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University Technology Transfer: A Data Set Showing How University Policies, Demographics and Location Influence Success (I1.A3)

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Structured Abstract

Data Overview: This dataset includes a 5 year survey of 153 United States universities' technology transfer outcomes, including the number of patents, licensing income, and the number of associated startups for each year collected by the annual survey of the Association of University Technology Managers (AUTM). Additional data was collected from publicly available sources and enriched by the authors. This includes information about the university location, climate, diversity, research expenditures, educational programs, relevant search engine results and other important regional factors. Additionally, the team studied the technology transfer policies for each university and encoded key factors with the data, making this data very valuable to university leaders hoping to improve their innovation and outreach impact.

Data Value: Technology transfer is the process of facilitating the spread of University-based innovative research and products from the creator organization to the general public. In our case, we are looking at how research conducted in universities flows to the common person for utilization. This data aligns with the U.N. Sustainable Development Goal 8: *Decent work and Economic Growth* and U.N. Sustainable Development Goal 9: *Industry, Innovation & Infrastructure*. Research universities help boost innovation and job creation in their own states. Understanding technology transfer will better position talent from the diverse and global community to have access to opportunity in the new economy, which can build a better world.

Data Description: The data contains eleven tables including institution, university policies, university financials, attractions, research and development, locational, university demographics, university patents, university licenses, and start-ups.

Data Application: The data is suited for predictive modeling and linear regressions as well as both unsupervised and supervised learning projects. Possible research questions include but are not limited to:

1. Which university policies are associated with tech transfer success?
2. What is the role of the community, workforce and economy in successful technology transfer?
3. How do indirect factors like walkability score, living index, weather, craft breweries, diversity and LGBTQ+ friendliness affect the technology transfer process?

4. How are the locational, demographics, and policy variables impacting the technology transfer process?

Indexing Table

Supported UN SDGs	8: Decent Work and Economic Growth 9: Industry, Innovation, and Infrastructure
Type of Data/Article	Archival
Class of Analytics	Descriptive, Diagnostic, Predictive
List of Tables	<p>Eleven tables in three categories.</p> <ul style="list-style-type: none"> University Profile: <i>university policies, university expenditures, university type; university demographics,</i> Community Profile: <i>community demographics; community startup support, community attractiveness, community economic base;</i> Tech transfer outcomes: <i>patents, licenses, startup results.</i>
Key Words	Technology transfer, Association of University Technology Managers (AUTM), innovation, commercialization, Economic Development

Introduction

Technology transfer is the process of facilitating the spread of University-based innovative research and products from the creator organization to the general public. Research universities can help boost innovation and job creation in their own states through innovation and outreach, which can help create new technologies and industries.

However, innovation is complex and happens unevenly. Not all universities achieve the same level of success in their innovation activities. This data set looks at 153 public

and private universities in the United States and provides variables that can help explore the factors that lead to success.

There are three broad categories of data in the technology transfer process. These include:

- *University Profile* - This category includes information on the university demographics, type, relevant colleges such as medical or engineering school, and related research and technology transfer expenditures. This section also includes data related to university policies.
- *Community Profile* - This category describes the community that houses the university. Key information includes demographics, level of start-up support, community attractiveness, and information on their primary industrial base.
- *Technology Transfer Outcomes* - This category describes the measurable outcomes as reported to AUTM such as patents filed, licenses and licensing income, and the number and type of start-ups created.

Together this data has the potential to illuminate key associative and causal factors in the technology transfer process that could help universities and communities increase their economic impact and improve the working conditions of the surrounding communities.

U.N. Goals Supported by the Data

The dataset provides a tool in aiding universities to reach the unrealized potential for greater economic impact through improved university innovation commercialization. The University technology transfer process creates and moves ideas from research institutions to the marketplace with the end goal to improve quality of life and benefit society. University-based research generates significant return on investment for national and global economies. The data provided will aid researchers in determining more efficient technology transfer methods and policies, which will promote increased technology innovation commercialization and high-tech business activity that aligns with U.N Sustainability Goal 8 and U.N Sustainability Goal 9.

Goal 8: *Decent Work and Economic Growth*: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all. (United Nations, 2021)

Goal 9: *Industry, Innovation, and Infrastructure*: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation. (United

Nations, 2021)

Data Summary

There are 11 data tables for the three broad categories described above. We give a brief summary of each table by category below.

University Profile

- *Entity 1 - University Policies* - Our team read and analyzed the policies of each university and encoded variables based on the factors, such as the length of time in reviewing an intellectual property (IP) disclosure, the make up of the IP Committee, and the distribution of royalties to faculty and departments.
- *Entity 2 - University Demographics* - This table presents basic demographic information about the university, such as the population, student-to-faculty ratio, and measures of diversity.
- *Entity 3 - University Type* - This table presents information on the type of university, including research level, colleges relevant to technology transfer, public/private and/or land grant status.
- *Entity 4 - University Expenditures* - This entity shows relevant expenses of the university on research and technology transfer activities, such as patents and licensees expenses.

Community Profile

- *Entity 5 - Community Demographics* - This table shows key information about the community in which the university resides. Examples include location, population, income, and unemployment rates.
- *Entity 6 - Community Start-up Support* - Includes information about the number of investment providers and incubators in an area as well as the prevalence of research centers.
- *Entity 7 - Community Attractiveness* - Focuses on factors that may attract (or repel) talent to an area, making it a desirable location to live in.
- *Entity 8 - Community Economic Base* - This table contains information on the major industries in the area.

Technology Transfer Outcomes

- *Entity 9 - Patents* - Includes information about the number and type of patents issued.

- *Entity 10 - Licenses* - Holds data on the various types and sources of licensing income.
- *Entity 11 - Start-up Results* - Contains information on the number and type of start-ups or new products created.

We also recognize that there may be a variety of external factors, such as economic and technological trends, that influence successful technology transfer, which we did not capture. To compensate for this we recommend looking at innovation and technology transfer over the 5 year period to average out some of the annual fluctuations.

Figure 1 shows how the data fits together to influence outcomes.

Figure 1: Conceptual Data Map

Value of Data

The AUTM survey data was collected from five years 2010 to 2015 from most of the universities involved in technology transfer in the United States. The survey was sent to all U.S. universities with operating Technology Transfer Offices registered with AUTM. This is an annual survey done every year. Most universities responded for multiple years, but a few responded for only one year. Notably, those with larger offices and more staff had a higher response frequency.

The focus of this research is the economic impact of university technology transfer processes. By breaking down the university into the variable categories, there can be better understanding of how specific variables and processes interact to forecast the target variable.

An institution is usually measured by its ability to convert research efforts into commercial income. The three categories of input variables: University Profile, Community Profile, and Technology Transfer Outcome, are influential in that it may indirectly impact the target variable that is predicting the efficiency of the technology transfer. Due to the nature of these variable categories, there may be some difficulty in changing variable inputs (at least in the short term). For this reason, policy makers may want to focus on how university policies impact success. Locational and University Demographic variables can act as a control due to their influential nature and resistance to change in the short term, but may also be interesting to study in their own right.

Apart from the direct data needed to calculate the target variables obtained through the AUTM survey, the indirect data will also be needed. Indirect data used to highlight the target variable (and other direct data points) such as walkability and crime rate will be considered. The inputs considered can be broken down into 3 categories: (1) Locational; (2) University Demographics; and (3) University Expenditures and University Policy. For example, variables such as Median Home Value, Walkability, and Sunny Days are thought to determine the “draw” of successful and professional individuals to a university. This, in turn, will increase the technology transfer outputs measured. For example, a skilled professor with the option to join any university to conduct research may prefer a location with more sunny days on average, and therefore will work at a location with better weather and will increase that university's output.

Other data such as the university endowment, student-faculty ratio, and LGBTQ+ friendliness are examples of variables used in the university demographic category. It is thought that the larger the endowment will correlate to better research funding and

ultimately higher technology transfer output. For a variable such as Student-Faculty ratio, there may be a negative correlation. As the number of students per faculty increases, this leaves less time and resources for that faculty member to conduct research, resulting in a lower output of the technology transfer metric.

Data Characteristics

The data was explored using descriptive statistics. Table 1 further describes some of these metrics for selected key columns. Overall, there are 153 institutions and 67 variables with five years of data from the year 2010 to 2015. AUTM data in this dataset is reporting data for the entire university system across the United States.

Table 1: Frequency of Key Data Columns

Attribute Name	Frequency
<i>Institution</i>	153
<i>Gross Licensing Income</i>	1094
<i>Total Research Expenditure</i>	1105
<i>Federal Research Expenditure</i>	1105
<i>Ind Research Expenditure</i>	1064
<i>License Income Run Royalty</i>	1036
<i>License Income paid to others</i>	1036
<i>Total Patents Applied FLD</i>	1080
<i>Legal Fees</i>	1104
<i>Marginal Rate of Return</i>	1094

Table 2 explains the summary statistics of some of the core variables of the dataset. This table explains the mean, maximum as well as the standard deviation of the variables. This shows the spread of the data points between the variables.

Table 2: Annual Average Statistics for Key Data Columns

Attribute Name	Mean	Max	Standard Deviation
<i>Gross Licensing Income</i>	\$11,229,530	\$195,687,598	\$30,052,873
<i>Total Research Expenditure</i>	\$255,461,274	\$5,348,436,122	\$470,394,562
<i>Federal Research Expenditure</i>	\$160,301,888	\$2,852,305,728	\$286,390,341
<i>Ind Research Expenditure</i>	\$18,233,206	\$349,054,515	\$38,220,941
<i>License Income Run Royalty</i>	\$7,781,271	\$180,531,184	\$22,580,138
<i>License Income paid to others</i>	\$811,031	\$54,274,272	\$4,934,991
<i>Legal Fees</i>	\$1,572,771	\$34,322,752	\$3,345,345
<i>Total Patents Applied FLD</i>	\$94	\$1,483	\$163
<i>Marginal Rate of Return</i>	\$0	\$1	\$0

Figure 2 below is specifying the different institutions across the United States who all have both medical and engineering schools. The map is based on the states, and marks are labelled by the institution. The view is filtered through Medical and Engineering Schools. This is useful due to medical and engineering schools being the most active in technology transfer activities due to higher margins and a culture of innovation. Note that this figure only includes universities that responded to the survey during the data collection period.

Figure 2: Institutions by Medical & Research Schools (Author Creation)

Institutions by Medical & Engineering Schools

Figure 3 below explains the maximum Gross Licensing income earned by each state and is compared with maximum research expenditure incurred by those states. The Universities across Maryland had the highest average annual research expenditures of \$1.2 Billion. Universities across New York are earning the most licensing income at roughly \$55 million per year.

Average Research Expenditure by State

State. Color shows details about State. Size shows average of Tot Res Exp. The marks are labeled by State. The view is filtered on State, which excludes Null.

Average Gross Licensing Income by State

State. Color shows details about State. Size shows average of Gross Lic Inc. The marks are labeled by State. The view is filtered on State, which excludes Null.

Figure 3: Comparison of Average Annual Research Expenditure by State with Gross Licensing Income by State

The dataset has variables which can be easily categorised into three important categories like policy variables, locational variables, and demographic variables. We also constructed a secondary data set that contains variables including walkability

scores, crime index, weather, and the median income of the people. These variables help enrich our analysis.

Variables like population and city can further be split to get an expanded look at the dataset. It is a very interesting dataset to help understand university technology transfer and how it is helping contribute to economic growth.

AUTM Survey Data Methods

Data Collection

The data was collected from late 2010 through 2015. The AUTM Licensing Activity Survey questionnaire and definitions of each of the data elements measured in the survey are available in Appendix A. The definitions are important to the interpretation of reported data and provide a glossary of terms recognized by the global academic technology transfer community. Appendix B shows a breakdown of the data. However, most of the data collected in this survey is also available in AUTM's Statistics Analysis for Technology Transfer (STATT) database. To access this online, searchable, exportable database containing more than two decades of academic licensing data, go to www.autm.net/statt.

As per the AUTM Survey instrument, the FY2014 survey was sent to all 302 U.S. institutions with registered Technology Transfer Offices. Of those 302 U.S. institutions, 191 responded, for a response rate of 63.3 percent. This compares to the FY2013 survey, which had 202 respondents, for a response rate of 68 percent. The FY2014 respondents included 163 universities, 27 hospitals and research institutions, and 1 third-party technology investment firm. However, for the purposes of this survey report, the responses for each category (universities, hospitals and third-party technology investment firms) have been combined in many of the tables and figures. Also, as with prior reports, some respondents reported data for the entire university system instead of each individual campus within the system, depending on how the university was structured. It is also important to note that not all respondents reply to all of the questions. Therefore, response rates to any given question will vary, and some subcategories are not completely represented.

Data Application and Conclusion

Universities are research incubators for many startups around the United States. Understanding the underlying factors that separate the ones that contribute to the technology transfer process is vital. A better understanding of this can lead to more

efficient funding allocation and an overall improvement in society. Research for life-saving drugs and technology that improve the lives of millions can serve to improve economic well being of not only the state where the University resides, but the nation as well.

Possible questions and projects of exploration within the dataset:

- Is there any correlation between the Crime Index and the number of patents issued to Universities?
- Project Idea: Examine the Median Home Values in the University Area to determine other statistics such as unemployment rate, student population, and total research expenditures.
- Should there be standards for Universities who wish to pursue possible research projects? Would their funds be more appropriately used if it went towards tuition instead?
- Should there be a defined process for applying for patents so that if the University does apply, they have a better chance of getting the patents approved?
- Does the “party school” score of Universities have a correlation with the research expenditures?

Additional data about the nature of university students, graduate vs. undergraduate mix, diversity, popular majors, etc., could add further value to this data set. The authors also believe educational data about the community could also be interesting.

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References

United Nations (2021). “The 17 goals”, United Nations Department of Economic and Social Affairs Retrieved April, 2021, from <https://sdgs.un.org/goals/goal8>

Appendix A - Entity Data Dictionary

For reference, the format column contains the following abbreviations for data formats:

- ● *varchar* - a variable-length string of text characters
- *int* - numeric integer values
- *double* - numeric double-precision floating-point values
- *datetime* - values represent the date and time in the local timezone
- *string*- sequence of characters
- *serial*- unique identifier assigned incrementally or sequentially to an item

Category 1 - University Policies

Entity 1: University Policies

Attribute Name	Format	Definition
<i>[ID]</i>	Int	Unique ID identifying institution
<i>Year</i>	Date (Year)	Year for which data is relevant
<i>PatCommDecision</i>	Binary	If a patent committee decides the fate of idea disclosures then 1, otherwise 0
<i>QuantTimeFrame</i>	Int	If time frame for idea disclosure evaluation is specified quantitatively then 1, otherwise 0
<i>PatCommRec</i>	Binary	If Patent committee provides a recommendation to the decision maker then 1, otherwise 0
<i>DistBeforeCosts</i>	Binary	If the university distributes revenue to the idea discloser(s) prior to covering its costs then 1, otherwise 0
<i>MinDistDept</i>	Double	Minimum distribution of revenue received by idea discloser(s)' department

<i>MaxDistDept</i>	Double	Maximum distribution of revenue received by idea discloser(s)' department
<i>MinDistCollege</i>	Double	Minimum distribution of revenue received by idea discloser(s)' college
<i>MaxDistCollege</i>	Double	Maximum distribution of revenue received by idea discloser(s)' college
<i>MinDistUniv</i>	Double	Minimum distribution of revenue received by idea discloser(s)' university
<i>MaxDistUniv</i>	Double	Maximum distribution of revenue receive by idea disclosure(s)' university
<i>PatentComPolitical</i>	Binary	Is the patent committee politically appointed or is your appointment knowledge based. (1 yes political 0 not political)
<i>MinDistIndiv</i>	Double	The minimum percentage of revenue received by the idea discloser(s)
<i>MaxDistIndiv</i>	Double	The maximum percentage of revenue received by the idea discloser(s)
<i>MinDistOther</i>	Double	Minimum distribution of revenue receive by other
<i>MaxDistOther</i>	Double	Maximum distribution of revenue receive by other
<i>TTOFounded</i>	Date(Year)	Year which the Technology Transfer Office was founded

Category 2 - University Profile

Entity 2: University Demographics

Attribute Name	Format	Definition
<i>[ID]</i>	Int	Unique ID identifying institution
<i>institution</i>	varchar	Name of the participating universities
<i>StuFac</i>	Int	Student to faculty ratio
<i>InStateTuition</i>	Int	In state tuition
<i>OutStateTuition</i>	Int	Out of state tuition
<i>Setting</i>	varchar	population density classification (Urban, City, Suburban, Rural) (us news college rankings)
<i>Diversity</i>	Int	Diversity score of the University
<i>Endowment</i>	int	Amount of the university endowment in 2016
<i>Diversity</i>	Int	Diversity score of the University

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Entity 2: University Type

Attribute Name	Format	Definition
<i>[ID]</i>	Int	Unique ID identifying institution
<i>institution</i>	varchar	Name of the participating universities

<i>ProgramYear</i>	Date	Year of the Tech Transfer program at the particular institution
<i>insttype</i>	varchar	Institution classification (research university, graduate level university, etc)
<i>state</i>	varchar	State in which institution is located
<i>medschl</i>	Binary	Does university have medical school
<i>enginschl</i>	Binary	Does university have engineering school
<i>LandGrant</i>	Binary	If the university is a land grant university
<i>PublicPrivate</i>	Binary	If the university is public or private

Entity 3: University Expenditures

Attribute Name	Format	Definition
<i>[ID]</i>	Int	Unique ID identifying institution
<i>Fed Res Exp</i>	Int	Federal research expenditures include expenditures
<i>Ind Res Exp</i>	Int	Non-federal research expenditures include expenditures

<i>Lic Inc Pd Oth</i>	Int	License income paid to other institutions under inter-institutional agreements.
<i>Leg Fees</i>	Int	LEGAL FEES EXPENDITURES include the amount spent by an institution in external legal fees for patents and/or copyrights. These costs include patent and copyright prosecution, maintenance, and interference costs, as well as minor litigation expenses that are included in everyday office expenditures (an example of a minor litigation expense might be the cost of an initial letter to a potential infringer written by counsel).
<i>Reimb Leg Fee</i>	Int	LEGAL FEES REIMBURSEMENTS include the amount reimbursed by licensees to the institution for LEGAL FEES EXPENDITURES
<i>Tot Res Exp</i>	Int	Total Research Expenditure
<i>MRR</i>	Double	Marginal Rate of Return calculated by Dividing GrossLicensing Income by Total research Expenditure

Category 3 - Community Profile

Entity 4: Community Demographics

Attribute Name	Format	Definition
<i>City</i>	String	City in which institution is located
<i>State</i>	String	State in which institution is located
<i>Setting</i>	String	Area classification (rural, urban, etc)
<i>Population</i>	Int	Local Population
<i>IncCap</i>	Int	Local Income per Capita
<i>MedianHI</i>	Int	Local Median Household Income
<i>MedianHV</i>	Int	Local Median Home Values
<i>Unemploy</i>	Double	Unemployment rate on 08/28/2016

Entity 5: Community Startup Support

Attribute Name	Format	Definition
<i>City</i>	String	City in which institution is located
<i>State</i>	String	State in which institution is located
<i>VCFunds</i>	Int	Number of google search results for "Venture Capital Fund" + "city" + "state"

<i>AngelNet</i>	Int	Number of google search results for "Angel Network" + "city" + "state"
<i>Incubators</i>	Int	Number of google search results for "startup incubator" + "city" + "state"
<i>ResCenter</i>	Int	Number of google search results for "Research Center" + "city" + "state"

Entity 6: Community Attractiveness

Attribute Name	Format	Definition
<i>City</i>	String	City in which institution is located
<i>State</i>	String	State in which institution is located
<i>NatAttr</i>	Int	Number of Natural Attractions (beach, hiking, national parks, etc) nearby. (number of google search results for "free attractions" + "anchorage" + "ak")?
<i>Party</i>	Int	Party School Ranking
<i>PartySt</i>	Int	Top party schools by state

<i>WalkScore</i>	Int	<p>Walkability of city college or university is located in; higher</p> <p>score is better</p> <p>https://www.walkscore.com / IF THE CITY DOES NOT PULL UP STREET ADDRESSES WILL SKEW DATA</p>
<i>Livability</i>	Int	<p>Livability metric found on http://www.areavibes.com/</p>
<i>Tourism</i>	Int	<p>Number of points of interest provided by google</p>
<i>Rain</i>	Double	<p>inches of rain per year on average</p> <p>(http://www.usclimatedata.com/)</p>
<i>Snow</i>	Int	<p>Number of Snowy days per year</p> <p>(http://www.usclimatedata.com/)</p>
<i>AvgTemp</i>	Double	<p>average temperature in Fahrenheit</p> <p>(http://www.usclimatedata.com/)</p>
<i>SunnyDays</i>	Int	<p>Number of Sunny Days per year</p> <p>(http://www.usclimatedata.com/)</p>
<i>CrimeIndex</i>	Int	<p>Local Crime Index. 100 is safest, 0 is least safe (index from</p> <p>http://www.neighborhoodscout.com)</p>

Entity 7: Community Economic Base

Attribute Name	Format	Definition (From Citydata.com)
<i>City</i>	String	City in which institution is located
<i>State</i>	String	State in which institution is located
<i>OCHealth</i>	Double	Percentage of area occupations in Healthcare.
<i>OCRetail</i>	Double	Percentage of area occupations in Retail.
<i>OCAccommodation</i>	Double	Percentage of area occupations in Accommodation.
<i>OCAAdmin</i>	Double	Percentage of area occupations in Administration.
<i>OCProf</i>	Double	Percentage of area occupation in Professional fields.
<i>OCManufacturing</i>	Double	Percentage of area occupations in Manufacturing.
<i>OCEdu</i>	Double	Percentage of area occupations in Education.
<i>OCDataProcessing</i>	Double	Percentage of area occupations in Data Processing.
<i>OCArts</i>	Double	Percentage of area occupations in the Arts.

<i>OCMiningOil</i>	Double	Percentage of area occupations in Mining and Oil.
<i>OCFinIns</i>	Double	Percentage of area occupation in Financial and Insurance.
<i>OCSocialAssist</i>	Double	Percentage of area occupation in Social Assistance.
<i>OCReligious</i>	Double	Percentage of area occupations in Religion.
<i>OCMachinery</i>	Double	Percentage of area occupations in Machinery.
<i>OCTransportation</i>	Double	Percentage of area occupations in Transportation.
<i>OCMotorVehPart</i>	Double	Percentage of area occupations in Motor Vehicle Parts.
<i>OCConstruction</i>	Double	Percentage of area occupations in Construction.
<i>OCRealEstate</i>	Double	Percentage of area occupations in Real Estate.
<i>OCFoodAndBev</i>	Double	Percentage of area occupations in Food and Beverage.
<i>OCManagement</i>	Double	Percentage of area occupations in Management.

<i>OCPublishing</i>	Double	Percentage of area occupations in Publishing.
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Category 4 - Technology Transfer Outcomes

Entity 8: Patents

Attribute Name	Format	Definition
<i>[ID]</i>	Int	Unique ID identifying institution
<i>Tot Pat App Fld</i>	Int	TOTAL U.S. PATENT APPLICATIONS FILED includes any filing made in the U.S. during the survey year, including provisional applications, provisional applications that are converted to regular applications, new filings, CIPs, continuations, divisionals, reissues, and plant patents. Applications for certificates of plant variety protection should also be included.
<i>New Pat App Fld</i>	Int	NEW PATENT APPLICATIONS FILED are the first filing of the patentable subject matter. NEW PATENT APPLICATIONS FILED do not include continuations, divisionals, or reissues, and typically do not include CIPs.

<i>For Pat App Fld</i>	Int	License income paid to other institutions under inter-institutional agreements.
<i>Pro Pat App Fld</i>	Int	U.S. PROVISIONAL APPLICATION became available June 8, 1995 as a new type of US patent application that can be used to obtain a filing date, and is less formal than a “regular” application. It may be filed without claims or named inventors.
<i>Util Pat App Fld</i>	Int	US UTILITY PATENT APPLICATION is the “regular”, non-provisional, U.S. patent application filed during the survey year for new, useful and nonobvious machines, manufactures, compositions of matter, processes or any new or useful improvements of the above. US UTILITY PATENT APPLICATIONS filed in would have had a U.S. Serial Number of format 14/XXX,XXX.
<i>Iss US Pat</i>	Int	U.S. PATENTS ISSUED includes the number of U.S. patents issued or reissued to your institution in the year requested. Certificates of plant variety protection issued by the U.S.D.A. should also be included. (See Question 10)

Entity 9: Licenses

Attribute Name	Format	Definition
<i>[ID]</i>	Int	Unique ID identifying institution
<i>Lic FTEs</i>	Int	Person(s) employed in the Technology Transfer Office whose duties are specifically involved with the licensing and patenting processes as either full or fractional FTE allocations. Licensing examples include licensee solicitation, technology valuation, marketing of technology, license agreement drafting and negotiation, and start-up activity efforts.
<i>Lic Iss</i>	Int	Licenses issued
<i>Opt Iss</i>	Int	Options issued
<i>Tot Discl Lic</i>	Int	DISCLOSURES include the number of disclosures, no matter how comprehensive, that are submitted during the survey year requested and are counted as received by the institution.

<i>Excl Lic/Opt.</i>	Int	<p>The reporting of a license as exclusive or non-exclusive should</p> <p>follow the terms of the license agreement. If a license is designated as exclusive in the license agreement, it should be reported as an exclusive license to this Survey. Exclusive licenses include licenses that are designated as exclusive by field of use, territory, or otherwise but excludes co-exclusive licenses, which are reported as NON-EXCLUSIVE LICENSES.</p>
<i>Non-Excl Lic/Opt</i>	Int	<p>The reporting of a license as exclusive or non-exclusive should adhere to the terms of the license agreement. If a license is designated as non-exclusive or co-exclusive in the license agreement, it should be reported under non-exclusive licenses to this Survey.</p>
<i>Lic w Equ</i>	Int	<p>The number of LICENSES/OPTIONS that were executed in the year surveyed that included EQUITY, where EQUITY is defined as an institution acquiring an ownership interest in a company.</p>

<i>Act Lic</i>	Int	The cumulative number of LICENSES/OPTIONS, over all years, that had not terminated by the end of the Survey's year requested.
<i>Tot Lic St-Ups</i>	Int	The number of LICENSES/OPTIONS from start up companies
<i>Tot Lic Sm Co</i>	Int	Companies that had 500 or fewer employees at the time the license/option was signed, but, for the purposes of this Survey, not including START-UP COMPANIES initiated by your institution.
<i>Tot Lic Lg Co</i>	Int	Companies that had more than 500 employees at the time the license/option was signed.
<i>Lic Gen Inc</i>	Int	The number of LICENSES/OPTIONS that generated LICENSE INCOME RECEIVED in the year requested.
<i>Lic Gen Run Roy</i>	Int	The number of LICENSES/OPTIONS that generated RUNNING ROYALTIES in the year requested.
<i>Lic \$1mm+</i>	Int	The number of LICENSES/OPTIONS that generated more than \$1mm

<i>Tot Lic/Opt Exe</i>	int	Calculated Field
<i>Gross Lic Inc</i>	Int	LICENSE INCOME RECEIVED includes: license issue fees, payments under options, annual minimums, running royalties, termination payments, the amount of equity received when cashed-in, and software and biological material end-user license fees equal to \$1,000 or more, but not research funding, patent expense reimbursement, a valuation of equity not cashed-in, software and biological material end-user license fees less than \$1,000, or trademark licensing royalties from university insignia. License Income also does not include income received in support of the cost to make and transfer materials under Material Transfer Agreements.
<i>Lic Inc Run Roy</i>	Int	The number of LICENSES/OPTIONS that generated RUNNING ROYALTIES in the year requested.

<i>Lic Inc Equ</i>	Int	The number of LICENSES/OPTIONS that were executed in the year surveyed that included EQUITY, where EQUITY is defined as an institution acquiring ownership interest in a company.
<i>Lic Inc Other</i>	Int	The number of LICENSES/OPTIONS that were executed in the year surveyed that included other income

Entity 10: Start-up Results

Attribute Name	Format	Definition
<i>[ID]</i>	Int	Unique ID identifying institution
<i>St-Ups Formed</i>	Int	Number of Start-Ups Formed
<i>St-ups in Home St</i>	Int	START-UP companies created within state in which university is located
<i>St-Ups Cld</i>	Int	START-UP companies created
<i>Cum op st-ups</i>	Int	Cumulative operating START-UP Companies
<i>St-ups w/ Equ</i>	Int	START-UP companies created with Equity
<i>New Product</i>	Int	Number of new products created from start ups

Note that a subset of variables from the AUTM survey were excluded from the dataset due the lack of data. All of the variables were missing 100% of the data. Although these variables are missing, they could still be of importance in the analysis. The data could be missing due to numerous reasons including that they were added after the finalized 2014 survey. The missing data includes data from licenses, start-ups, and a few other categories. For future research: data, formats, and definitions for these variables should be collected to further improve any analysis.

Below is the list of the excluded variables:

The following AUTM variables were excluded due to a high degree of missing data:

Excl Lic Lg Co, Non-Excl Lic Lg Co, Excl Lic Sm Co, Non-Excl Lic Sm Co, Excl Lic St-Ups Non-Excl St-Ups, Inv Dis Cld, Cum Inv Dis Cld, Inact Inv Dis, Techn Lic, St-Ups No Fnd, St-Ups Inst Fnd, St-Ups SBIR Fnd, St-Ups F&F Fnd, St-Ups Angl Fnd, St-Ups Angl Netw Fnd, St-Ups State Fnd, St-Ups VC Fnd, St-Ups Corp Fnd, St-Ups Oth Fnd

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