Indian Institute of Technology, Bombay
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CS 752:System Dynamics: Modeling & Simulation for Development

Analysis of startup culture in India

PROJECT REPORT

Submitted to:

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Introduction

Startups mostly refers to company in early stages of operation.In recent years there has been significant growth in number of startups in India.This has given a boost to economic growth and also solved various problems related to health sector ,agricultural sector etc.India with large population is also market for various new companies thus various foreign companies invest in indian startup.

The major factor which affects the growth of startups in India are its talent and large customer base.Due to this reason various companies invest in Indian talent.Also the population of India gives startup good opportunities for scaling and understanding the market.Most of the startups have founders and co-founders from IITs and IIMs this proves which are highly skilled.

Startups contribute majorly to jobs creation and growth of the economy.According to government data till date 6.5 lakhs jobs are created by startups.These jobs provide helping hand to economy and with growing number of startups it will surely boost economy.

As Digitalization is growing and most of the things are made online thus its important for us to invest in startups and check its effects.

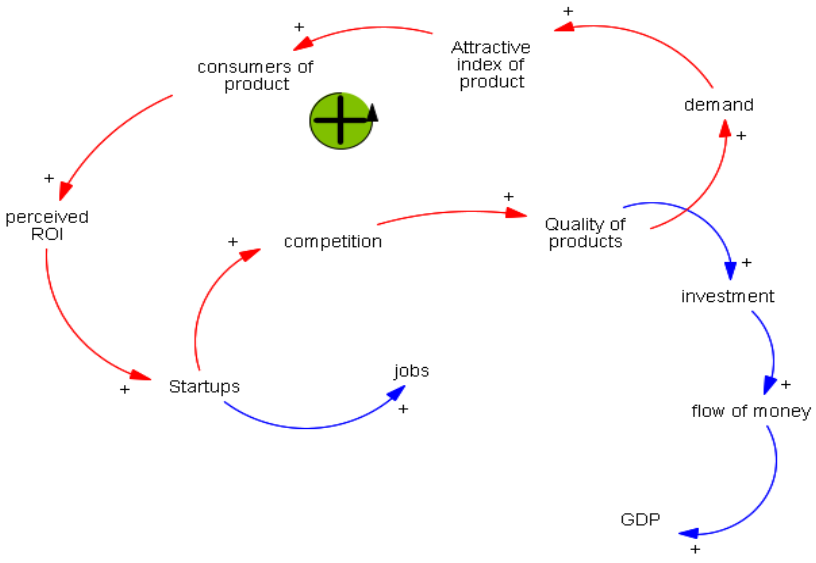
Problem Statement

Our aim is to study factors which influence or lead to growth of startups and also find its impact on economy,jobs availability and other paradigms.The area of focus is mainly on job creation and economic growth.

Literature review

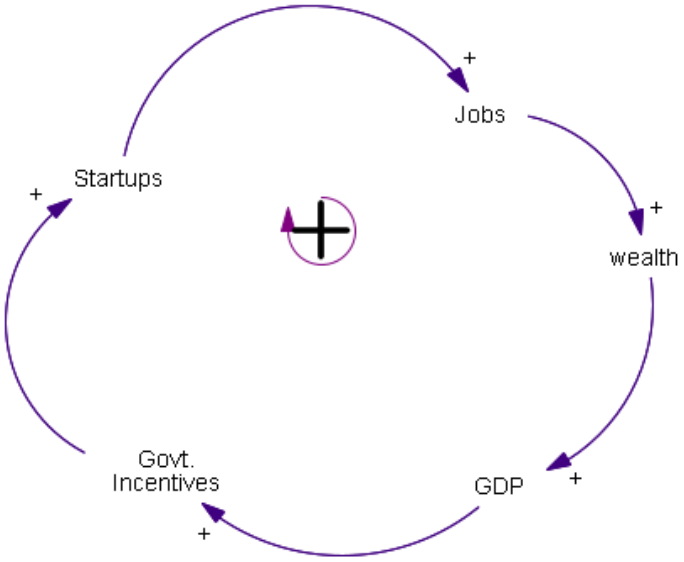
Impact of startups on Job creation

Startups create jobs,more jobs means more employment opportunities which leads to more economy.They also impact the growth of cities.The cities in which startups are made they attract more technical and non-technical people thus leads to migration which in turn leads to more development of cities. Bangalore turned out to be the IT hub of India [1] .Following causal loop diagram shows its effects.
If the number of startups are more then it will led to more healthy competition which will in turn improve quality of products.The better is the product more is its demand.This demand attracts more customers which in turn builts perceived return of investment in the product thereby leading to more growth of startups.



Impact of startups on Economy

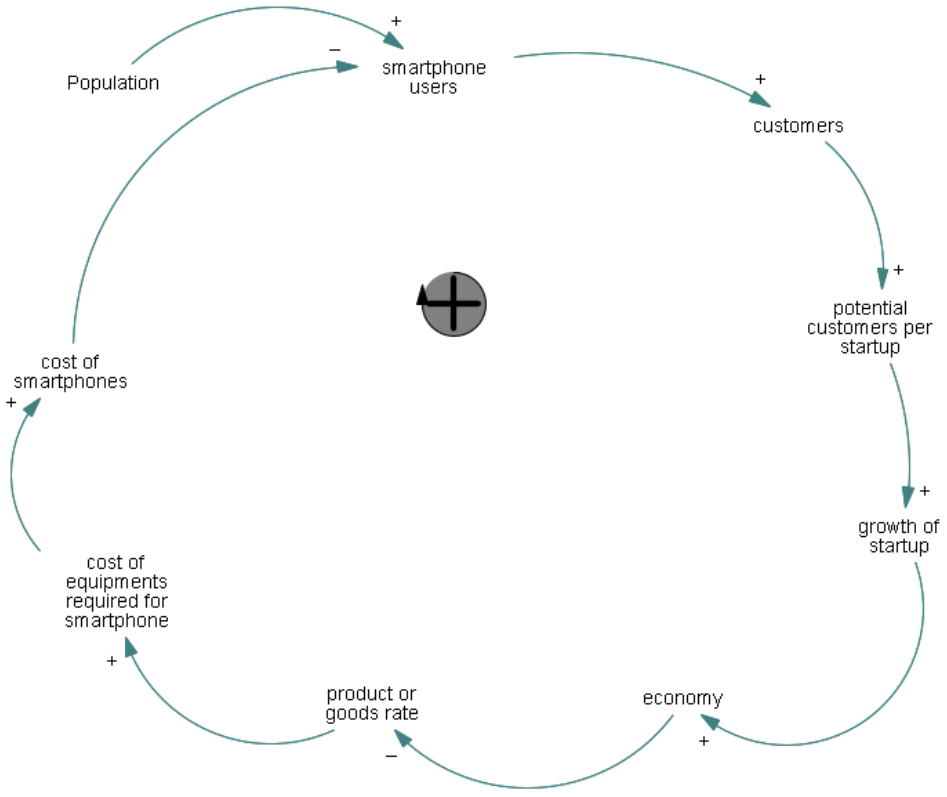
Startups create more jobs which in turn creates wealth.This leads to upgradation of standard of living.Many startups are working on reducing gap between cities and rural life of living.They also boost economic growth and contribute to research and development as they often deal with good state-of-the art technology[3].
Startup create more jobs opportunities which generate income for employees.Thus now people are able to spend more which inturn increase wealth.This wealth contributes to our GDP.As of now GDP of India is close to 2 trillions.We can see that startups do contribute to our economy by creating more jobs.



Population impact on Startups

India has a large population.This makes India a global market for innovation and growth.This attracts investment in terms of skills and technology as well as money from foreign parties.This gives us an upper hand on other countries.

The following causal loop diagram shows how the population of a country plays an important role in the growth of a startup. As India has a very large population this means it has a more young population which can be a talent hub.This also means India has a large number of smartphone users.These smartphones users are customers for startups.As the users of smartphones increases it leads to more customer base for startups.These startups earn more and this help economy grow by using taxes.This also means the education and other commodities will be cheaper and thus improve standard of living of people.This also means that Cost of smartphones will be reduced and now more people will be using it.

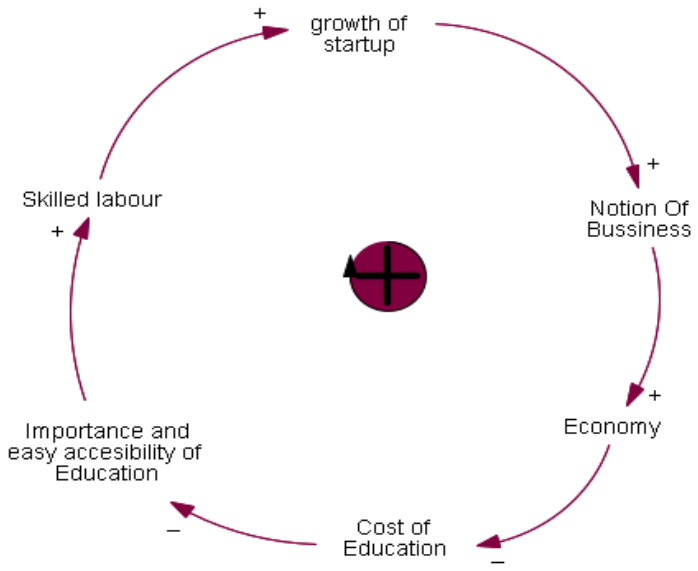


Skilled labor Impact on Startups

India is well known for its talented and hardworking graduates.This is reason why most of the leading companies have Indian as CEOs.Most of the founder and co-founders of leading startups are from IITs and IIMs.Brain drains was big problem in India but now government have started giving more attention to growth and people have also realized the importance of business and startups.

This has led to students being more inclined towards skills development rather than rote learning.These bright students then form startups which boost the morale of others also.

As the following causal diagram shows how the skilled labor led to growth of startup.It improves notion of business and then boost economy.This reduces cost of education and also makes knowledge and education more accessible.This again helps in creating more skilled workers.



Variables names and description

Stock Variables

Name	Description	Initial Value
Young population	Population in age group 0-20	5.418e+08
Adult population	Population in age group 20-40	3e+08
Old population	Population in age group 40-80	5.382e+08
Jobs	Number of jobs	5.01e+08
Freshers	Graduates which apply after completing graduating with no work experience	4.418e+08
Experienced	Graduates which has worked and has gained some experience	1.418e+08
Startups	Freshly created startups	65861
Failed Startups	Startups which do not grow in 10 years	0
Sustained Business	Business which grew and are now financially independent	0
Unicorn Startups	Startups which has valuation above 1 Billion	94
MNC	Startups which are now well established companies in domestic as well as overseas	0
GDP	Gross domestic Product	3e+12
Government Reserve	The amount of money in Government’s deposits	1e+12

Flow Variables

Name	Description	Units
Birth	Rate at which children born	person/year
Aging	Rate at which people turn out adults per year	person/year
Maturing	Rate at which people turn out old per year	person/year
Death	Rate at which people die per year	person/year
Jobs Received	Rate at which jobs are received	person/year
Jobs Closed	Rate at which jobs are closed	person/year
Graduates	Rate at which student take admission for graduation course	person/year
Gain Experience	Rate at which student gains experience by working in industry	person/year
Retire	Rate at which person retire from jobs	person/year
Registration of new startup	Rate at which new startups are formed	startup/year
Success	Rate at which startup succeed and turn into unicorn	startup/year
Failed	Rate at which startup are failed	startup/year
financial independent	Rate at which startup achieves financial Independence	startup/year
Further Expansion	Rate at which unicorns turn out to be MNCs	startup/year

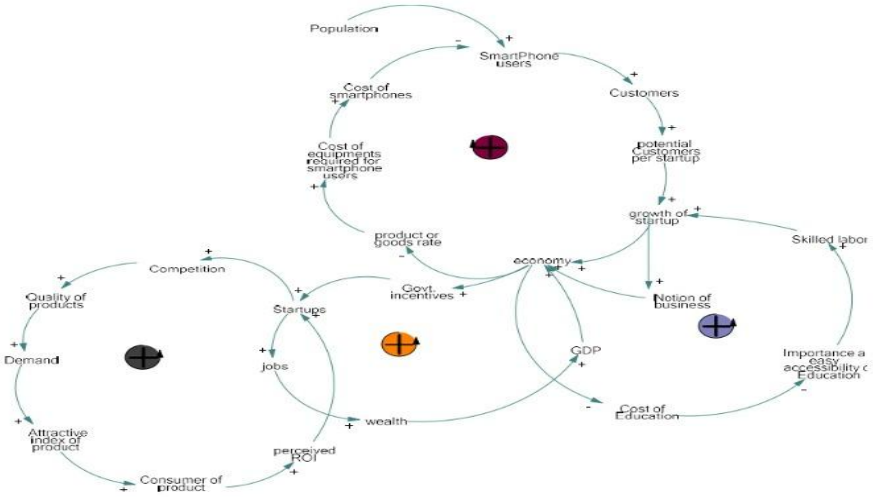
GDP Growth	Rate at which GDP is growing	Dollar/year
Income	Rate at which income is generated	Dollar/year
Expenditure	Rate at which amount is spent	Dollar/year

Constants and Auxiliary Variables

Name	Description	Units
Adult age interval	Age at which the young population will turn into adults	constant
Old age interval	Age at which the adult population will turn into old	constant
Total Population	Total population	person
Fraction of population affected by covid	Fraction of population get affected by covid	person
Growth rate of covid	Growth rate of covid	lookup table
Employment per business	Number of employees per business	constant
Total tax	Total tax generated	dollar
Average income per job	Income generated per job	dollar/person
Skilled labor	Total skilled labor	person
Total labor	Total labor	person
Average income per startup	Average revenue generated per startup	Dollar
Reduction in Fiscal Deficit	By how much amount fiscal deficit is reduced	Dollar

Integrated Model

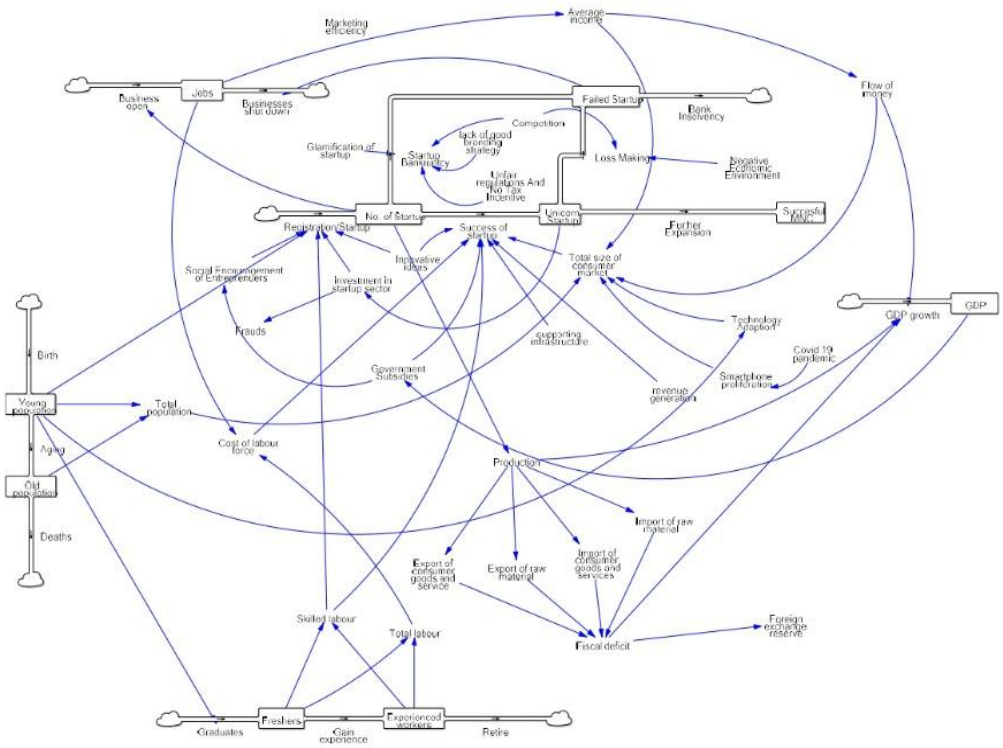
1)CLD



The above CLD model is integration of all factors which impacted startups as well as factors which got affected by startup growth.As we can a positive reinforcing loop in above diagram but in SFD we will see that it's not the scenario.This means startups will not keep on increasing for eternity.After some time it will lead to saturation.

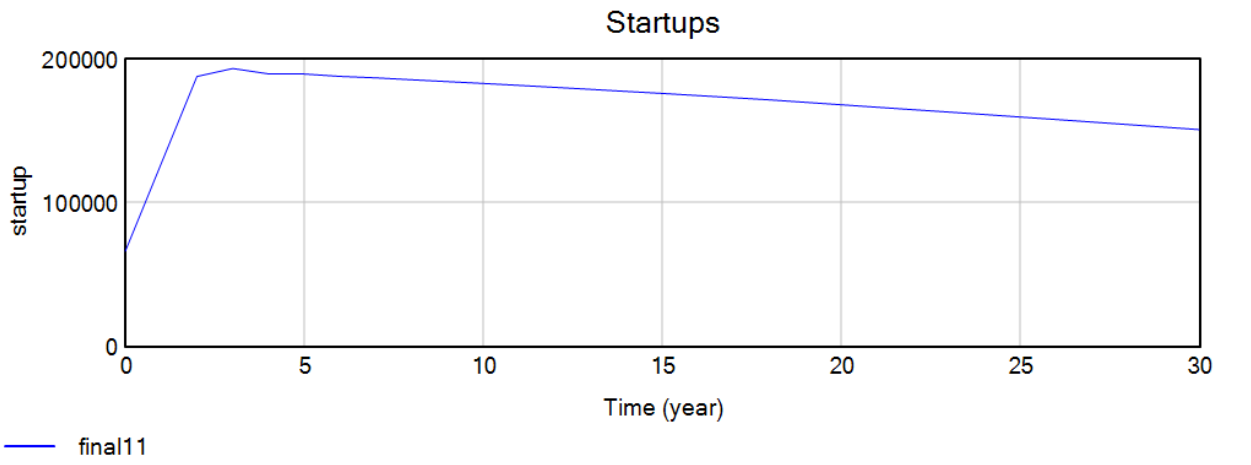
2)SFD

The below diagram is a conversion of the above CLD.It is not simulatable but shows the complex dynamics involved in it.We can understand the complex dynamics of jobs and economy and how it affects the overall growth.



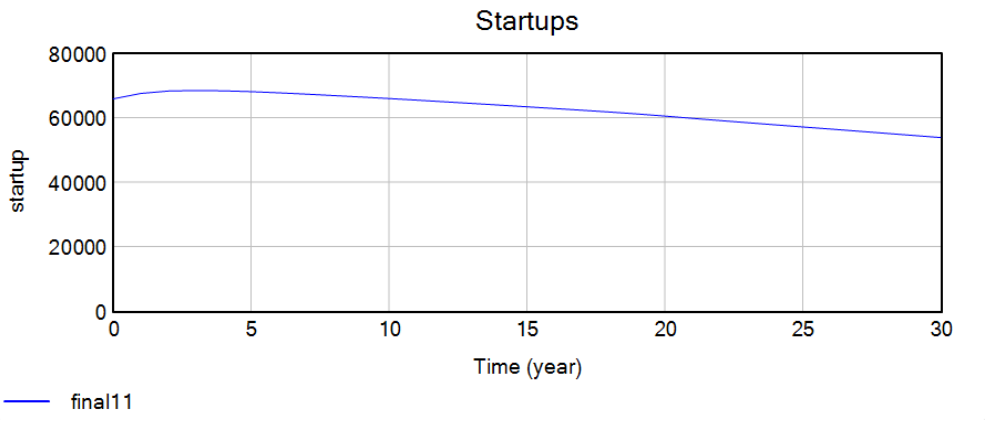
Experiments

1)Government support got doubled



The above diagram shows the impact of growth on startups when government support is doubled. This behavior is understandable as more students and young people will take risks and try to make something more big.This will surely continue for some years and trigger huge numbers of startups but after some time it will start to decrease as people will lose interest and people will focus more on having a safe career option as career.Statistics say that almost 50% of India's GDP comes from startups.[6]

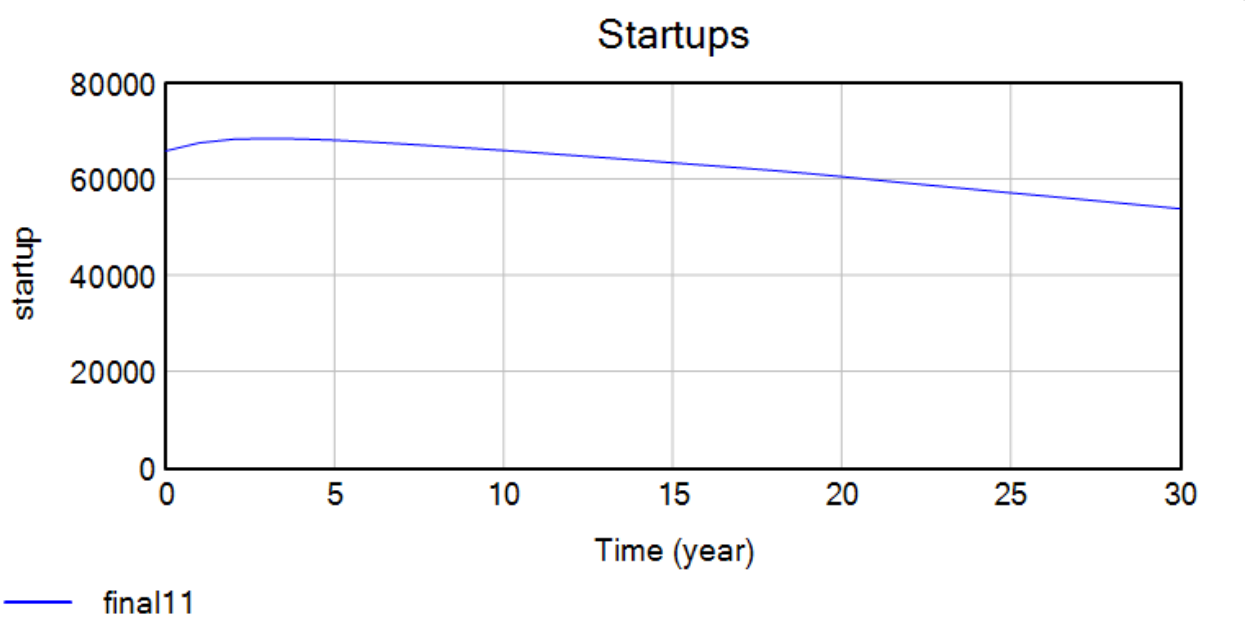
2)Government support is removed



The above shows the effect on growth when government support is removed.This behavior is obvious as a startup career becomes more risky and people will look for

more safe career options.Investment is always a major factor for growth of startup.Most of companies gets failed due to lack of funding thus Government subsidies play important role.Almost 90% of startups failed in last five years[6].

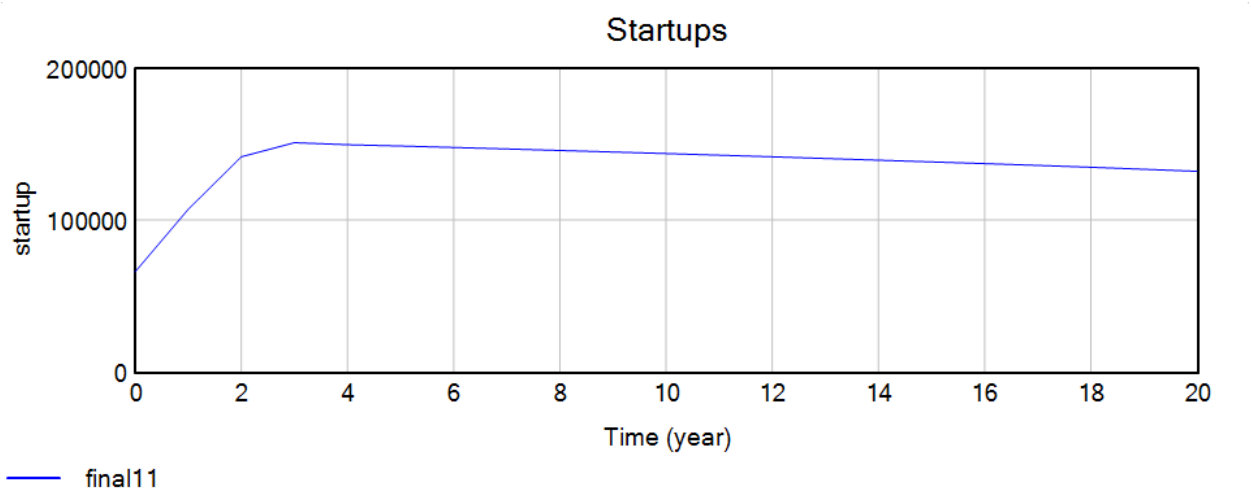
3)Brain-drain is accelerated



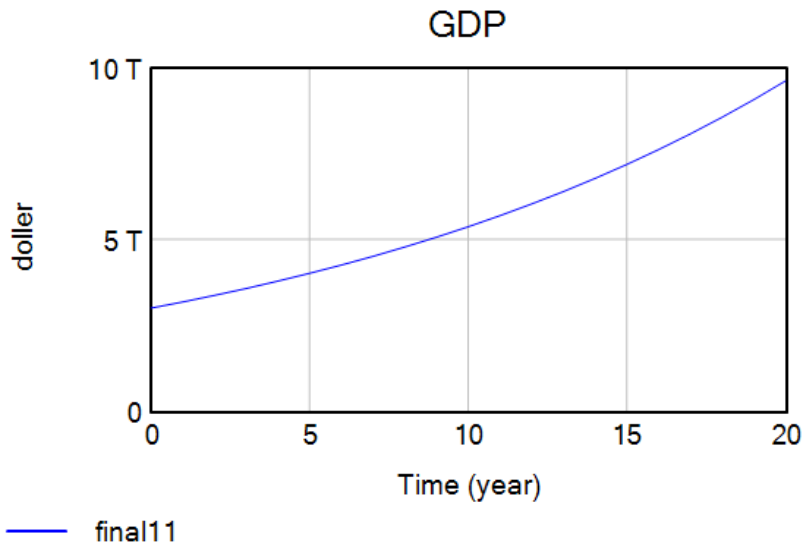
If the government does not incentivise new startup business it can lead to massive brain drain of the Indian labor force if some other country incentivises them. Brain drain is currently a severe issue for India. If these incentives are increased the drain will accelerate and this will impact heavily on the startup culture of India. Because of that, the availability of highly skilled labor will be reduced and the cost of labor in India will increase. Startups are in early stage of operation and cannot afford high labor cost.

Results & Conclusions

From the graphs we can see that the number of startups will continue to grow exponentially for a few years and then they will decrease because of the saturation in the market and after some time it will be constant.



Currently startups are growing exponentially every year. This is because there have been many favorable nudges for startup growth in india. However, any market can accommodate so many startups. Hence there will be an excessive number of startups. Due to this overkill, the startup bubble will burst and the number of startups will slowly reduce in India and ultimately an equilibrium will be reached. Meanwhile the economy will be continuously expanding. The startups create a large number of jobs that will prevent brain drain.



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[2] Impact of startups in the Indian economy | Direct benefits | Indirect benefits
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