at 41%. Portland (12%), Arizona State (10%), and Georgia Tech (9%) showed less emphasis at more than one standard deviation below the mean.

Next in the study was an examination of the terms used to describe Category One of the third mission (Table 4).

Table 4: Category One Topics

TOPIC	UNIVERSITY																			AVE
	Ariz	Carn	Geor	Iowa	No Ca	Ohio	Penn	Port	Purd	Rutg	Sal K	Tex	Tusk	Cal D	Illin	Utah	Verm	Wisc	Virg	
Extension				6%	3%	2%			1%	3%		5%	10%	17%					6%	2.8%
Knowledge trans & app	6%	6%	3%	4%	13%	4%	10%	5%	4%	3%		6%	3%	33%		22%	25%	10%	9%	8.7%
Outreach	2%		5%	6%	3%	9%	17%	5%	3%	6%		3%	13%		8%			2%	20%	5.3%
Support of public schools						5%												2%		0.4%
Technical assistance		3%							1%		14%								3%	1.1%
Technology trans & app	2%	9%	2%	6%	8%	3%		2%	9%	3%				8%				22%		3.8%
Workforce development				1%			3%		4%	1%		2%							1%	0.6%
Other										2%			2%	8%	8%	11%		4%	2%	1.9%
TOTAL Category One	10%	18%	9%	23%	26%	23%	30%	12%	22%	18%	14%	16%	28%	58%	23%	33%	25%	41%	41%	24.7%

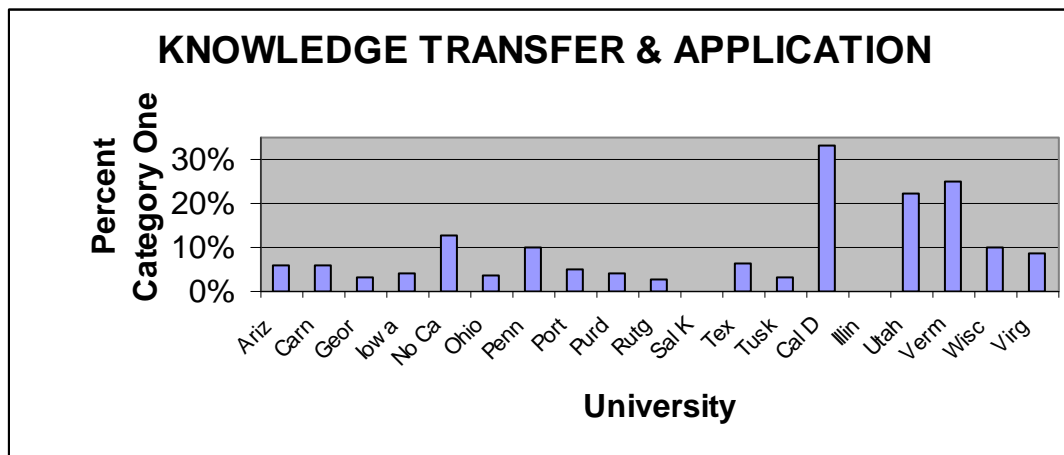
In Table 4, universities in the sample especially those with full strategic plans (See Table 1), tended to show a variety of third mission topics. Vermont was an exception with only one topic – knowledge transfer and application. Among the remaining public, research, and land-grant institutions, the fewest number of topics in one plan was three for Arizona State, Pennsylvania State, Portland, and Tuskegee. Carnegie Mellon, the only private university in the study, also had three topics in its plan. The largest number of topics in one plan was six for Purdue’s plan and five in the Ohio State plan. (These numbers omit the “Other” topic.) Four of the topics constituted the largest portions of references to all third mission topics: Knowledge Transfer and

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Application, Outreach, Technology Transfer and Application, and Extension. Tables 5 through 8 examine them in order of frequency.

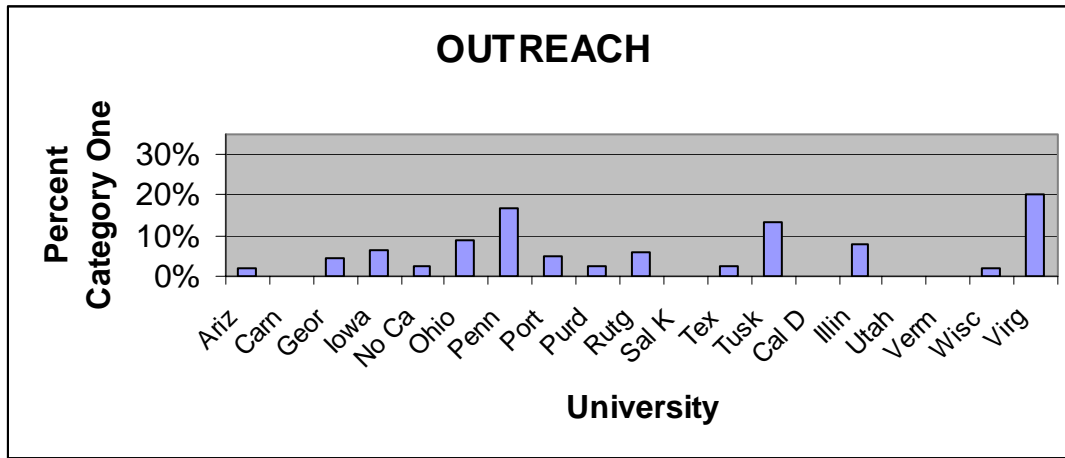
Several topics received less frequent mention in plans – *Technical Assistance* 1.1%, *Workforce Development* .6%, and *Support of Public Schools* .4%. In each case one-half or fewer of the universities mentioned these topics at all. Those along with the miscellaneous grouping (*Other* 1.9%) were not charted. The sum of these topics represents 4.1% of all mentions of the third mission.

Table 5: Knowledge Transfer and Application



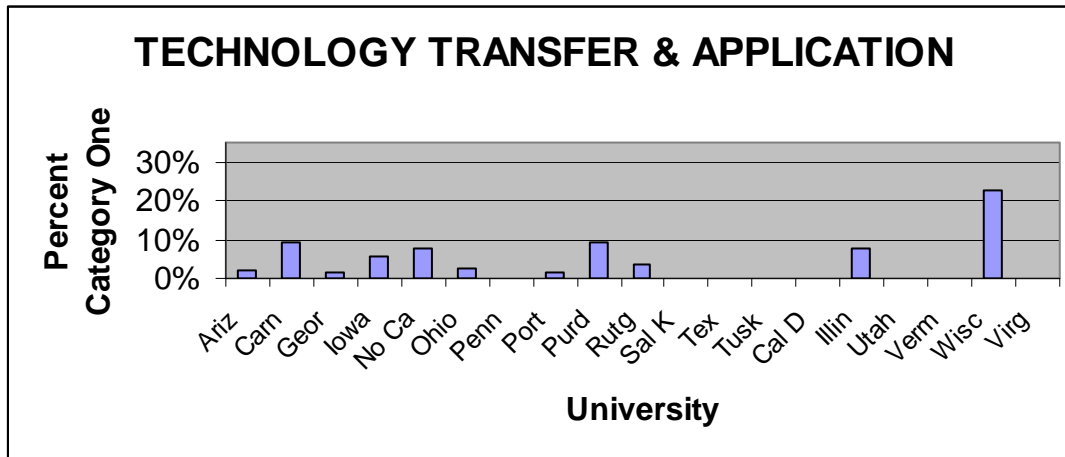
Seventeen universities – all but Salish Kootenai College (with limited documentation to study) and the University of Illinois (with only components of a strategic plan) – included *Knowledge Transfer and Application* in the strategic plan (Table 5). This topic led all others in accounting for 8.7% of the mentions for all third mission topics. The range for frequency of mentioning this topic was 1% to 17% of all third mission topics for all four categories (From Table 4).

Table 6: Outreach



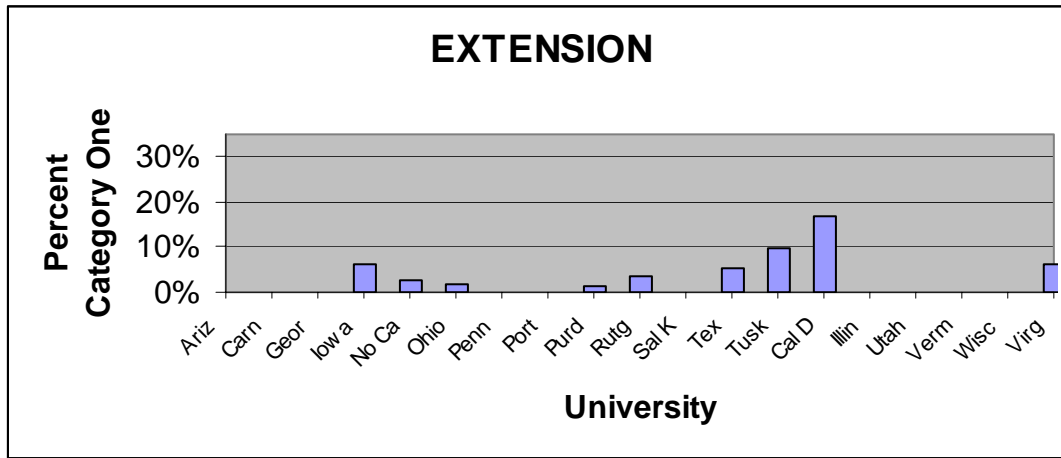
Thirteen universities included *Outreach* in the strategic plan (Table 6). This topic accounted for 5.3% of all third mission topics. The range for frequency of mentioning this topic was 2% to 17% of all third mission topics for all four categories (From Table 4).

Table 7: Technology Transfer and Application



Eleven universities included *Technology Transfer and Application* in the strategic plan (Table 7). This topic accounted for 3.8% of all third mission topics. The range for frequency of mentioning this topic was 2% to 22% of all third mission topics for all four categories (From Table 4).

Table 8: Extension



Nine universities included *Extension* in the strategic plan (Table 8). This topic accounted for 2.8% of all third mission topics. The range for frequency of mentioning this topic was 1% to 17% of all third mission topics for all four categories (From Table 4).

Implications

Five major implications emerged from the study.

1. The variation from 9% to 58% in the frequency of references to third mission Category One topics, although normal in distribution for a general population of colleges, was somewhat surprising here. One would expect more uniformity for research, mainly public, and preponderantly land-grant institutions, pointing to the varying emphases for the third mission of higher education, even among relatively homogeneous institutions.
2. Category One, the traditional third mission of higher education’s one-way efforts to sustain and improve existing business, maintained 25% -- an expected share of a four-category schema – of all references to third mission topics, despite recent movements toward other manifestations for the third mission found in Categories Two, Three, and Four. This traditional focus for the third mission is maintaining its presence in university strategic plans.

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3. Among the major topics for Category One, the preponderant one was *Knowledge Transfer and Application*, 8.7% of all mentions of third mission topics in strategic plans. This portion was far ahead of the nearest competitors, *Outreach* at 5.3%, *Technology Transfer and Application* at 3.8%, and *Extension* at 2.8%.
4. *Outreach* and *Extension* have vied for recognition for well over a century. At least in this study, *Outreach* is ahead slightly in percent (5.3% vs. 3.9%) and more so in inclusion in strategic plans (13 universities vs. 9).
5. Between the other two major topics, *Knowledge Transfer and Application* was considerably ahead of *Technology Transfer and Application* in frequency (8.7% vs. 3.8%) and inclusion (17 universities vs. 11). It may be that the prior topic is more general in nature, encompassing the third, and/or that the prior topic is older and has had more opportunities over time to be mentioned in planning documents.

What is it that we do officially? In these strategic plans, the answers are knowledge transfer and application (more than technology transfer and application) and outreach (more than extension).

Future Studies

Labels shift over time sometimes to reflect trends as *extension* originating to describe an agrarian society transforming to *knowledge or technology* reflecting the information and industrial ages. These shifts can thus signal changes in society and in academe. The author hopes this study serves as a benchmark against which to measure future trends which would add more light to the varied and at times confusing third mission of higher education.

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Appendix

Third Mission Category and Topic Coding Scheme

Category One: One-way Efforts, sustaining, improving existing business

(Example topics below each category)

Consulting	Technical assistance
Extension	Technology transfer
Knowledge transfer	Training / Retraining workforce development
Outreach	

Comment: This category encompasses the original intention for creating the land-grant college system: assisting the citizenry in obtaining and using practical applications produced by the federal-and-state-funded college system, those things that derived from both the teaching (learning) and research (discovery) missions. It was primarily a one-way delivery system – halls of academe to populace – which in large part explains the derivation of the ivory-tower concept. It is the historical, traditional third mission of higher education.

Category Two: Two-way Efforts, sustaining, improving existing business

A category one topic in a two-way context	Involvement
Alliance	Joint venture
Bridge	Linkage
Coalition	Network
Collaboration	Partnership
Connection	Relationship
Cooperative effort	Responsiveness
Engagement	Sharing (and dialogue)
Exchange	

Comment: These two-way efforts represent the newer third mission of higher education, engendered from the Boyer emphasis of the 1990s, the cry for higher education to listen and respond to the citizenry, especially motivated by the growing competition for tax dollars to support higher education. This is the 21st century third mission of higher education.

Category Three: Initiating Efforts, creating and developing new business

Commercialization	New business
Economic development / growth	Spin-off business
Entrepreneurial venture	Start-up (support) effort
Incubator	Research Park
Invention, patent, license	

Comment: These efforts are also related to the newer third mission of higher education, much like Category Two, except that the emphasis is on creating and nurturing new businesses, new products, new processes, and new services. Even more than Category Two, the efforts are very interactive, with the university usually initiating the effort and holding major responsibility for its early development. Some (patents, research parks) are not new, but the emphasis on importance and two-way nature are new.

Category Four: One-way Efforts, sustaining and improving society and community

Civic endeavor	Distance education
Community involvement	Lifelong learning
Continuing education	Quality of life
Contributions to society / public	Service

Comment: The previous three categories concentrated on business and professional issues; this one broadens to encompass society, community, and public at large. More historical and traditional in nature, it harks back to the original intent of land-grant colleges, attuned to the need to have an educated, active citizenry. Like Category One, it is primarily one-directional from university to the citizenry.