TE360 Final Project Proposal
5ᵗʰ November 2020

OVERVIEW

This project will analyze the correlation between the increase in incubators/accelerators and employment levels in Cook County.

GOALS

1. Analyze datasets from the Illinois Department of Employment Security and determine the relationship between employment rates and the creation of incubators/accelerators
2. Observe how employment levels change different sectors
3. Create a simulation for how overall employment rates, as well as employment rates per sector will change depending on the number of incubators/accelerators
4. Research incubators in Chicago

HYPOTHESIS

As the number of incubators/accelerators increase, so will the employment levels in Cook County, especially for STEM sectors.

INPUTS

1. The Illinois Department of Employment Security has released reports every year since 2001 titled *Where Workers Work*. This report features private sector employment totals for six northeastern Illinois counties. It also highlights the overall employment totals for these counties, and how they have changed since the prior year.
   a. Links: 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019
2. Find significant incubators/accelerators and record the year which they were founded
   a. Possible source: Illinois' Innovation Ecosystem has a great list of incubators/accelerators

b. Then I will research each of these and record when they were founded

MODEL

Number of Incubators/Accelerators in Chicago, 2006 to 2019
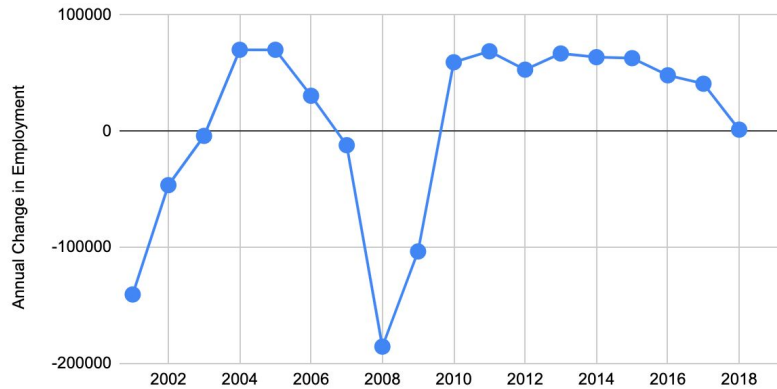
1.54*x + -3091 R² = 0.972
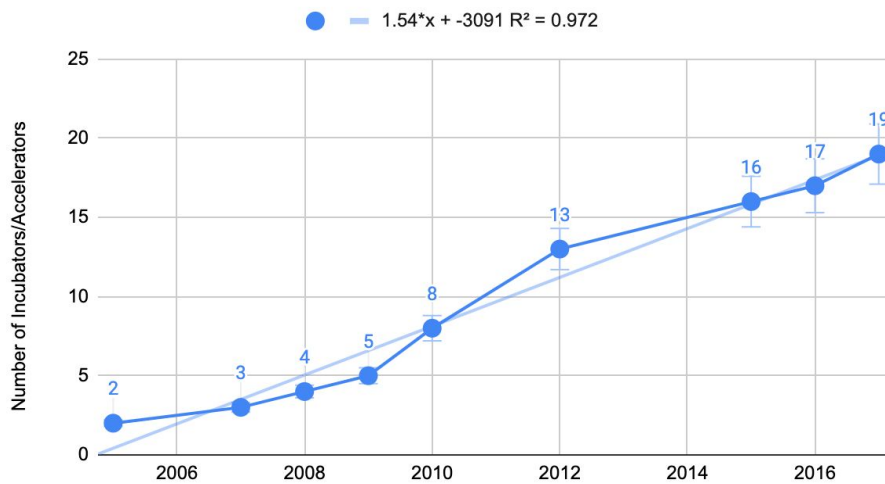
This relationship is fairly linear and the R^2 value is close to one so for the model, I will use a linear equation to estimate the growth in the number of incubators/accelerators in Chicago.

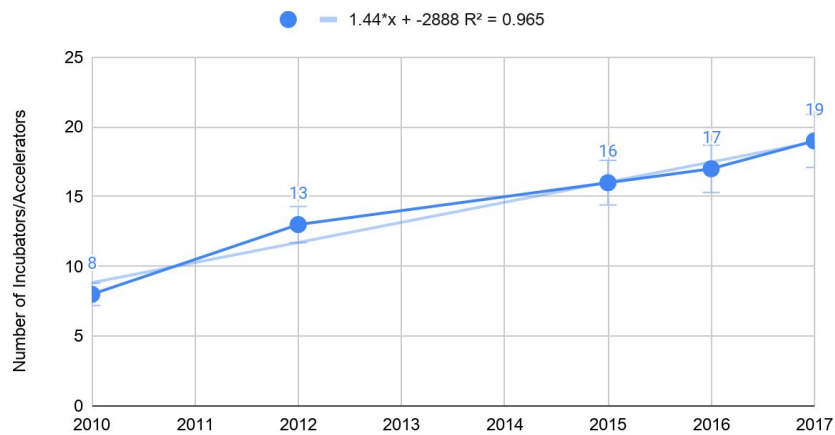### Employment in the Chicago Metro Area, 2006 to 2019
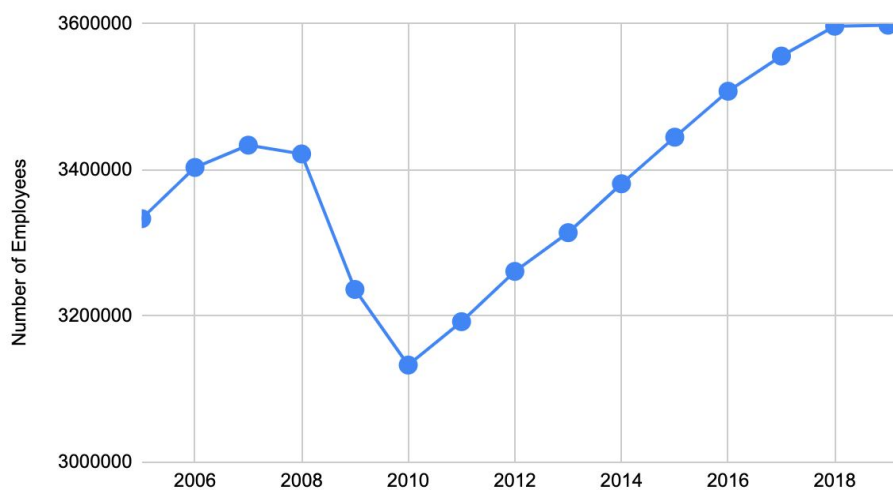
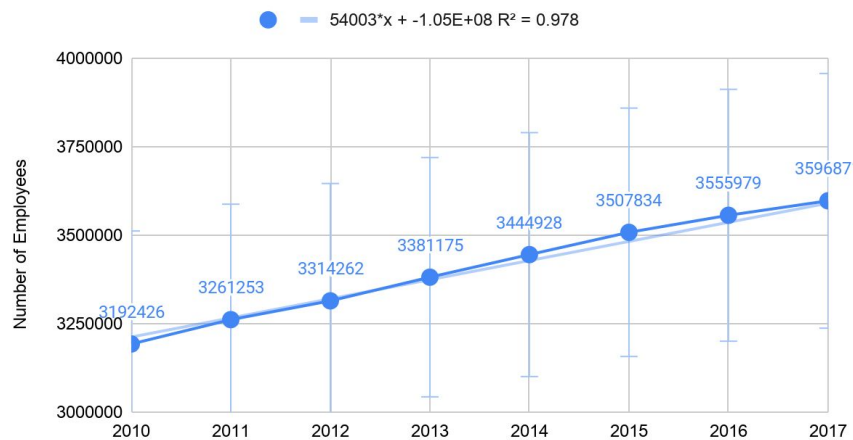Annual Change in Employment in the Chicago Metro Area, 2002 to 2019

These two graphs do not have a linear relationship. I believe that I will look at data only from 2010 and after because 2008 and 2009 data points were outliers because of the stock market crash. After doing so, here are the graphs:

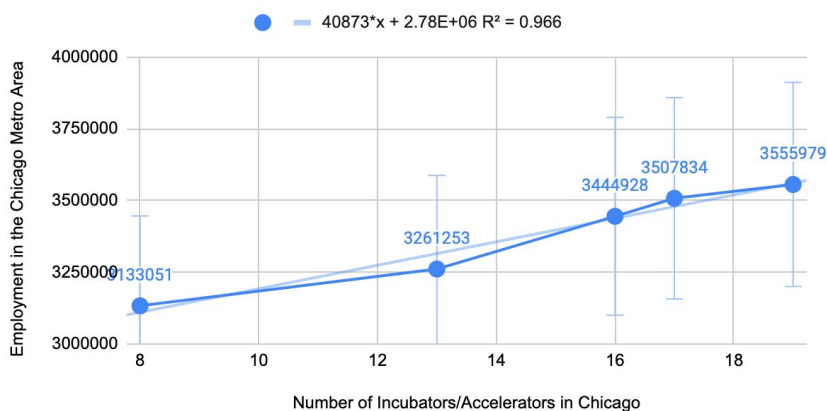Number of Incubators/Accelerators in Chicago, 2010 to 2017

1.44*x + -2888 R² = 0.965

This graph still has a linear relationship and a good R^2 coefficient.

Employment in the Chicago Metro Area, 2010 to 2017

54003*x + -1.05E+08 R² = 0.978

This graph now has a linear relationship.

Employment in the Chicago Metro Area vs. the Number of Incubators/Accelerators in Chicago

40873*x + 2.78E+06 R² = 0.966

The last graph shows positive linear correlation between employment and the number of incubators/accelerators in the Chicago metro area. The purpose of creating these graphs was to determine if the data fits well together. Then, the simulation will be created. The language used will be Python and the SimPy simulation library. SimPy allows users to simulate discrete-events, and this fits the needs for the project.

- SimPy sources: documentation, detailed guide, code examples

If there is a need for data visualization, I will use the Seaborn library.

- Seaborn sources: documentation, detailed guide, code examples

To determine the accuracy of the simulation, I can leave out the most current data point from the model, model the outcome for that and compare it to the actual value.

OUTCOME

A simulation which would estimate the increase in employment as the number of incubators/accelerators increase. Further, it would estimate by how much employment in each sector changes.

I do not believe this model will be very accurate because there are many other variables that can result in an increase in employment. It is impossible to get specific data that has only one independent variable. That being said, I still do believe that an increase in incubators/accelerators does have a positive effect on employment, but not to the extent that is displayed by the results of the simulation.