Investigating the AAU Citations Admission Criterion and the History of Papers, Citations and Impact at USF

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Executive Summary

This research sought to determine which factors relate to higher and lower production of papers, citations and impacts (citations divided by papers), because this is one of the AAU Phase I Indicators (Appendix A). The primary purpose of these analyses was to provide a better grasp of what factors appear to most influence citation productivity to serve as guiding principles as USF works toward becoming an AAU institution.

Methods and Population

The time period under consideration regarding citations was from 1981 through 2005. In order to assess the relationship between various possible causal factors and citation productivity, comparisons among AAU and non-AAU institutions were conducted. All institutions were classified as Research Extensive under the 2000 Carnegie system.

Findings

The following points emerge from these analyses:

- It appears to require between 11 and 16 years for the average article to mature regarding citations impact (Figure 1).
- Over time, USF exhibits generally upward trends relative to all other institutions regarding citation productivity (Table 4), however, the gap between USF and AAU institutions has not lessened during the time under consideration, except with regards to paper impact, where USF reached AAU levels by 1993 (Figure 9).
- The best simple predictors of citation productivity are post doctorates, federal research expenditures, national academy members, total research expenditures and core revenues (Table 2).
- The strongest influence on citations is the percent of research conducted in biological and health sciences disciplines (Table 2). Panel B of Figure 2 shows that the broad discipline areas of biological and health sciences, and other physical sciences and mathematics generate 80.5% of all U.S. papers, and 89.7% of all U.S. citations.
- Carnegie rankings exhibit a one-to-one relationship with funding (Figure 4), which associates with larger faculty numbers and greater research productivity in the form of published papers and citations (Figure 5).
- AAU institutions average between two times and five times as many National Academy Members and Faculty Award winners as non-AAU Very High research institutions (Figure 7).
- AAU institutions exhibit a 54% advantage over non-AAU Very High public research institutions for research expenditures per faculty member (Figure 8).
- Both AAU and non-AAU Very High research institutions have about 30% of their expenditures coming from grant-based funding. However, for USF this percentage was 42% (Panel B of Figure 6).
- Compared to Big East, SUS and Strategic Plan Peers, USF and other SUS institutions have lower tuition than other peer groups. USF has at least 10,000 fewer citations between 2001 and 2005 than the average research extensive institution of every peer group (Table 3).

Discussion, Conclusions and Recommendations

As one of the five Phase I AAU Indicators (Appendix A), citations is a prerequisite for attaining AAU membership. USF has generally been moving in the direction of AAU institutions for several years, however, as Birnbaum (2007) notes: "...'world-class' has increasingly come to be synonymous with 'Western.' That means science, research, and lots of money..." Regarding funding and revenues (money), Figure 4 depicts the gap between AAU and non-AAU research universities. USF is above the average non-AAU Very High public research institution, but below the average AAU institution on all funding measures except tuition used in this study.

Recently, USF has exhibited rapid growth in most of the areas that characterize typical public AAU institutions. However, regarding citations, although USF has exhibited growth, the gap between USF and the average AAU public institution has not decreased over the past 25 years (Figure 9). The data in this study suggest that gap reduction requires more faculty, researchers and postdoctorates in the biological and health sciences or multidisciplinary sciences. The preceding groups are those who produce the most papers, which result in greater numbers of citations.

Panel B of Figure 6 suggests that research at USF is more dependent on grant funding than the average institution from any other comparison group. This dependency may prove a detriment to future development, as more stable funding sources are usually preferable to uncertain sources such as grant funding. Overall, among 97 public research institutions, had the seventh highest percent coming from grants. However, UF was fourth, at 46 percent. Also, Florida was the seventh highest state overall for public research extensive institutions (33.5%), and would have been third (40.3%), except for FIU which was at 13 percent. Also, Hawaii at the top, was a single institution (Manoa). It appears that Florida's very high research institutions (UF, FSU, USF) have all been forced to turn to grant funds for growth and development. These data suggest that developing more dependable funding sources must be a top priority for USF during the coming years as we seek to attain AAU membership.

Investigating the AAU Citations Criterion and the History of Papers, Citations and Impact at USF

Purpose

This research investigates the AAU Phase I Indicator Citations (see Appendix A). Several research questions guide the work, perhaps the most important of which is attempting to determine which factors relate to higher and lower production of papers, citations and impacts (citations divided by papers). Additionally, analyses of USF's current productivity and historical trends were investigated, as were those of AAU institutions, Big East research institutions, Strategic Plan Peers, SUS research institution competitors, and Carnegie High or Very High Research institutions.

Research Questions Relating to Paper, Citation and Impact Productivity:

Which factors relate more and less positively with citation productivity?
How does USF relate to the following groups on recent productivity and discipline mix?

- SUS Competitors
- Big East Peers
- Strategic Plan Peers
- AAU pubic institutions
- Non-AAU High or Very High Research institutions

What can USF's historic growth trajectory tell us about future likelihoods?

This is an extremely complex area within which to conduct analyses because so many factors impact citations at the institutional level. The primary purpose of these analyses was to provide a better grasp of what factors appear to influence citation productivity to serve as guiding principles as USF works toward becoming an AAU institution.

Background

The AAU and the New Carnegie Classification Schema

This research was primarily implemented in an attempt to determine (1) where USF stands relative to AAU institutions on citations, one of AAU's Phase I membership indicators (see Appendix A), and (2) what factors appear to relate more or less strongly with citation productivity. Further analyses compare USF with three additional relevant groups: Big East, SUS and Strategic Plan research institution peers. A secondary factor in these analyses relates to the fact that in December 2005, the Carnegie Foundation implemented a new, more varied and balanced method of classifying higher education institutions. Under the old method, all AAU institutions were classified as Research Extensive. Under the new method, all AAU institutions are classified in the Very High Research group. Therefore, this classification system was used as a basis for specific comparisons. The historic Carnegie Foundation Research Extensive classification was used as the basis for including non-AAU public institutions in analyses.

Methods

Data Sources

All data derive from one of the following three sources:

1. The Thompson Science, Social Science and Humanities citations database (Thompson ISI), which provides extensive cumulative and individual year data from 1981 through 2005 at the institution and discipline within institution level.
2. TheCenter Top American Research Universities (TARU) – TARU includes data on several important variables relative to this research for 639 institutions reporting some Federal Research funding during the past five years.
3. IPEDS Peer Analysis System – Data were obtained for a variety of relevant variables from this source.

Variables

Outcome Variables

Four outcome variables were used in analysis, each of which comes in multiple forms at the institution level:

- Impact – Impact equals citations divided by papers. This can be cumulative, annual and within discipline. A secondary form of this is Impact of Cited, which reflects the total
- Citations – The number of citations: annual, cumulative and within discipline.
- Papers – The number of published papers: annual, cumulative and within discipline.
- Percent of Papers Cited – The percentage of all published papers receiving citations within other published papers.

Categorical Variables

Discipline

The Thompson ISI database classifies citations into 24 broad discipline areas (**Table 1**). These were reclassified into seven[1] broader discipline areas for two reasons: (1) to increase population size within discipline, and (2) to make the data more amenable to analysis and to the available other sources of discipline-based information. IPEDS and TARU broad disciplines were reclassified into approximations of these seven discipline areas. The seven broad areas and included Thompson disciplines are:

1. Biological & Health Sciences (Biology & Biochemistry, Clinical Medicine, Immunology, Microbiology, Molecular Biology & Genetics, Neurosciences & Behavior[2], Pharmacology)
2. Business
3. Education
4. Engineering & Computer Sciences
5. Multi-Interdisciplinary

[1] Law was excluded because USF lacks a law school.
[2] This was included here rather than Social Sciences because it is not strictly a social science.

6. Other Physical Sciences & Math (Agricultural Sciences, Chemistry, Ecology-environmental, Geosciences, Materials Science, Mathematics, Plant & Animal Science, Space Science)
7. Social & Behavioral Sciences (Social Sciences general, Psychology/Psychiatry)

The IPEDS disciplines were organized into parallel broad areas as follows:

1. Biological and biomedical sciences, Health professions & related clinical sciences
2. Business
3. Education
4. Engineering, Computer sciences, Engineering technologies, Military technologies,
5. Multi-interdisciplinary studies
6. Agricultural sciences, Mathematics & statistics, Physical sciences,
7. Area-ethnic studies, Psychology, Protective services, Public administration, Social sciences,
8. Other (Natural resources/conservation, Communications & Technologies, English, Foreign languages, Law, Liberal arts, Library science, Parks & recreation, Philosophy-religious studies, Visual & performing arts, History, Undesignated

The TARU research disciplines included in five of the eight classifications are:

1. Life sciences,
2. NA
3. NA
4. Engineering & Computer sciences
5. NA
6. Physical sciences, Environmental sciences, Mathematics,
7. Social sciences and Psychology
8. Other sciences

Institutional Group

Institutional level data and group averages were developed for the following groups (Table 5 specifies institution names and affiliations). Most analyses included only institutions included within the 2000 Carnegie classification of Research Extensive:

- AAU institutions – Includes all 34 public AAU institutions.
- Big East institutions – Includes the 16 Big East institutions, although only 14 are represented in the Thompson databases (Providence and Villanova have no records in Thompson's ISI). Ten Big East schools other than USF were classified as Research Extensive.
- SUS institutions – Includes UF, FSU and FIU in addition to USF. These were the four SUS Research Extensive institutions.
- Strategic Plan Peers – Includes the eight institutions identified as peers.
- Other High or Very High Research Institutions – Includes 62 non-AAU institutions classified by The Carnegie Foundation as either High or Very High Research. All were classified as Research Extensive under the 2000 Carnegie system.

Independent Variables

In addition to citations and papers from the Thompson ISI databases, the following variables were submitted to analysis (see Appendix B for descriptive statistics by variable):

Predictor	Source
Total Student Enrollment fall 2005	IPEDS
Total Degrees Granted 2004-05	IPEDS
Core Revenues FY 2004	IPEDS
Total Grant Amount FY 2004	IPEDS
Grant Percent of Total Revenues FY 2004	IPEDS
Total Assets FY 2004	IPEDS
Instructional Expenditures FY 2004	IPEDS
Research Expenditures FY 2004	IPEDS
Total Faculty fall 2005	IPEDS
Faculty in Biological & Health Sciences[3]	IPEDS & TARU
Faculty in Other Physical Sciences	IPEDS & TARU
Faculty in Social & Behavioral Sciences	IPEDS & TARU
Faculty in Education	IPEDS & TARU
Faculty in Engineering	IPEDS & TARU
Faculty in Business	IPEDS & TARU
Faculty in Multidisciplinary Disciplines	IPEDS & TARU
Faculty in Arts & Letters	IPEDS & TARU
Faculty in Fine Arts	IPEDS & TARU
Other Faculty	IPEDS & TARU
Pct of Total Research in Biological & Health Sciences	TARU
Pct of Total Research in Other Physical Sciences	TARU
Pct of Total Research in Social & Behavioral Sciences	TARU
Pct of Total Research in Engineering & Computer Science	TARU
Pct of Total Research in Other Fields	TARU
Pct of Federal Research in Biological & Health Sciences	TARU
Pct of Federal Research in Other Physical Sciences	TARU
Pct of Federal Research in Social & Behavioral Sciences	TARU
Pct of Federal Research in Engineering & Computer Science	TARU
Pct of Federal Research in Other Fields	TARU
National Academy Members 2003 2004	TARU
Faculty Awards 2003 2004	TARU
Doctorates Granted 2003 2004	TARU
Post Doctorates 2002 2003	TARU

Limitations

Different data sources have been used for different aspects of similar measures, and particularly so, regarding funding and research expenditures. As a result, figures generated from one source are likely to differ from those coming from a different source. All figures have been verified, but this is the reason for the inconsistencies between

[3] Estimated from Percent of Research Expenditures by Institution and Total Faculty

charts on funding and research dollars. Further, IPEDS and TARU sources may come from different years and also sometimes define apparently similar measures in different fashions, which cause apparent discrepancies.

Some data are missing for some institutions on specific variables from different sources; therefore, the number of cases will differ depending on analyses.

Because of the comparatively small populations (maximum 140), results for more complex analyses are open to question and were therefore generally avoided. This is an extremely complex area within which to conduct analyses because so many factors impact citations at the institutional level. The overall purpose of the analyses was to provide a better grasp of what factors appear to influence citation productivity to serve as guiding principles as USF works toward becoming an AAU institution.

Results

Population

The population consisted of 140 institutions including all public AAU members, and all SUS and Big East institutions for which data were available. All institutions, except for a few SUS and Big East schools, were Research Extensive under the 2000 Carnegie Classification system. For purposes of global analysis, only Research Extensive institutions are included. Some institutions that were not Research Extensive are included where appropriate for specific analyses.

Table 5 provides a list of institutions included in this study, along with their affiliations (e.g. Big East, AAU, etc.). Table 6 gives descriptive statistics for all variables included in the study. The skewness estimates shown in this table show that the use of nonparametric statistics was a better choice than parametric for all tests of correlation magnitude.

Citations

Three factors are of interest regarding citations:

1. Number of papers published in peer review journals
2. Number of times these papers are cited in other papers
3. Impact equals citations divided by papers either overall, or for a given year of papers. This measure controls for institutional size by providing the average number of citations each paper receives. The world wide average is 4.6 citations per published article. The greatest number of citations for any single article to 2005 was over 293,000. One of every 58 papers receives 100 or more citations, one of every 270 papers receives 200 or more citations, and one of every 3,300 receives 500 or more citations during its influence period (Garfield, 2005).

Because USF has less history than almost any AAU institution (other than U of California-Irvine), and because cumulative papers published and citations favor institutions with longer histories (greater productivity in earlier years), most analyses in this study consider paper and citation productivity during the most recent five year period (2001 through 2005).

It is important to realize that two broad discipline areas, the biological and health sciences, and the other physical sciences and mathematics (includes engineering), generate both far more articles and far more citations per article than any other broad discipline area (see Figure 2 and Figure 3).

Time Required for Maximum Citation Impact

In an attempt to determine approximately how many years are required for articles to generate their maximum impact, a comparatively thorough analysis was conducted using Big East institutions due to the comparatively wide variety of institutions in the Big East. Data were not available for Providence College and Villanova. We may assume that due to the diverse nature of the Big East, general trends that cross all of the different types of Big East institutions are likely to hold for all institutions.

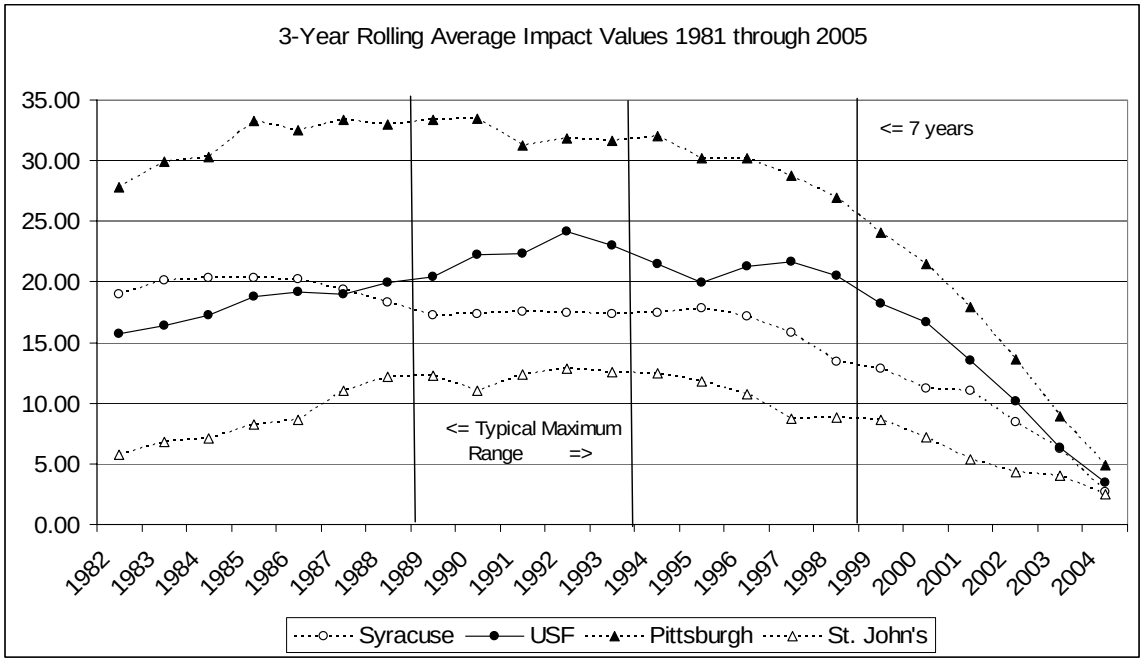
Figure 1 depicts 3-year rolling average[4] impact curves for four Big East institutions of different types. Pittsburgh is an established AAU research university. USF is an up-and-coming research university. Syracuse is an established smaller research university, and St. John's is primarily a liberal arts university. The impact measure is the average number of citations for articles published in a given year. Of course, more recent articles (e.g. 2003 and 2005 – 2004 rolling average) haven't had enough time to be cited very frequently. As the figure indicates, it takes roughly seven years for the average article to reach about two-thirds of its final impact. The highest impact point for USF and Pittsburgh is around 1990, suggesting that about 15 years is required for maximum impact (1990 to 2005). For 10 of the 14 Big East schools, the maximum article impact occurred between 1988 and 1994, with earlier articles not showing greater impact. For established institutions like Pittsburgh and Syracuse in the figure, article impact tends to be fairly flat over several years until it begins dropping as more recent articles haven't had time to realize their full citation potential.

One interesting effect is that for Syracuse, the maximum impact occurred from 1983 to 1985 (1984 - rolling average), and that it dropped from there. This suggests that one, or a few articles from Syracuse written between 1983 and 1985 had a large number of citations and that when this article(s) ceased to be widely cited Syracuse's overall impact dropped. The same phenomena also occurred for Seton Hall, Connecticut and Notre Dame. Eleven of the Big East institutions show their maximum impact between 1989 and 1994 which indicates that maximum impact occurs between roughly 11 and 16 years following publication. Most institutions show a slow growth from 1981 (1982 here) to perhaps 1988, which may reflect either that an increase in the number of journals or the number of published articles occurred during that time, because more journals and articles mean more citations. Established institutions like Pittsburgh, Georgetown, Connecticut, etc. show comparatively flat lines until the drop off begins at about 1995, when only 10 years of citations are available for an article. More recently published articles show fewer citations due to a lack of maturity. USF, as a growing research university, showed steady growth in the number of citations from 1981 through 1993.

[4] In order to stabilize the frequently erratic annual impact values, 3-year rolling averages were computed. The number for 1982 averages 1981 through 1983, and, for 2004, 2003 through 2005.

Pittsburgh and St. Johns were chosen because they represent comparatively typical extreme cases regarding citations. Pittsburgh consistently shows about 10 more citations per article than USF, while St. John's consistently shows about 10 fewer. After 1988 Syracuse shows about five fewer citations per article than USF. These differences are consistent with overall cumulative 25 year impact data which is 24.0 for Pittsburgh, 16.3 for USF, 14.8 for Syracuse and 8.6 for St. John's. By 1999 (seven years of citations), USF was fourth in annual impact, behind Pittsburgh, Georgetown and Cincinnati and tied with Connecticut. By 2000, USF was tied with Cincinnati and had moved ahead of Connecticut. This upward trend of USF is reflected in the figure where one can see that as time moves forward to 2000 (the last legitimate year), USF's gap over Syracuse increases and gap beneath Pittsburgh decreases.

Figure 1



Discipline Influence on Paper and Citations Productivity

Table 1 lists the 24 broad discipline areas used by Thompson ISI to organize papers and citations. To more clearly show the discipline effects on papers and citations, Figure 2 and Figure 3 depict respectively, impact and the percentage of papers and citations for seven very broad discipline areas that derive from the Thompson ISI 24 (see Methods for specifics). Three groupings are used in these figures: all institutions, public AAU institutions and USF. All institutions are used, rather than Very High and High Research Carnegie classifications because the issue here relates to generalizable phenomena.

Table 1
Thompson ISI 24 Broad Discipline Areas

Agricultural Sciences	Materials Science
Biology & Biochemistry	Mathematics

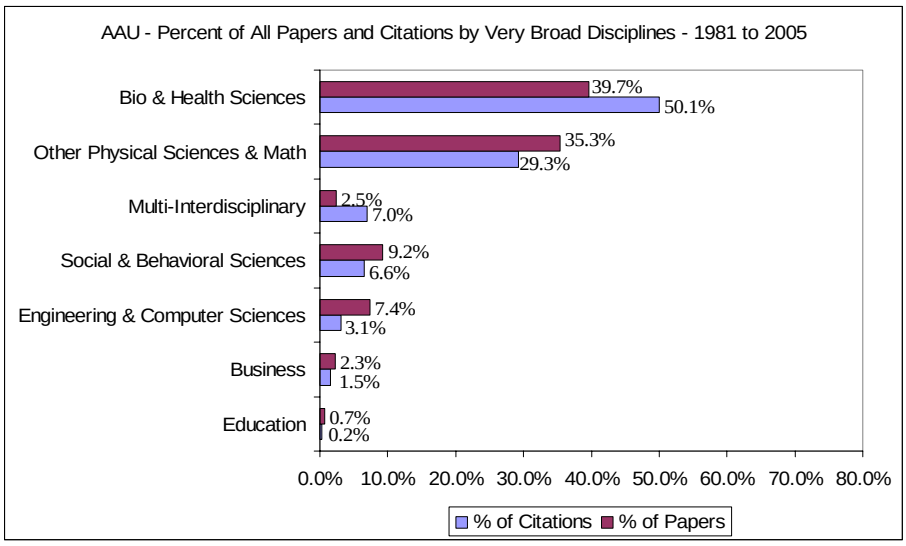
Chemistry	Microbiology
Clinical Medicine	Molecular Biology & Genetics
Computer Science	Multidisciplinary
Ecology/Environment	Neurosciences & Behavior
Economics & Business	Pharmacology
Education	Physics
Engineering	Plant & Animal Science
Geosciences	Psychology/Psychiatry
Immunology	Social Sciences, general
Law	Space Science

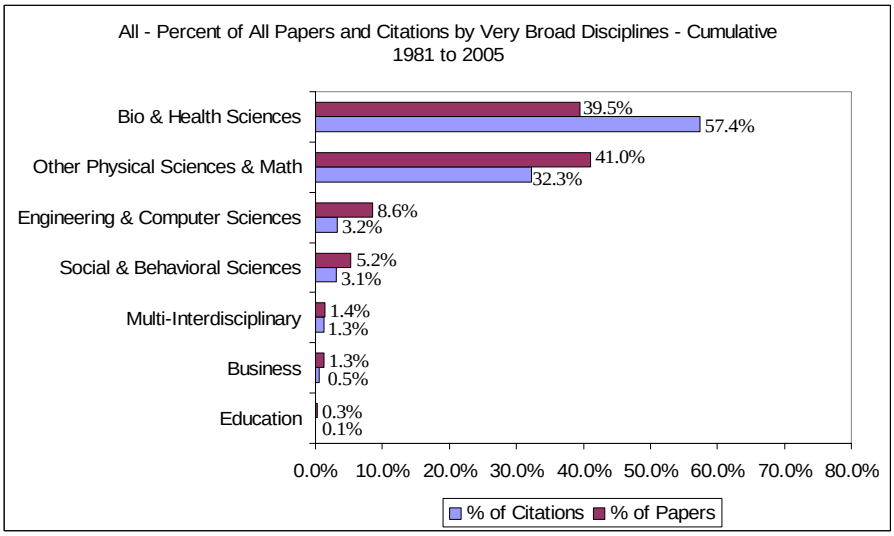
Figure 2 and Figure 3display evidence indicating that the biological and health sciences and other physical sciences and mathematics broad discipline areas produce at least 75% of all papers and citations. Panel B, the global situation including all published papers from any U.S. source shows that 80.5% of papers and 89.7% of citations occur in those two broad discipline areas. A conspicuous paper and citation gap occurs between these and other disciplines.

Generally, only two of the broad discipline areas show more citations than papers, those being the biological and health sciences and multidisciplinary. Regarding multi-disciplinary papers and citations, both figures suggest that USF more closely models public AAU institutions than all institutions with regards to that set of disciplines. This is further supported by Figure 3, which shows multidisciplinary to have the greatest number of citations per paper both for AAU institutions and USF, but not for all institutions, where the biological and health sciences are greatest. This may partially occur because of multidisciplinary papers involving the social and behavioral sciences, engineering and physical sciences and biological and health sciences, all of which are comparatively high on citations.

One phenomenon that Figure 2 and Figure 3 suggest is that USF produces comparatively fewer citations in the other physical sciences and mathematics very broad discipline areas than either the average AAU or average research extensive institution does.

Figure 2


AAU - Percent of All Papers and Citations by Very Broad Disciplines - 1981 to 2005
Bio & Health Sciences
39.7%
50.1%
Other Physical Sciences & Math
35.3%
29.3%
Multi-Interdisciplinary
2.5%
7.0%
Social & Behavioral Sciences
9.2%
6.6%
Engineering & Computer Sciences
7.4%
3.1%
Business
2.3%
1.5%
Education
0.7%
0.2%
0.0% 10.0% 20.0% 30.0% 40.0% 50.0% 60.0% 70.0% 80.0%
% of Citations
% of Papers


All - Percent of All Papers and Citations by Very Broad Disciplines - Cumulative 1981 to 2005
Bio & Health Sciences
39.5%
57.4%
Other Physical Sciences & Math
41.0%
32.3%
Engineering & Computer Sciences
8.6%
3.2%
Social & Behavioral Sciences
5.2%
3.1%
Multi-Interdisciplinary
1.4%
1.3%
Business
1.3%
0.5%
Education
0.3%
0.1%
0.0% 10.0% 20.0% 30.0% 40.0% 50.0% 60.0% 70.0% 80.0%
% of Citations
% of Papers

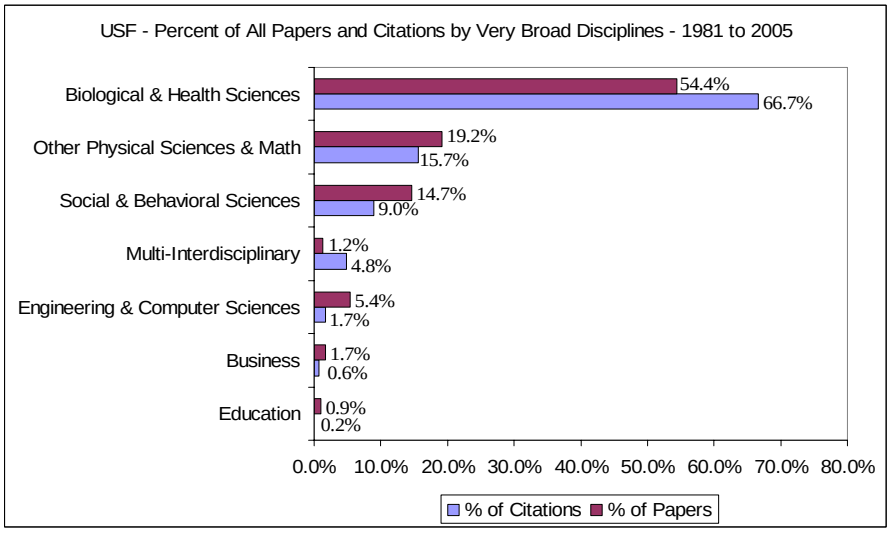
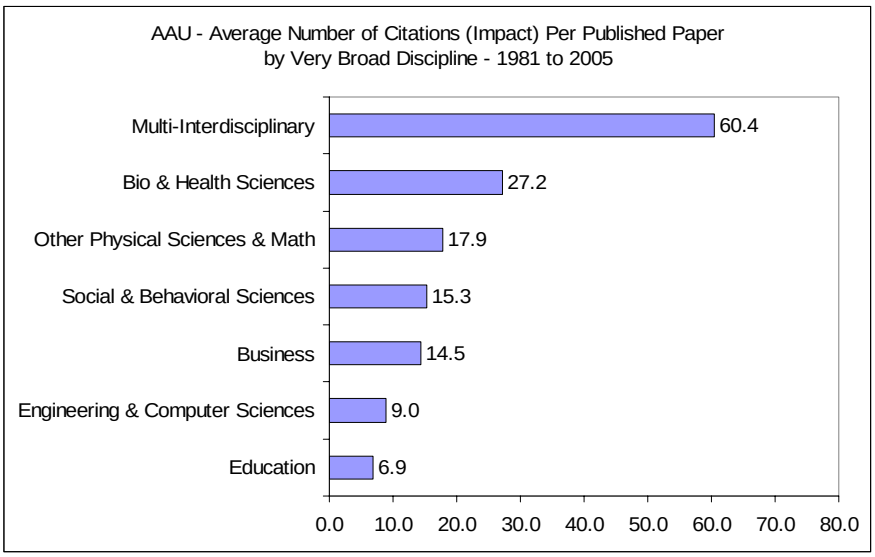
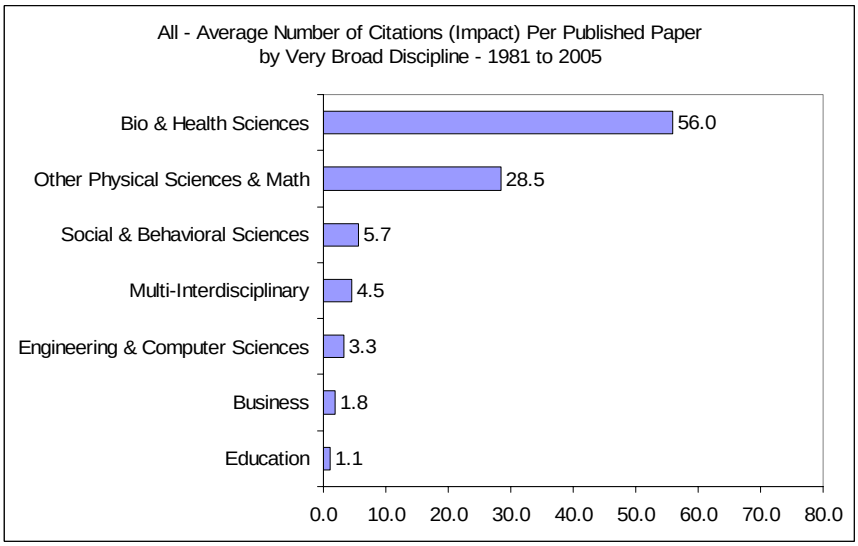
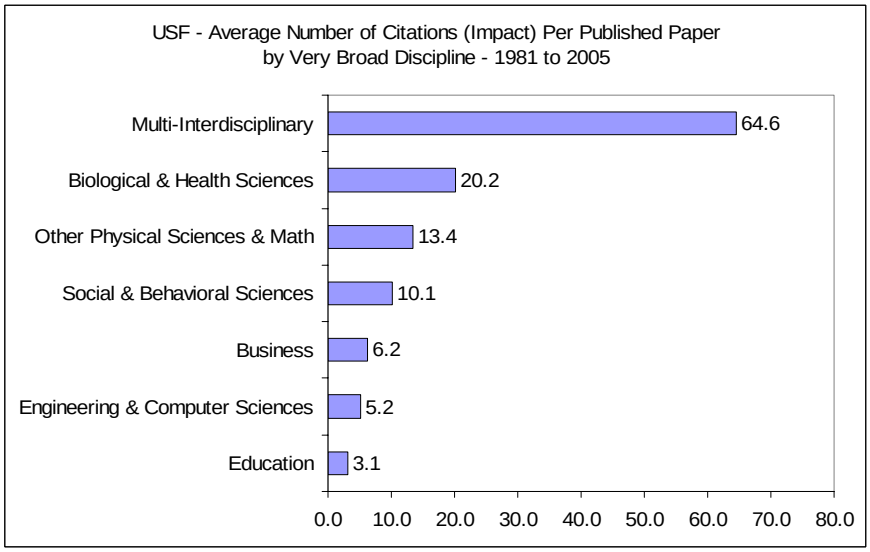

USF - Percent of All Papers and Citations by Very Broad Disciplines - 1981 to 2005
Biological & Health Sciences
54.4%
66.7%
Other Physical Sciences & Math
19.2%
15.7%
Social & Behavioral Sciences
14.7%
9.0%
Multi-Interdisciplinary
1.2%
4.8%
Engineering & Computer Sciences
5.4%
1.7%
Business
1.7%
0.6%
Education
0.9%
0.2%
0.0% 10.0% 20.0% 30.0% 40.0% 50.0% 60.0% 70.0% 80.0%
% of Citations
% of Papers

Figure 3


AAU - Average Number of Citations (Impact) Per Published Paper
by Very Broad Discipline - 1981 to 2005
Multi-Interdisciplinary
60.4
Bio & Health Sciences
27.2
Other Physical Sciences & Math
17.9
Social & Behavioral Sciences
15.3
Business
14.5
Engineering & Computer Sciences
9.0
Education
6.9
0.0 10.0 20.0 30.0 40.0 50.0 60.0 70.0 80.0


All - Average Number of Citations (Impact) Per Published Paper
by Very Broad Discipline - 1981 to 2005
Bio & Health Sciences
56.0
Other Physical Sciences & Math
28.5
Social & Behavioral Sciences
5.7
Multi-Interdisciplinary
4.5
Engineering & Computer Sciences
3.3
Business
1.8
Education
1.1
0.0 10.0 20.0 30.0 40.0 50.0 60.0 70.0 80.0


USF - Average Number of Citations (Impact) Per Published Paper
by Very Broad Discipline - 1981 to 2005
Multi-Interdisciplinary
64.6
Biological & Health Sciences
20.2
Other Physical Sciences & Math
13.4
Social & Behavioral Sciences
10.1
Business
6.2
Engineering & Computer Sciences
5.2
Education
3.1
0.0 10.0 20.0 30.0 40.0 50.0 60.0 70.0 80.0

What Institutional Characteristics Best Predict Paper and Citation Productivity?
Because Appendix B shows that the several of the value distributions for citations and predictor measures exhibit comparatively extreme distributional characteristics, robust rank statistical comparisons were applied rather than traditional Ordinary Least Square (OLS) analyses. In order to evaluate simple relationships (correlations) between predictor measures and citation productivity output variables (papers, citations and impact), Spearman Rranks correlations were computed for the complete population of 140 institutions for which all data were available. Table 2 exhibits the results of these correlations. Before discussing these correlations, it becomes necessary to discuss multiplicity. Because so many analyses were conducted, rather than considering the statistical significance of relationships, the following discussion will be concerned only with the magnitude and direction of obtained relationships.[5]

Table 2 ranks predictors in descending order by the magnitude of relationship with the total number of citations. The highest correlations/relationships with each outcome are highlighted in yellow. The single best predictor of citations is the number of post doctorates, followed fairly closely by the amount of federal research expenditures, the number of national academy members, total research expenditures and core revenue amount. None of these top relationships differ significantly among themselves because all are strong. All of the predictors relate at a 0.60 or higher rate to the number of papers and citations down to total faculty numbers. Relationships with citation impact, however, drop off far more quickly, reducing below Rranks 0.60 after total grant revenues. Total enrollment and total degrees are the only variables exhibiting zero or negative impacts, and that only occurs for impact and percent of papers cited.

The bottom section of the table shows relationships between the percentage of research expenditures in TARU broad discipline areas and the citations outcome variables. Other than research in the biological and health sciences, all of these relationships are negative or near zero. This indicates that the strongest influence on citations is research conducted in the biological and health sciences disciplines.

Table 2
Spearman Ranks Correlations of Citation Productivity Predictors with Five Outcomes

		5-year	Impact	Number of		Percent
	N	Impact	of Cited	Papers	Citations	Cited
Post Doctorates Fall 2003	132	0.76	0.74	0.88	0.91	0.79
Federal Research FY 2004	132	0.71	0.69	0.90	0.90	0.71
Academy Members 2005	132	0.75	0.74	0.86	0.88	0.76
Total Research FY 2004	132	0.57	0.55	0.92	0.87	0.59
Core Revenues FY 2004	140	0.62	0.61	0.89	0.87	0.59
Expenditures-Research FY 04	134	0.64	0.63	0.88	0.87	0.63
Faculty Awards FY 2004-05	132	0.70	0.69	0.85	0.86	0.69
Total Grants FY 2004	140	0.60	0.59	0.88	0.86	0.59

[5] Given a population of 140, all rranks correlations of 0.30 or higher are significant at the $p < .0001$ level for single comparisons; however, due to the multiplicity involved, significance is comparatively meaningless.

		5-year	Impact	Number of		Percent
	N	Impact	of Cited	Papers	Citations	Cited
Expenditures-Instruction	134	0.55	0.55	0.82	0.80	0.53
Total Doctorates AY 2005	132	0.41	0.41	0.84	0.76	0.41
Assets FY 2004	90	0.52	0.50	0.73	0.73	0.53
Total Faculty Fall 2005	140	0.31	0.31	0.67	0.61	0.31
Faculty Bio-Health Sciences	140	0.39	0.37	0.59	0.57	0.43
Faculty Engineering	140	0.17	0.17	0.57	0.48	0.15
Total Degrees AY 2005	140	-0.04	-0.04	0.48	0.35	-0.05
Grant % of Revenues FY 2004	140	0.26	0.25	0.33	0.32	0.27
Total Enrollment Fall 2005	139	-0.18	-0.18	0.33	0.19	-0.18
Percent of Research Expenditures by TARU Broad Discipline Area, FY 2004						
Biological & Health Sciences	132	0.39	0.36	0.42	0.43	0.44
Other Physical Sciences	132	-0.20	-0.20	-0.23	-0.24	-0.22
Engineering & Computer Sci	132	-0.30	-0.28	-0.13	-0.19	-0.36
Social & Behavioral Sciences	130	-0.21	-0.20	-0.16	-0.18	-0.23
Other Sciences	130	-0.23	-0.23	-0.11	-0.17	-0.22

Analyses and Comparisons with AAU Institutions

Figure 4 through Figure 8 provide some direct comparisons between public AAU institutions, USF, and other public Carnegie Very High and High Doctoral/Research Institutions. The population sizes are AAU, 34, Very High Research excluding USF, 27, and High Research 35. All institutions included in these populations were classified as Research Extensive under the 2000 Carnegie Classification System. All data are for the most recently available years.

Figure 4 shows that the funding and revenue available to AAU institutions is greater than at non-AAU institutions, although not as great a difference occurs for grant funds as for core revenues. This figure shows that the Carnegie rankings exhibit a one-to-one relationship with funding. Figure 5 depicts how these additional revenues translate into larger faculty numbers which in turn associates with greater research productivity in the form of published papers and citations.

Figure 6 depicts the fact that non-AAU institutions are far closer to AAU institutions in the impact of citations (panel A) and in the percentage of papers that are cited (panel B), than in total citations. Impact reflects the average number of citations per paper. Panel B displays the fact that, of the papers that are cited (between 64% and 70% for these institutions) AAU cited source papers are cited perhaps 25% more frequently than are those from High Research institutions, and about the same as non-AAU Very High Research institutions. USF's impact and percent cited are both relatively close to the average AAU institution (see Table 2 for the relevant dates).

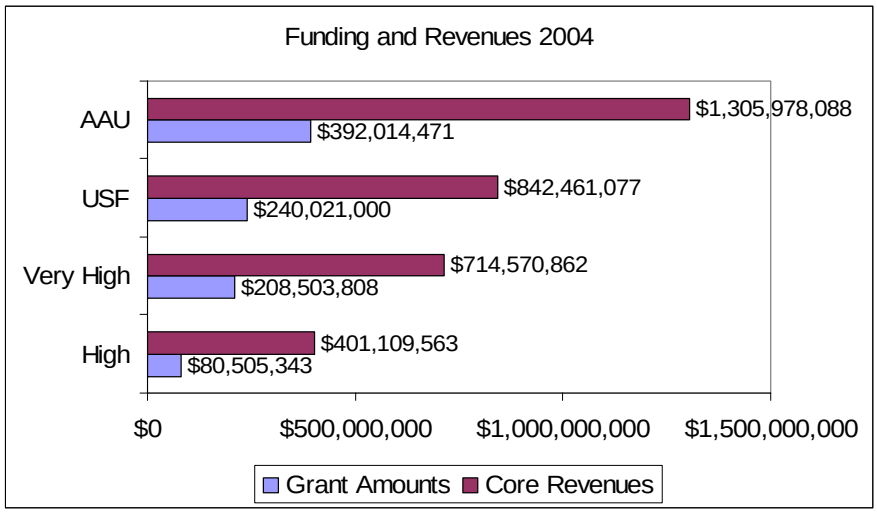
Figure 7 shows that AAU institutions have a large advantage regarding the number of National Academy Members and Faculty Award winners over non-AAU members. Panel

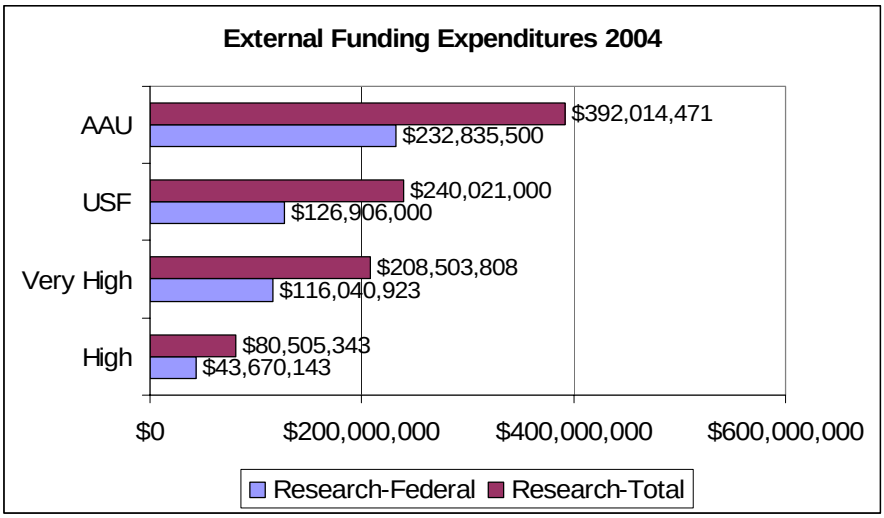
B tells that a similar advantage occurs regarding the number of doctorates granted and post-doctoral appointments at these institutions.

Panel A of Figure 8 suggests that institutional size may be an important factor in the funding and faculty numbers results. Therefore, Panels B and C standardize such values relative to the size of the institution's student body and faculty numbers. The AAU institutions exhibit less of an advantage relative to each student or each faculty member regarding core revenues and grant dollars expended in the most recent year. Panel C indicates that the same is true regarding instructional expenditures per FTE student. However, regarding research expenditures per faculty member, the AAU institutions retain a 54% advantage over non-AAU public Very High research institutions, and a greater advantage over High Research universities.

Generally, USF's values consistently fall close to the non-AAU Very High Research institutions. Regarding grant funding, USF is more dependent on this source of income than are AAU, Very High or High Research institutions and this may prove a detriment to future development. Overall, among 97 public research institutions, USF had the seventh highest percent of funds coming from grants. However, UF was fourth, at 46 percent while FSU had 35 percent. Overall, Florida was the second highest state for public Very High institutions (41%) behind only Hawaii with a single institution, Manoa, at 47 percent. It appears that Florida's very high research institutions (UF, FSU, USF) have either chosen to or been forced to turn to grant funds for growth and development.

Figure 4


Funding and Revenues 2004
AAU
USF
Very High
High
$1,305,978,088
$392,014,471
$842,461,077
$240,021,000
$714,570,862
$208,503,808
$401,109,563
$80,505,343
$0
$500,000,000
$1,000,000,000
$1,500,000,000
Grant Amounts
Core Revenues


External Funding Expenditures 2004
AAU
USF
Very High
High
$392,014,471
$232,835,500
$240,021,000
$126,906,000
$208,503,808
$116,040,923
$80,505,343
$43,670,143
$0
$200,000,000
$400,000,000
$600,000,000
Research-Federal
Research-Total

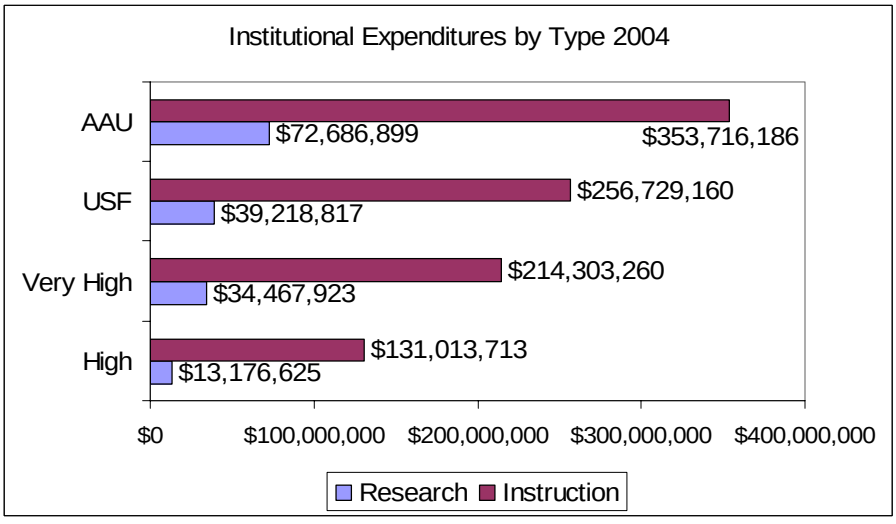
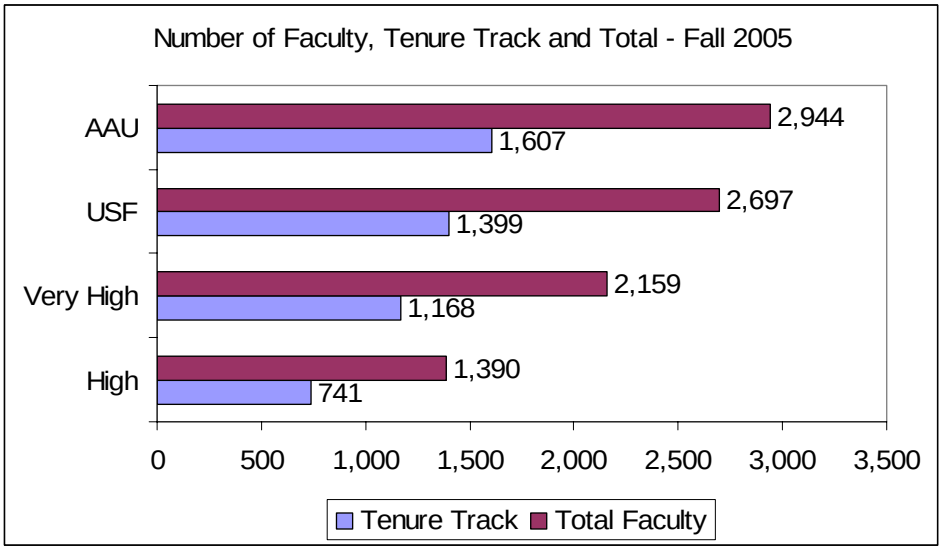

Institutional Expenditures by Type 2004
AAU
USF
Very High
High
$72,686,899
$353,716,186
$39,218,817
$256,729,160
$34,467,923
$214,303,260
$13,176,625
$131,013,713
$0
$100,000,000
$200,000,000
$300,000,000
$400,000,000
Research
Instruction

Figure 5


Number of Faculty, Tenure Track and Total - Fall 2005
AAU
2,944
1,607
USF
2,697
1,399
Very High
2,159
1,168
High
1,390
741
0
500
1,000
1,500
2,000
2,500
3,000
3,500
Tenure Track
Total Faculty

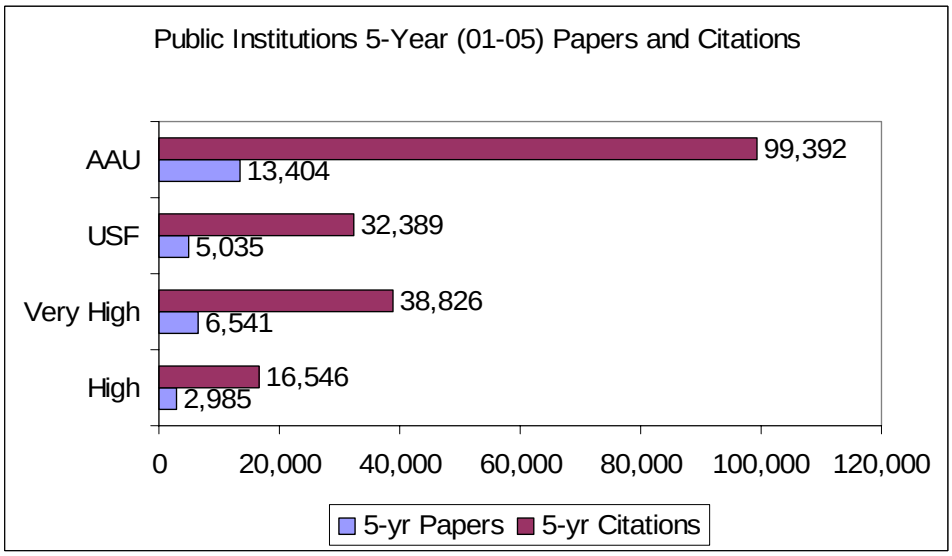
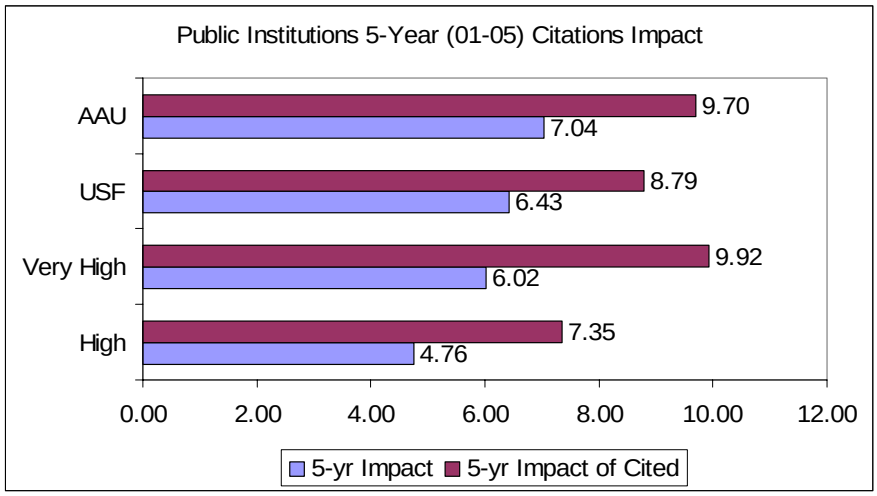

Public Institutions 5-Year (01-05) Papers and Citations
AAU
99,392
13,404
USF
32,389
5,035
Very High
38,826
6,541
High
16,546
2,985
0
20,000
40,000
60,000
80,000
100,000
120,000
5-yr Papers
5-yr Citations

Figure 6


Public Institutions 5-Year (01-05) Citations Impact
AAU
USF
Very High
High
9.70
7.04
8.79
6.43
9.92
6.02
7.35
4.76
0.00
2.00
4.00
6.00
8.00
10.00
12.00
5-yr Impact
5-yr Impact of Cited

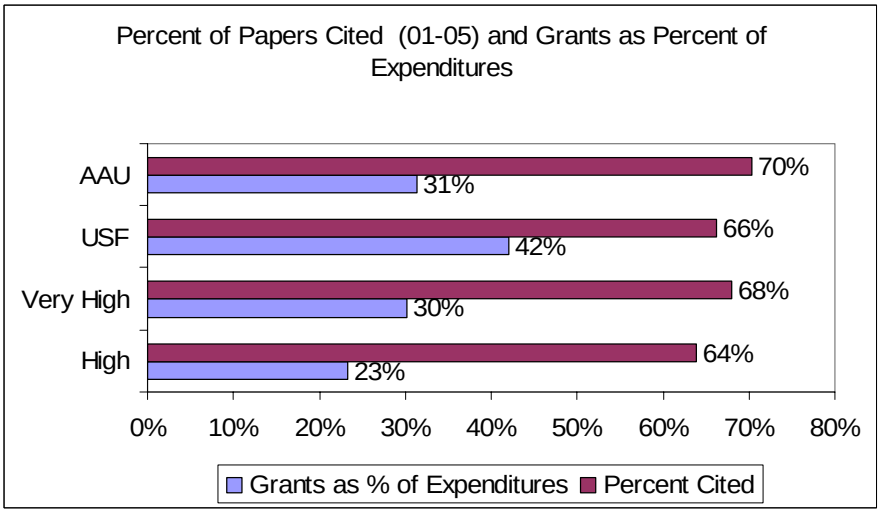
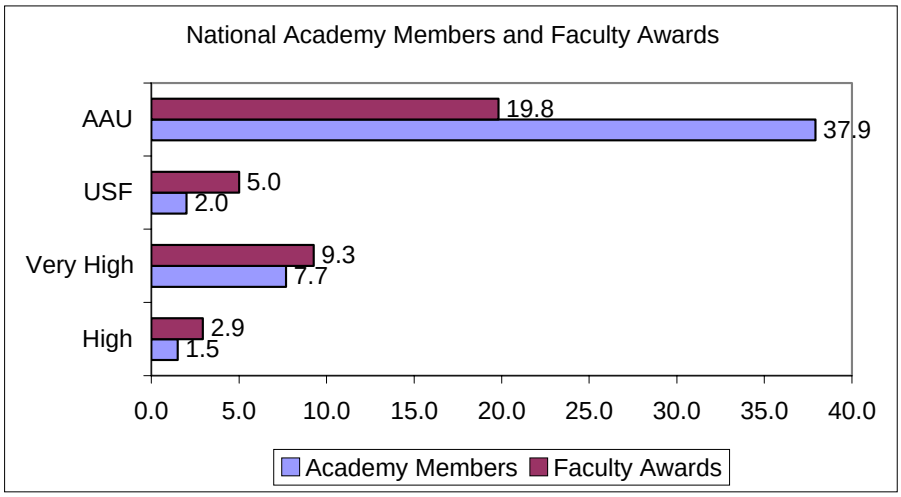

Percent of Papers Cited (01-05) and Grants as Percent of Expenditures
AAU
USF
Very High
High
70%
31%
66%
42%
68%
30%
64%
23%
0%
10%
20%
30%
40%
50%
60%
70%
80%
Grants as % of Expenditures
Percent Cited

Figure 7


National Academy Members and Faculty Awards
AAU
USF
Very High
High
19.8
37.9
5.0
2.0
9.3
7.7
2.9
1.5
0.0
5.0
10.0
15.0
20.0
25.0
30.0
35.0
40.0
Academy Members
Faculty Awards

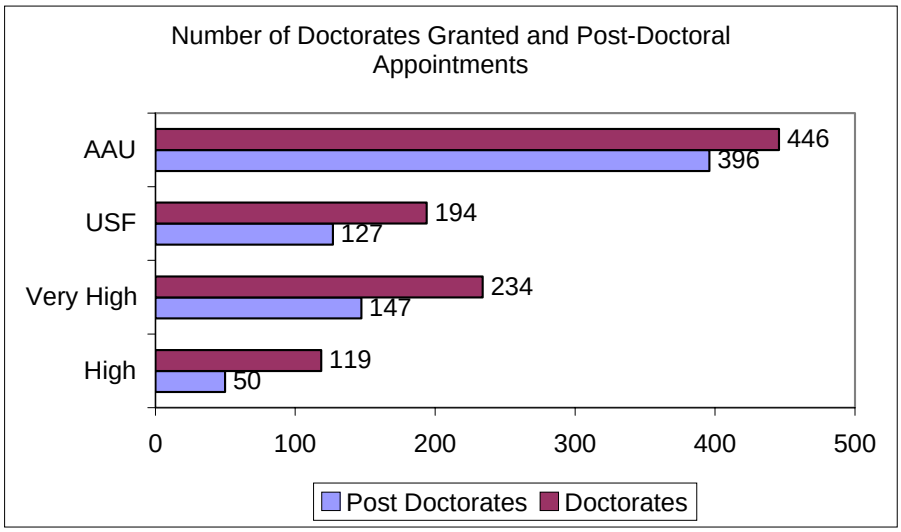
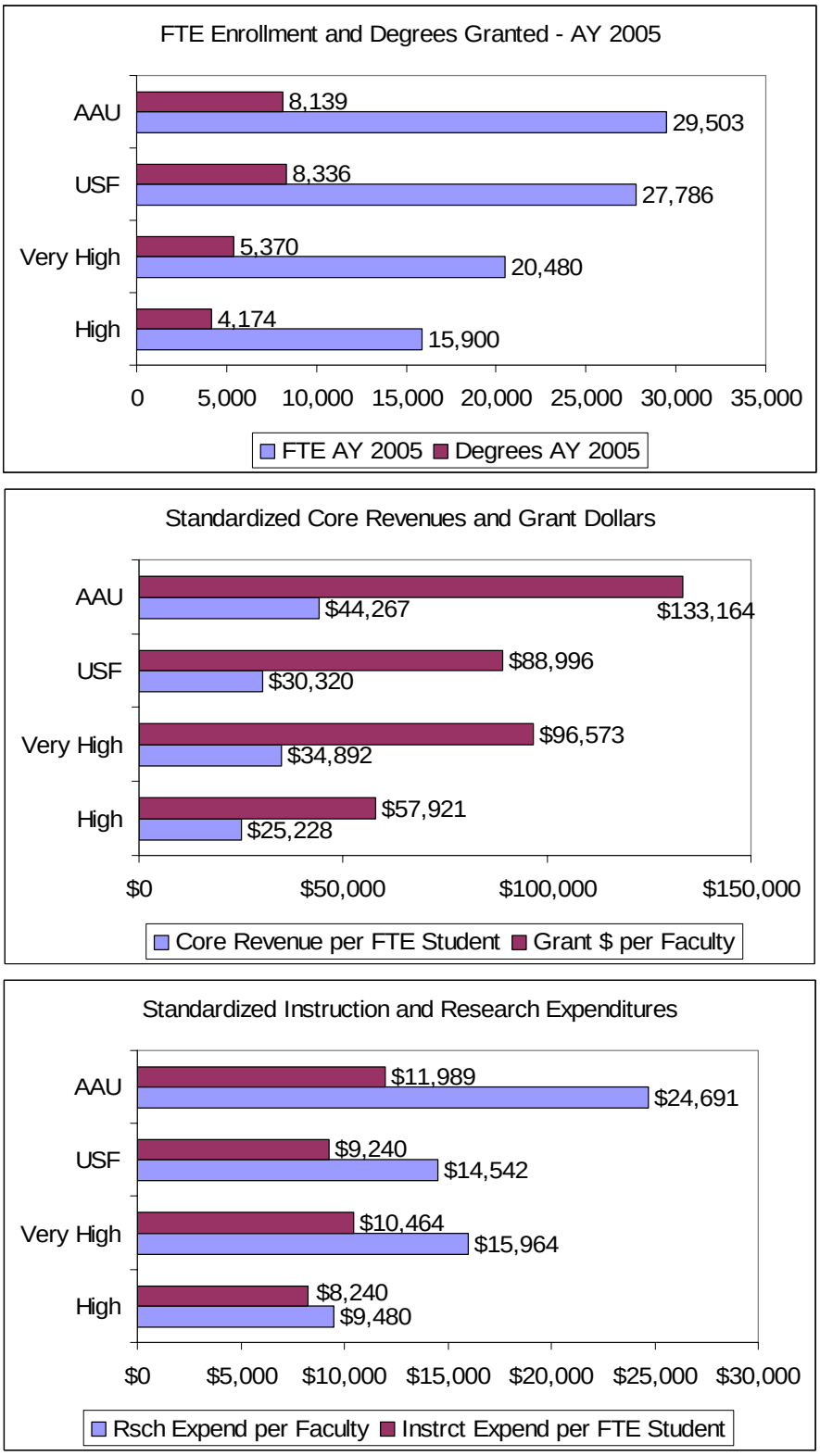

Number of Doctorates Granted and Post-Doctoral Appointments
AAU
USF
Very High
High
446
396
194
127
234
147
119
50
0
100
200
300
400
500
Post Doctorates
Doctorates

Figure 8


FTE Enrollment and Degrees Granted - AY 2005
AAU
USF
Very High
High
8,139
29,503
8,336
27,786
5,370
20,480
4,174
15,900
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
FTE AY 2005
Degrees AY 2005
Standardized Core Revenues and Grant Dollars
AAU
USF
Very High
High
$44,267
$133,164
$30,320
$88,996
$34,892
$96,573
$25,228
$57,921
$0
$50,000
$100,000
$150,000
Core Revenue per FTE Student
Grant $ per Faculty
Standardized Instruction and Research Expenditures
AAU
USF
Very High
High
$11,989
$24,691
$9,240
$14,542
$10,464
$15,964
$8,240
$9,480
$0
$5,000
$10,000
$15,000
$20,000
$25,000
$30,000
Rsch Expend per Faculty
Instrct Expend per FTE Student

Analyses and Comparisons with Big East, SUS and Strategic Plan Peers

In the following comparisons, only Research Extensive institutions are compared.[6] The Big East Research Extensive institutions are: the University of Connecticut, Georgetown University, the University of Notre Dame, the University of Louisville, The University of New Hampshire, Rutgers University, Syracuse University, The University of Pittsburgh, West Virginia University and Marquette University. The three SUS institutions are The University of Florida, Florida State University and Florida International University. Note that some of these institutions have lower values than others and pull down the mean values. For example, both Florida International University and Florida State University have far lower values than the University of Florida on all of the measures included in Table 3. USF's values are generally comparable with these sets of peers and generally below the Strategic Plan (SP) peers on the measures shown, with a few exceptions:

1. Tuition – Both USF and other SUS institutions have lower tuition than the other peers. Note that some of the Big East institutions are private.
2. Citations – USF has at least 10,000 fewer citations during the five year period from 2001 through 2005 than any of the other group means.
3. Grants as a percentage of funds – For USF, grants represent between a 35% (SUS) and 83% (Big East) greater percentage of total revenues than at any of the other peer group's average institution (note, 42%/23% = 182.6%).
4. National Academy Members and Faculty Awards – USF is below all other group means on these Phase I AAU Membership Indicators. Usually, USF is closer than the most recent year with regards to Faculty Awards.

Table 3
Comparison of USF with Big East, Strategic Plan and SUS Peers

	USF	Big East	SP Peer	SUS Peers
N of Institutions	1	10	8	3
Citations 5-yr (2001-2005)	32,389	42,692	56,284	43,243
Papers 5-yr (2001-2005)	5,035	6,058	8,292	8,238
Impact 5-yr (2001-2005)	6.4	6.2	6.5	5.0
Impact of Cited (2001-2005)	9.7	9.1	9.2	7.8
Percent Cited (2001-2005)	66%	68%	69%	64%
Core Revenues FY04	42%	23%	29%	31%
Grants as a Percentage of Funds FY04	$842,461,077	$730,854,855	$905,416,151	$979,015,883
Total Grant Amount FY04	$353,833,652	$176,782,626	$259,139,710	$365,908,450
Instructional Expenditures FY04	$256,729,160	$191,267,219	$270,359,444	$263,573,865
Research Expenditures FY04	$39,218,817	$30,657,133	$38,255,734	$47,452,094
Federal Research FY04	$126,906,000	$94,712,100	$160,690,875	$124,259,333
Total Research FY04	$240,021,000	$141,387,000	$272,641,625	$226,274,333
Tuition & Fees 0607	$3,416	$17,397	$7,153	$3,214
Tenured/Ten Track Faculty 2005	1,399	1,000	1,316	1,658
Total Faculty 2005	2,697	2,010	2,530	2,779
National Academy Members	2.0	7.9	14.6	9.3

[6] This comparison includes private Big East institutions to increase the numbers in each cell.

	USF	Big East	SP Peer	SUS Peers
N of Institutions	1	10	8	3
Faculty Awards	5.0	9.7	14.4	9.7
Post Doctorates 03	127	119	254	219
Total Enrollment Fall05	42,660	20,088	25,943	41,914
FTE Enrollment 0506	27,786	16,827	20,823	32,584
Total Degrees 0506	8,336	4,690	5,742	9,677
Doctorates Granted 0506	194	174	281	353

Changes Over Time at USF

Table 4 provides the number of papers published by broad discipline area in 1981-85 and 2001-05. The overall growth of papers published at USF was 188%, from 1,964 in the earlier years, to 5,649 in the most recent 5-year period. This compares with an increase of 76% for all U.S. paper sources. Below the total row, broad disciplines are divided into two groups: (1) those at USF publishing more than 100 papers between 2001 and 2005, and (2) those publishing fewer than 100 papers during that time. Within these groups, disciplines are sorted by growth from greatest to least. Looking at USF's growth, most disciplines show at least a doubling of published papers (100% growth). This is a greater growth than average, because, among all U.S. sources, only six of the 24 discipline areas show 100% or greater growth, and only computer science shows more than a 200% growth. At USF, 15 disciplines showed 100% or more, and 11 showed a 200% or greater increase. Only in mathematics and space science does USF show less growth than the overall U.S. rate.

For USF, the growth percentage relates to the number published during the early period, as Clinical Medicine, which published almost three percent of all papers from 1981 to 1985, showing average growth, although they increased their publication by almost 1,300 papers. Physics and Materials Science, which respectively published 23 and 3 papers from 1981 to 85, showed the greatest growth, respectively 787% and 2000% with increases respectively of 181 and 60 papers. Biology and Biochemistry showed about the lowest growth (62%), although they increased their publications by 147 papers.

Table 4
Changes in the Number of USF Published Papers by Discipline from 81-85 to 01-05

		Total Papers		Growth	
	25yr Totals	1981-1985	2001-2005	USF	All U.S.
All Disciplines	19,745	1,964	5,649	188%	76%
USF Disciplines Publishing More Than 100 Papers from 2001 to 2005					
Physics	466	23	204	787%	113%
Molecular Biology & Genetics	443	22	139	532%	130%
Neurosciences & Behavior	857	52	303	483%	99%
Engineering	863	51	274	437%	124%
Geosciences	749	64	255	298%	97%
Immunology	663	40	141	253%	74%
Social Sciences, general	1,330	126	429	240%	68%

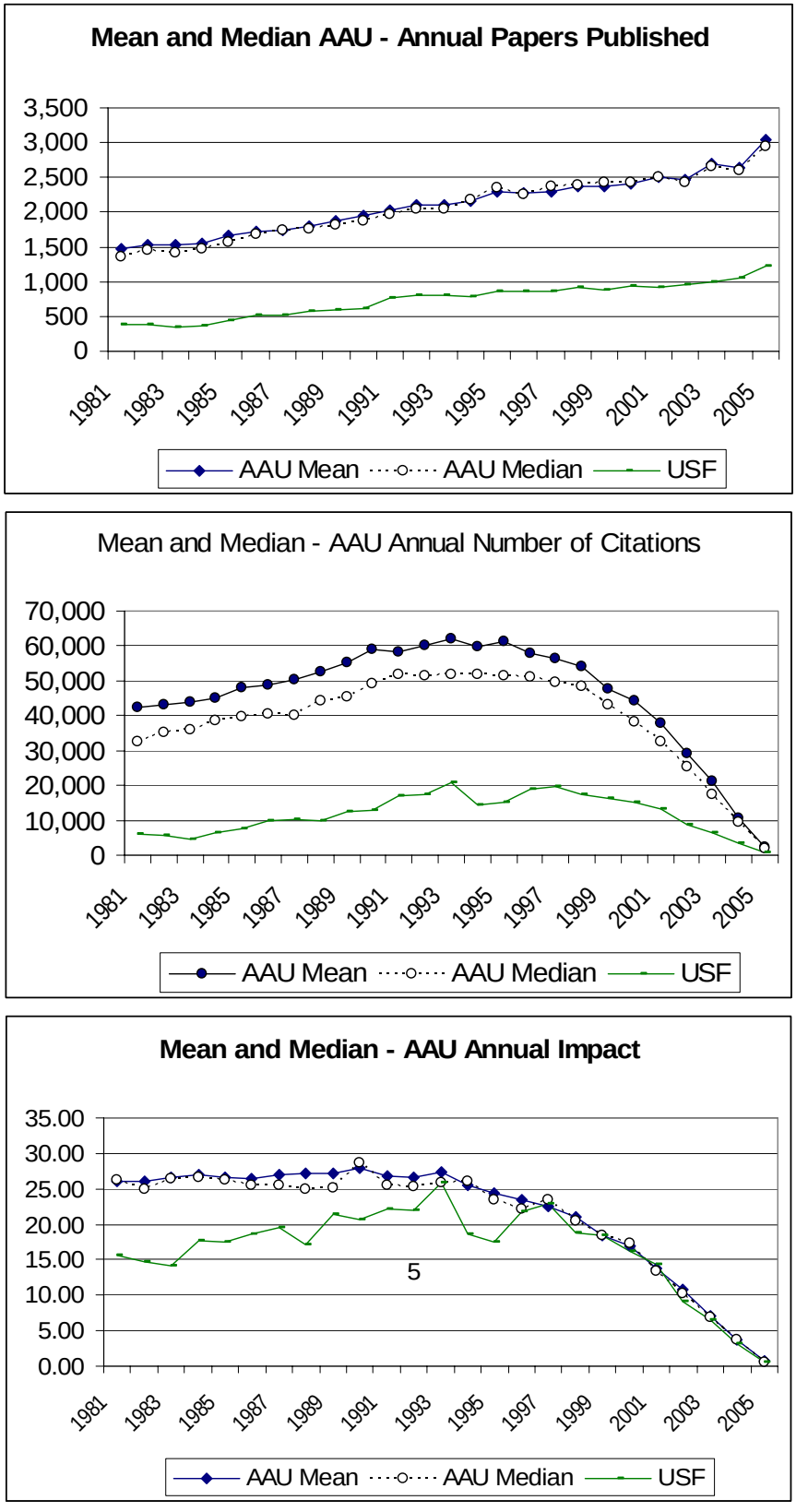
		Total Papers		Growth	
	25yr Totals	1981-1985	2001-2005	USF	All U.S.
Economics & Business	340	36	110	206%	63%
Clinical Medicine	6,606	594	1,794	202%	81%
Ecology/Environment	455	52	150	188%	133%
Psychology/Psychiatry	1,568	167	455	172%	42%
Chemistry	868	113	245	117%	76%
Biology & Biochemistry	1,551	236	383	62%	36%
Plant & Animal Science	994	162	259	60%	33%
USF Disciplines Publishing Fewer Than 100 Papers from 2001 to 2005					
Materials Science	142	3	63	2000%	137%
Computer Science	197	14	68	386%	213%
Multidisciplinary	240	25	59	136%	6%
Education	183	22	48	118%	8%
Pharmacology	331	41	74	80%	28%
Agricultural Sciences	94	13	23	77%	19%
Microbiology	284	44	74	68%	58%
Mathematics	473	56	90	61%	79%
Law	37	6	9	50%	15%
Space Science	11	2	0	-100%	94%

USF Relative to the Average AAU Institution on Papers and Citations

Figure 9 depicts that, relative to annual papers published and citations, USF roughly parallels the growth exhibited by the "Average" AAU institution between 1981 and 2005. However, USF's parallel course is significantly lower than that of the average AAU institution. Figure 1 and the discussion regarding the time required for maximum impact explain why citations and impact exhibit downward trends after about 1993.

Regarding impact, by 1993, USF reached that of the "average" AAU institution, and although there as a dip relative to the AAU in 1994 and 1995, by 1997, USF was again equal to the "average" AAU institution for this metric.

Figure 9


Mean and Median AAU - Annual Papers Published
3,500
3,000
2,500
2,000
1,500
1,000
500
0
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
AAU Mean
AAU Median
USF
Mean and Median - AAU Annual Number of Citations
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
AAU Mean
AAU Median
USF
Mean and Median - AAU Annual Impact
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
5
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
AAU Mean
AAU Median
USF

Summary and Discussion

As one of the five Phase I AAU Indicators (Appendix A), citations is a prerequisite for attaining AAU membership. USF has generally been moving in the direction of AAU institutions for several years, however, as Birnbaum (2007) notes: "...'world-class' has increasingly come to be synonymous with 'Western.' That means science, research, and lots of money..." Regarding funding and revenues (money), Figure 4 depicts the gap between AAU and non-AAU research universities. USF is almost equidistance between the mean public AAU and non-AAU institutions regarding funding and revenues.

In recent history, USF has exhibited rapid growth in most of the areas that characterize typical public AAU institutions. Unfortunately, regarding citations, although USF has exhibited growth, the gap between USF and the average AAU public institution has not decreased over the past 25 years (Figure 9). The data in this study suggest that gap reduction requires more faculty, researchers and postdoctorates in the biological and health sciences or multidisciplinary sciences. The preceding groups are those who produce the most papers, which result in greater numbers of citations.

Panel B of Figure 6 suggests that research at USF is more dependent on grant funding than either AAU or other Very High or High Research institutions. This dependency may prove a detriment to future development, as more stable funding sources are usually preferable to variable funding sources such as grant funding.

References

Birnbaum, R. (2007). No World-Class University Left Behind. *International Higher Education*, 47, Spring 2007. Downloaded from the WWW on April, 29, 2007: http://www.bc.edu/bc_org/avp/soe/cihe/newsletter/Number47/p7_Birnbaum.htm

Garfield, E. (2005). *The Agony and the Ecstasy*. International Congress on Peer Review And Biomedical Publication. Chicago, IL. September 16, 2005. Downloaded from the WWW on March 15, 2007: http://www.garfield.library.upenn.edu/papers/jifchicago2005.pdf)

Appendix A
AAU Membership Indicators and Definitions

Phase I Indicators

1) *Competitively funded federal research support:* These data are collected by the National Science Foundation. The Membership Committee has been using obligations, which are the only measures that break down federal support by agency. The committee has recently switched to using NSF research expenditure data, which are more accurate, with a correction factor to subtract the estimated proportion of university expenditures drawn from USDA. Most USDA funding is not allocated competitively, and USDA support accordingly is included as a Phase II indicator.

2) *Membership in the National Academies (NAS, NAE, and IOM):* The National Academies' membership database maintains the current institutional affiliation of its members.

3) *National Research Council faculty quality ratings:* These ratings are drawn from the decennial national assessment of research-doctorate programs conducted by the NRC. Though the data become dated between surveys, the committee believes that they continue to provide a valuable peer-assessment of faculty quality. The last NRC report was published in 1995 based on 1993 data; preparation for the next NRC assessment is currently underway.

4) *Faculty arts and humanities awards, fellowships, and memberships:* For its last research doctorate assessment, NRC compiled a list of awards, fellowships, and memberships signifying faculty achievement primarily in arts and humanities fields. The Membership Committee has expanded this list and will use it as an additional assessment of the distinction of an institution's faculty, focusing on the arts and humanities faculty (Attachment 1). Additional appropriate awards, fellowships, and memberships will be added to this list as they are identified.

5) *Citations:* The *U.S. University Science Indicators* citations database provides an annually updated measure of both research volume and quality and will provide a valuable complement to the first four indicators listed above.

Phase II Indicators

1) *USDA, state, and industrial research funding:* Though these three sources of academic research support fund important, high-quality research, they will be treated as phase II indicators since they are generally not allocated through competitive, merit-review processes. Competitively funded USDA research programs that can be separately identified in reported data will be included in phase I data.

2) *Doctoral education:* The committee will use number of Ph.D.s granted annually as well as tabulate the distribution of Ph.D.s across broad disciplinary categories (e.g., engineering but not aerospace engineering), using Department of Education IPEDS

(Integrated Postsecondary Education Data System) data. These data will be treated as phase II indicators to de-emphasize the quantitative dimensions of Ph.D. programs and avoid sending an unintended signal to institutions to increase Ph.D. output at a time when many institutions are or are considering scaling back their Ph.D. programs.

3) *Number of postdoctoral appointees:* The committee will use NSF-compiled data from institutions on postdoctoral appointees, most of who are in the health sciences, physical sciences, and engineering. Postdoctoral education is an increasingly important component of university research and education activities that the committee believes should be tracked in AAU membership indicators. However, because postdoctoral activity is highly correlated with university research and because self-reported postdoctoral data are less uniform than data on federally funded research, postdoctoral appointees will be treated as a phase II indicator.

4) *Undergraduate education:* The committee will assess the institution's undergraduate programs to determine that the institution is meeting its commitment to undergraduate education. Recognizing that differing institutional missions among research universities dictate different ways of providing undergraduate education, the committee will be flexible in this assessment. A number of measures have been suggested, including some that focus on input and others that look primarily at output variables. These are at this time imperfect, but may provide some guidance to the committee in making its judgments on this topic.

Appendix B

Table 5
Institutions Included in the Study

Public		Private	
AAU Institutions			
Indiana U-Bloomington		Brandeis U	
Iowa State U		Brown U	
Michigan State U		Carnegie Mellon U	
Ohio State U		Case Western Reserve U	
Pennsylvania State U		Columbia U New York	
Purdue U		Cornell U	
Rutgers U-New Brunswick	Big East, SP Peer	Duke U	
SUNY-Buffalo	SP Peer	Georgetown U	Big East
SUNY-Stony Brook	SP Peer	Harvard U	
Texas A & M U		Johns Hopkins U	
The U of Texas-Austin		MIT	
U of Arizona		Marquette U	Big East
U of California-Berkeley		New York U	
U of California-Davis		Northwestern U	
U of California-Irvine	SP Peer	Princeton U	
U of California-Los Angeles		Rice U	
U of California-San Diego		Stanford U	
U of California-Santa Barbara		Syracuse U	Big East
U of Colorado-Boulder		Tulane U of Louisiana	
U of Florida	SUS	U of Chicago	
U of Illinois-Urbana-Champaign		U of Pennsylvania	
U of Iowa		U of Rochester	
U of Kansas		U of Southern California	
U of Maryland-College Park		Vanderbilt U	
U of Michigan-Ann Arbor		Yale U	
U of Minnesota-Twin Cities			
U of Missouri-Columbia			
U of Nebraska-Lincoln			
U of North Carolina-Chapel Hill			
U of Oregon			
U of Pittsburgh	Big East		
U of Virginia			
U of Washington-Seattle			
U of Wisconsin-Madison			
Non AAU Institutions			
Arizona State U-Tempe		Boston U	
Clemson U		California Institute of Technology	
Colorado State U		Dartmouth College	
Florida Agricultural & Mechanical U	SUS	DePaul U	Big East

Public		Private	
Florida Atlantic U	SUS	Emory U	
Florida International U	SUS	Providence College	Big East
Florida State U	SUS	Rensselaer Polytechnic	
Georgia Institute of Technology		Saint Johns U	Big East
George Mason U		Seton Hall U	Big East
Georgia State U		Tufts U	
Kansas State U		U of Miami	
Louisiana State U		U of Notre Dame	Big East
Mississippi State U		Villanova U	Big East
Montana State U-Bozeman		Washington U in St Louis	
New Mexico State U		Yeshiva U	
North Carolina State U-Raleigh	SP Peer		
Northern Illinois U			
Oklahoma State U			
Old Dominion U			
Oregon State U			
SUNY-Albany			
San Diego State U			
Southern Illinois U Carbondale			
Temple U			
Texas Tech U			
The U of Alabama			
The U of Tennessee			
The U of Texas-Arlington			
U of Alabama-Birmingham	SP Peer		
U of Arkansas			
U of California-Riverside			
U of California-Santa Cruz			
U of Central Florida	SUS		
U of Cincinnati	SP Peer		
U of Colorado-Denver &Hlth Sci Ct			
U of Connecticut	Big East		
U of Delaware			
U of Georgia			
U of Hawaii-Manoa			
U of Houston			
U of Idaho			
U of Illinois-Chicago	SP Peer		
U of Kentucky			
U of Louisville	Big East		
U of Maine			
U of Maryland-Baltimore County			
U of Massachusetts-Amherst			
U of Memphis			
U of Mississippi			
U of Nevada-Reno			

Public		Private	
U of New Hampshire	Big East		
U of New Mexico-			
U of North Florida	SUS		
U of North Texas			
U of Oklahoma Norman			
U of Rhode Island			
U of South Carolina-Columbia			
U of Southern Mississippi			
U of South Florida	SUS, Big East		
U of Toledo			
U of Utah			
U of Vermont			
U of West Florida	SUS		
U of Wisconsin-Milwaukee			
U of Wyoming			
Utah State U			
Virginia Polytech			
Virginia Commonwealth U			
Washington State U			
Wayne State U			
West Virginia U	Big East		
Western Michigan U			

Table 6

Descriptive Statistics for Variables

	N	Range	Minimum	Maximum	Mean	Std.	Variance	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
PctCited	140	.24	.54	.78	.6846	.05496	.003	-.376	.205
PctWorldPapers	140	.01	.00	.01	.0021	.00173	.000	1.616	.205
Impact 5-yr	140	10.34	2.53	12.87	6.5971	2.35588	5.550	.456	.205
ImpactOfCited	140	11.83	4.67	16.49	9.4396	2.70831	7.335	.400	.205
Citations	140	551880.0	1290.00	553170.0	64108.54	72389.90	5E+009	2.940	.205
Papers	140	42632.00	342.00	42974.00	8188.450	6791.102	5E+007	1.616	.205
TotEnrl05	145	49616	1996	51612	23404.10	11232.46	1E+008	.445	.201
TotDeg05	146	12726	459	13185	5278.86	2693.527	7255085	.782	.201
CoreRev	146	6E+009	57552621	6E+009	9E+008	9E+008	8E+017	2.928	.201
GrantAmount	146	*******	1151052	*******	*******	*******	5E+016	1.494	.201
GrantPct	146	.550	.020	.570	.25801	.110038	.012	.088	.201
Assets	94	2E+009	33201086	2E+009	3E+008	3E+008	1E+017	3.078	.249
InstExpse	140	*******	*******	*******	*******	*******	5E+016	1.979	.205
RschExpse	140	*******	*******	*******	*******	*******	3E+015	2.284	.205
FacBioHealth	146	********	********	********	********	********	52827.45	1.126	.201
FacOthPhysical	146	********	********	********	********	********	4127.421	1.251	.201
FacSocBeh	146	********	********	********	********	********	123965.0	.936	.201
FacEducation	146	********	********	********	********	********	14949.76	.724	.201
FacEngineering	146	********	********	********	********	********	44924.05	1.518	.201
FacBusiness	146	********	********	********	********	********	43759.69	.690	.201
FacMultidiscipl	146	********	********	********	********	********	1235.493	1.512	.201
FacLetrsNOth	146	********	********	********	********	********	38572.83	1.970	.201
FACFineArts	146	1785	0	1785	224.60	208.570	43501.30	3.448	.201
FACOther	146	119	0	119	10.79	22.070	487.077	2.421	.201
TotRschBio&Hlth	138	********	********	********	********	********	.069	-.146	.206
TotRschOthrPhysical	138	********	********	********	********	********	.020	1.221	.206
TotRschSocBeh	138	********	********	********	********	********	.006	2.597	.206
TotRschEngCompSci	138	********	********	********	********	********	.030	1.355	.206
TotRschOther	135	.31	.00	.31	.0235	.04505	.002	3.361	.209
FedRschBio&Hlth	138	1.000000	.0000000	1.000000	********	********	.075	-.087	.206
FedRschOthrPhysical	138	********	********	********	********	********	.022	.978	.206
FedRschSocBeh	138	********	********	********	********	********	.007	3.588	.206
FedRschEngCompSci	138	********	********	********	********	********	.035	1.358	.206
FedRschOther	138	0	0	0	.01	.029	.001	4.695	.206
TARUAcad05	137	264	0	264	23.35	44.313	1963.656	3.634	.207
TARUAcad04	137	259	0	259	22.85	43.703	1909.934	3.655	.207
TARUFacAwrds05	137	54	0	54	12.21	11.451	131.124	1.386	.207
TARUFacAwrds04	137	57	0	57	11.80	10.997	120.924	1.626	.207
TARUFedRsch04	137	1022337	173	1022510	123292.7	131821.2	2E+010	2.974	.207
TARUFedRsch03	137	879640	101	879741	108698.8	116642.3	1E+010	2.809	.207
TARUTotRsch04	137	1140012	223	1140235	204257.2	181972.7	3E+010	1.759	.207
TARUTotRsch03	137	999092	154	999246	184525.4	164656.1	3E+010	1.686	.207
TARUDocs05	137	772	0	772	232.55	167.648	28106.01	1.050	.207
TARUDocs04	137	804	1	805	229.53	166.903	27856.69	1.083	.207
TARUPDoc03	137	3597	0	3597	260.09	391.591	153343.7	5.069	.207
TARUPDoc02	137	3491	0	3491	257.53	384.786	148060.5	4.906	.207
Valid N (listwise)	81								