

BUSINESS PLAN

TRAGEN TRUCKS

The last mile delivery robot



TechMates Innovation Inc.
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Acknowledgments

Team TechMates, would like to express heartfelt gratitude to our families and friends for putting up with the lunacy created in the name of entrepreneurial adventures.

Dr. Sanders, for leading us up-front and for being a constant source of inspiration.

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Executive Summary

The Tragen-Trucks by TechMates Innovation Inc. started as an idea in our technology innovation class through an assignment. We wanted something to improve college students' busy life by saving their valuable time. Walking to a restaurant, waiting in line to order, order food, waiting to get the order, walking back to the library to start being productive again can cause a lot of unnecessary distractions as we all know.

With Tragen-Trucks, a student can use that time to be productive instead. We wanted the process to be smart and cost-efficient so that we decided to use autonomous rovers as couriers to deliver per student's requirement. It could be delivering a book from the bookstore, a bowl of ramen from a restaurant or more, any time of the day. Our service is top-rated among students based on surveys and test trials we conducted. By pairing robots with humans, Tragen-Truck can beat traditional couriers with faster delivery times. We are delighted with the feedback we have received thus far and look forward to continuing this process over the next few years as we begin to get our service out into the market and across different campuses.

Overall, we feel that our company is uniquely positioned to profit with this proposed service idea and our business expertise will help drive our business further. We will continue to strive for customer satisfaction to deliver perfect services. Our technological breakthrough is crucial to the

industry, we truly believe in the efficiency of autonomous bots replacing human couriers, and we are delivering the future. The best 'Last Mile' solution is finally here

Mission Statement

Tired of awkward interactions with a delivery guy? Get anything you want to be delivered to you in minutes with Tragen-Trucks, and we are here to ensure your products arrive safely using our most advanced autonomous technology.

Business Overview

TechMates Innovation Inc. is a budding company created by five University at Buffalo Management Information System majors: Nidhishant, Rahul, Minnie, Disha, and Mukunth. Our company began when we all met in a Technology Innovation class and were discussing how we wish a service like Tragen-Trucks existed and possibilities for it to happen. We brainstormed and created, what we firmly believe, to be the smartest, most cost and time efficient courier service. The Tragen-Trucks. A delivery service that will allow you to focus on your studies, save the embarrassment of not wanting to tip, a one-stop delivery service that not only deliver food but books or groceries as well. We design our autonomous rovers with care and tailor them to meet the highest expectations. We are here to ensure your pro

Product Design

To operate autonomously, Tragen-Truck needs to understand its surroundings. A fully integrated Ultra HD 360 camera is installed on every Tragen-Truck, giving it a 360-degree field of vision all at once. Our bots are also equipped with technologies most self-driving cars have, LIDAR sensors, light detection and ranging device that measure distances using pulses of lights to understand its surrounding environment and be aware

of pedestrians. Lidar sensors also can detect the edges of roads and identify lane markings.

With innovations in deep learning and computer vision algorithms, Tragen-Trucks can easily identify traffic lights and their signals by collecting examples of types of traffic lights in the area it will be operating. We have successfully programmed Tragen-Trucks to correctly recognize traffic lights, cross streets, use indoor elevators, detect objects to avoid collisions entirely autonomously. Additionally, they are trained to gather data from its sensors to make intelligent decisions that ensure safe, quick and cost-efficient deliveries.



*Figure 1: Tragen Truck Design
[Outsourced from Alibaba]*

Manufacturing Cost:

\$19,000 for a set of 4
\$4,750 per unit

Product Specifications:

Height - 90 cm, Depth - 50 cm
Weight – 100 lbs,
Trunk Size - 270mm*220mm*300mm
Maximum Loading Weight – 25 lbs
Average Speed - 5 miles/ hour

Industry, economic, and regulatory analysis

Robots in food delivery is altogether a new concept in the city, and regulations governing them are not yet formed entirely. Though there has been no attempt to regulate these laws on the federal level, locally, five states and some of the cities have permitted them. Although there are some restrictions imposed on size, speed limit, and areas of operation. In December 2017, San Francisco passed a bill that limits delivery robots to 3 mph, to testing only, and only in small industrial areas of the city. Since our delivery robot does not operate only in the campus area, the struggle to comply with size, weight, and speed limit can be flexible.

SWOT

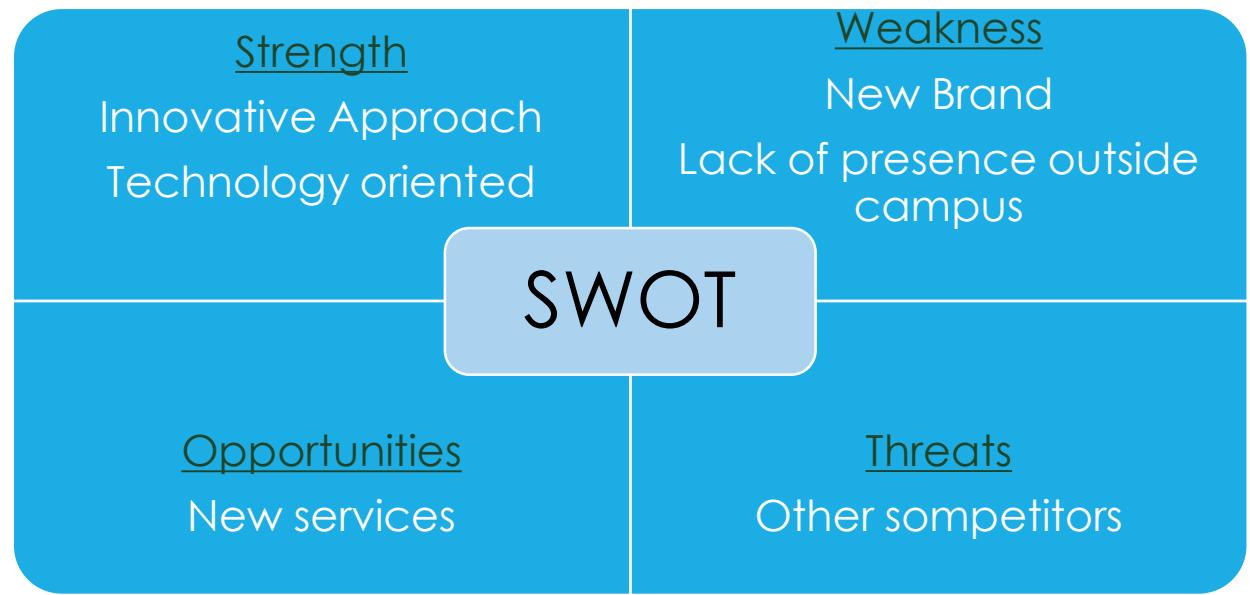


Figure 2: SWOT Analysis

COMPETITION

There is no competition as such in the market, but few that are in the making, are still in the planning phase like Deli, Boxbot, Robby 2, Carry robot.

Marketing strategy

Since university students and staffs are our primary customers, we'll be targeting on campus related promotions and offers for the students, etc.

Initial Campaigns and Billboards: Before we launch our service in the university we will focus on various science-related events which happen in the university. We will promote our robot in such science events and create curiosity among students. We will invest in the billboards touting the launch of our service. We will use the robots to deliver the food to the players during the intermission of the football game to attract more audience.

Promotions and Offers: Once we launch our service we will provide the service for free of cost. We need to get the customers to use to our service, and we focus on making them little lazy by providing such convenience at their work area. Once the customers get used to our service, we will start implementing the service charge. We will also give first few free deliveries which can be used within a month. By providing a limited time offers customers will tend to use our service instead of wasting it. Also, we'll provide cash back options which are balanced from the service charge made out from the restaurant.

Restaurants and Benefits: We get half of our service charge from the restaurants. So we need to focus on satisfying our ally restaurants too. As we make progress, we'll provide our analysis of how much profit the restaurant can make using our services. Providing these insights, we will buy more restaurants' deals and will retain their service with us. We will also offer the special privileges to our premium restaurants to set their own service charge for the services which counts beyond the agreed number. By this feature, the restaurants can make more profit which will not be shared with our company.

Social Media and Publicity: We will be rolling out the promotions, t-shirts and offer emails to the student by partnering up with the university. We will be investing in the Google and Facebook ads to promote our service which will help us expand our service to the customers as well as bring in more investors in the future.

Operations & Human resource strategy

Goal

Develop efficient Tragen Trucks and provide maximum value to the customer, both concerning performance and cost efficiency.

Core Values

- Promote Honesty, Integrity and Trust
- Celebrate Teamwork
- Encourage Communication
- Produce Quality Results
- Focus on our Customers

Organization Structure

We are currently five members of the company. We have come up with an initial plan to hire three members including a management team of 2 members. Strategy to appoint members are based on the team requirements. We have come with four groups and their specific functionalities of operations.

- I. **Management Team:** This would comprise of the co-founders who would be looking after decision making and other issues. Managerial roles are art, not science. With experienced managers in teams, smooth operations are ensured throughout the day.
- II. **Research Team:** The primary function of this team is to work to serve better to the customer continuously. This team would work on creating our robots with enhanced capabilities for future

expansion. They will continually explore the data and surveys and work on improving efficiency and performance of robots.

III. **DevOps:** We are looking out a team of engineers who would implement the first software for the functioning of the software. This team also handles the operations which will be available 24*7. Developers and Operations team will not have a wall to separate them from developers arguing to release new features frequently and operations fighting to ensure 100% uptime for the application

IV. **Marketing Team:** This team would look after the advertising of the product. This team will be responsible for implementing the marketing strategy stated in the business plan and advice improvisations to it.

V. **Finance Team:** This team would look all the finances related to ordering robots and set up costs of the robots as well. The primary responsibility of this team to process incoming payments, keeping the bills paid, preparing financial reports and more.

For all the teams, there will be opening for both entry-level and experienced professionals. We will hire individuals based on the requirement of the respective teams. We will be looking candidates who are willing to work on a start-up organization, and they can take the responsibility and leadership in the task assigned to them. We are also planning to hire few interns in the Marketing and DevOps team.

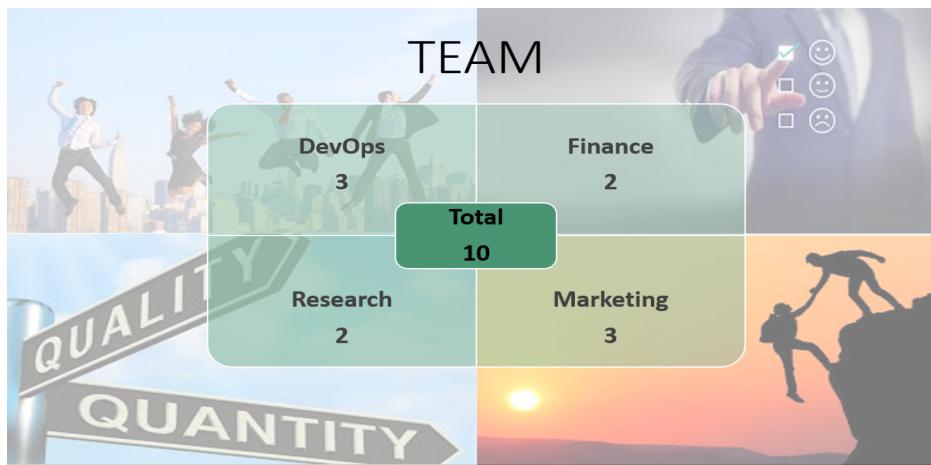


Figure 3: Team structure breakdown and company core values.

Financials and forecasts

Financials

The capital fund required to kick start this plan is \$300,000. The cost includes all the funds needed to run this business for the next two years.

Asset and Service Cost: We will be purchasing ten robots in the beginning for the sum of \$47500. Moreover, the rent for the docking stations would be \$500 per month. Our internal team will develop the application with no development cost, but the hosting and server charges would come around \$150 per month. We, the partner, would not be taking any salary. So the development and maintenance cost would be negligible. Once we start seeing the profit, the profit will be shared among the partners and the investors respectively.

Promotions and Marketing: The service will be offered free for the first two months to attract the customers. Once we get the customers used to our services we will start charging them a token of \$.20 for each delivery. This will be implemented from the 3rd month from the launch. From the 6th month, we will be charging the restaurants as well. We'll gradually increase the service charge until we reach our magic number \$1 where \$.5 will be charged from the customer and restaurant each.

Operations: The operation cost would be \$21,000 which will be break-even to \$900 per month. The operation cost includes the office utility such

as electricity, robot service cost if any, power supply for the docking stations, funds allocated for team activities, etc.

Labor: Initially we will be hiring three resources for the operations and maintenance, and the salary structure will be \$2100 to \$3500 resulting in \$12500 per month break even for the next two years.

Cash Flow Analysis

Starting with 3600 services predicted a month we would be running in a loss for the first six months. Once we touch the safe zone of 16000 services per month, we will start seeing the cash flow in, in the next eight months we will see steady growth in the number of services as we achieve our magic number at the end of first quarter of the second year.

Below forecast graph shows the loss/ profit as we progress year by year.

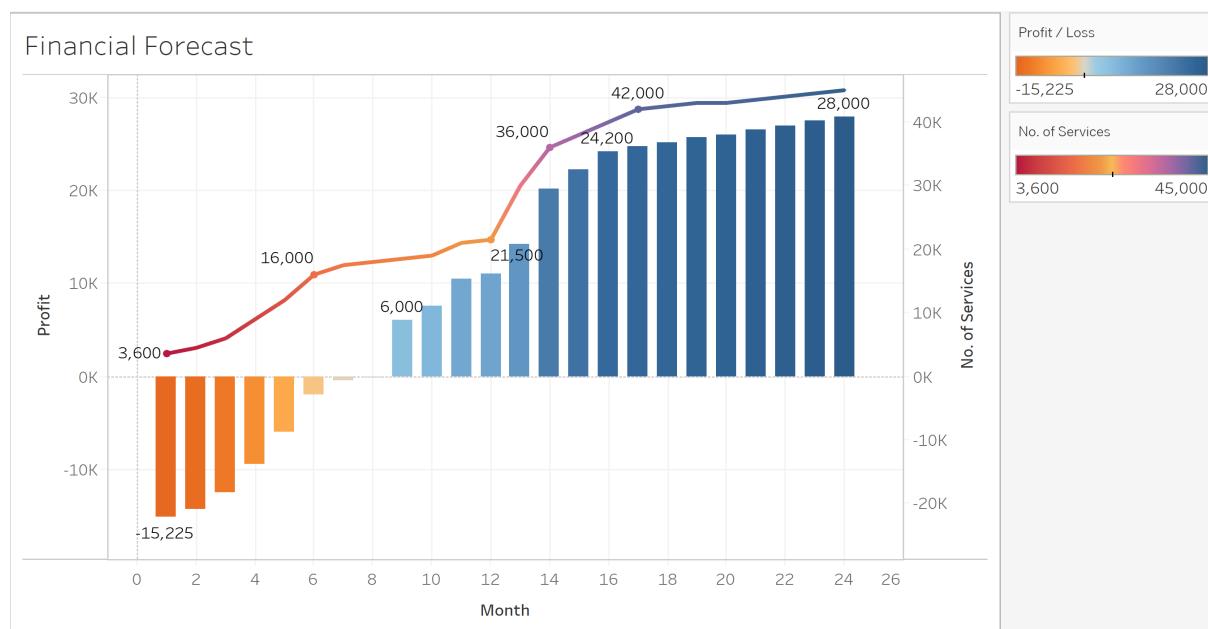


Figure 4: Financial Forecast with a monthly breakdown

As we can see, there is a significant leap at the end of the first year. This is where we will be expecting a steep increase in the number of services as we expand our services from the 14th month of our operation.

Investment

Once we achieve our target of 40000 services per month, we will be in a position to repay the debt. We need \$300000 to set up this business plan and get this operation going. We are ready to agree either be repaying the investors 200% of the investment they make on them, or we can share part our profit once we achieve our target.

We will be repaying or rolling out the profit share from the end of the second quarter of the second operational year.

Stage of development and the implementation plan

Implementation and Current Stage

Tragen Trucks are the self-driving robots. With a combination of mobile technology, we are aiming to make a local delivery faster, smarter and cost-efficient. Our team consists of highly talented young professionals, and these young talents are keen to learn new technologies and want to implement new things which will help the company to reach their goals.

Stages of Development

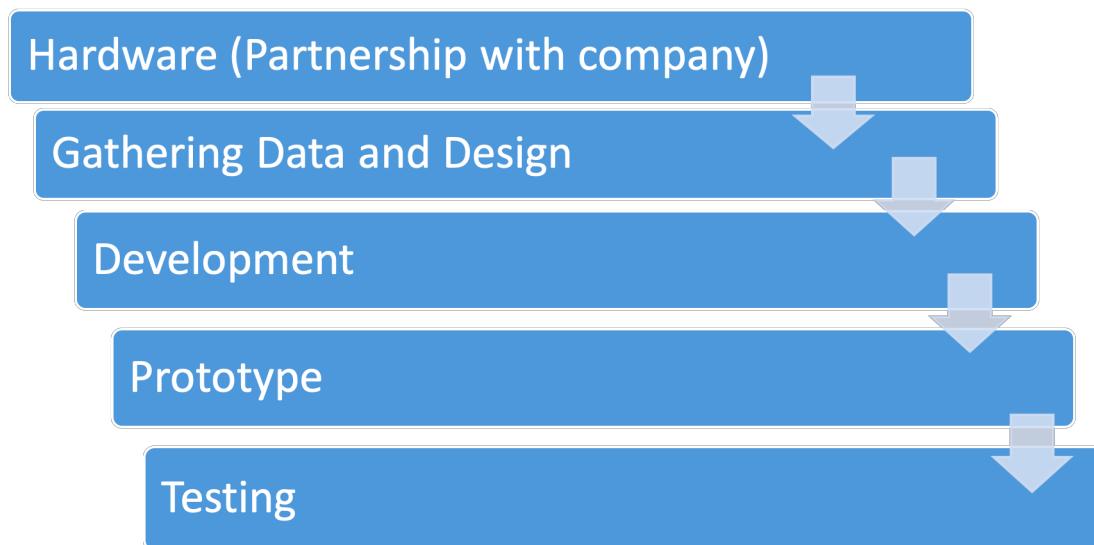


Figure 5: Stages of development for Robot and application

As illustrated in the above figure we will be partnered with a Factory Chain PVT. LTD for the components like actuators, wheels, chains and more. Below is the detailed description about the phases and tasks which we will follow in each stage:

Phase 1: Gathering Data and Design

In this phase, we gather the information and identify the specific details of the design like how will robot move within its environment? How will the robot move and manipulate other objects within its environment? The initial 20 days (11/01/2018-11/30/2018) we will be focusing on gathering the data and design considerations. We also take a survey in which we will ask questions from the food delivery guys on the challenges they face while delivering the food.

Phase 2: Development

The development consists of two parts: Software and Hardware. From 12/01/2018-01/30/2019, the two teams will be simultaneously working on the development of the software. In the development phase, there will be a possibility that the team has to go with restructuring and to redesign to make the system friendlier and robust. Due to this reason, we have kept a buffer of ten days in the development phase.

Phase 3: Prototype

We are aiming to build a product running prototype by 20 Jan 2019. In this phase, we will combine the software and hardware components and test an individual element which is known as unit testing.

Phase 4: Testing

01/30/2019-03/30/2019 the product will be put to the rigorous testing and bugs will be solved immediately. The product will be given to some

customers for testing, and their valid suggestions and concerns will be addressed.

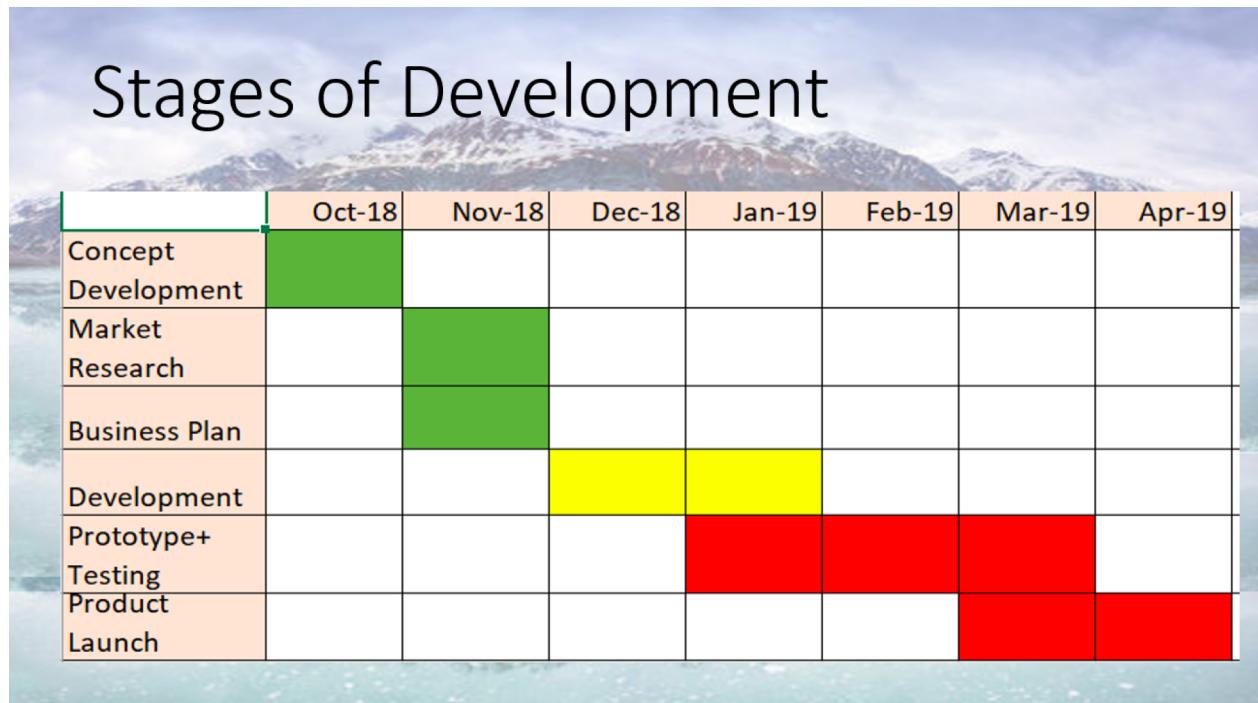


Figure 6: Expected progress with stages of development

Angel and Venture capital funding

To kick-off research and development, the initial investment is needed for getting a robot and developing firmware and application to interact with. This will need around \$25,000 of investment. We will be initially investing \$15,000 from our families and friends who will be expecting a minimum return on their investment. The initial investment of \$10,000 from founders and University research grant of \$15,000 will help us in research and building the prototypes.

With some research in market and basic prototype plus a business model, we are targeting \$120,000 from individual angel investors during the seed phase to develop more robust application and firmware which is functioning in best for its essential feature of delivering food. Before the launch phase, we expect another \$200,000 from angel groups investors. Panache and other start-up competitions will attract us more help in making us sufficient to get expected funds from angel investors.

Since, Venture Capitals are reputed for the branding of start-ups, during the early launch phase and later stages, we target Venture Capital investors to ensure some smooth and strong money to sustain our business.

Being a start-up with little experience in the market, we rely heavily on founders, family and friends funding. We also target on non-venture-capital fund sources for around \$300,000 after initial release phase. As an

alternative investment fund source, we will also seek a venture loan through crowdfunding or from federal banks. The loan amount will be for \$300,000, which will require repayment after four years. The fixed interest rate is estimated at 8%, and interest pay-out is required semi-annually. This avenue provides us the working capital needed without requiring investor profit sharing or participation in company value.

Business plan summary

Different forms of Food serving robots have been used in restaurants for years, to serve food and take the order from the customers. Recent leaps in automation technology have expanded such that it is delivering food on its own, navigating the sidewalk using cameras, GPS and sensors fitted all around. Motivated by the potential to reduce labor costs and enable new delivery business models, the range and complexity of tasks that robots are performing, allows them to be appropriate for real-world use.

We know walking all the ways to a restaurant or waiting in line to order, can eat up a lot of your time especially when you are a student. We at TechMates Innovation Inc. are providing a technological solution to this growing demand, a solution with operational efficiency in mind.

At TechMates Innovation Inc. are all motivations are aligned towards this well-organized, economical and functional perfection service.

Our Tragen Truck uses sensors and navigation technologies to deliver food around the college campus without a human controlling them.

Each 100-pound Tragen Truck is a medium-sized box on six wheels and drives at an average speed of about 4 miles per hour. It has lights and a tall, bright colored flag to make it prominently visible to pedestrians around

it. A smartphone app unlocks the lid to access the insulated area where the food is placed, and then automatically locks back into place.

The Tragen Truck's camera recognizes many things including, crosswalks and stops signs. Also, they get smarter the more they drive, learning more about the sidewalks and traffic patterns if the campus streets are busy with every trip they take. That camera that is installed in them provides security, and if someone tries to steal the Truck, it raises the alarm. The cameras click a photograph of the thief while the track of the Tuck location is being traced. However, the Truck won't open as it requires an app to do so. Since Tragen trucks operate autonomously, its Brain should understand its surroundings, for that we use Deep Learning to teach them the correct way to interpret data gathered from its sensors and to make intelligent decisions that ensure a fast, safe and cost-efficient delivery.

Our initial aim was not to save work hours, but it is well predicted that in coming time it will impact labor costs. The total shift hours of workers and their overtime hours, for which are billed extra, will significantly fall.

Lastly, with our multimodal system is in place, we anticipate a campus in which a meal or any goods can be delivered fast and cheap - anywhere - anytime.

Appendices

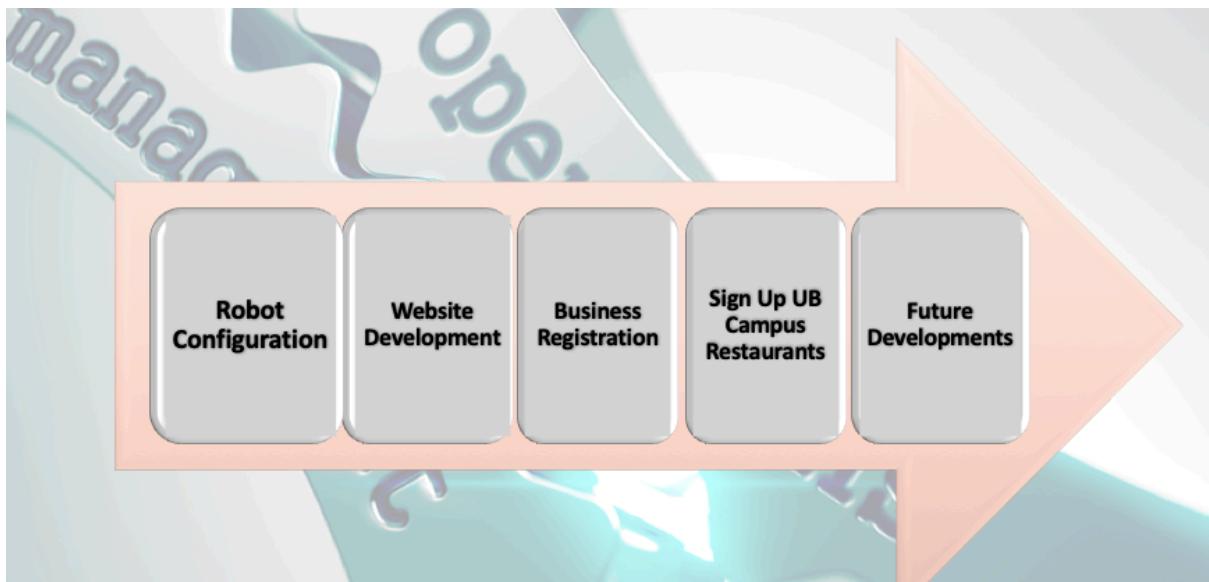


Figure 7: Parallel Operations Strategy

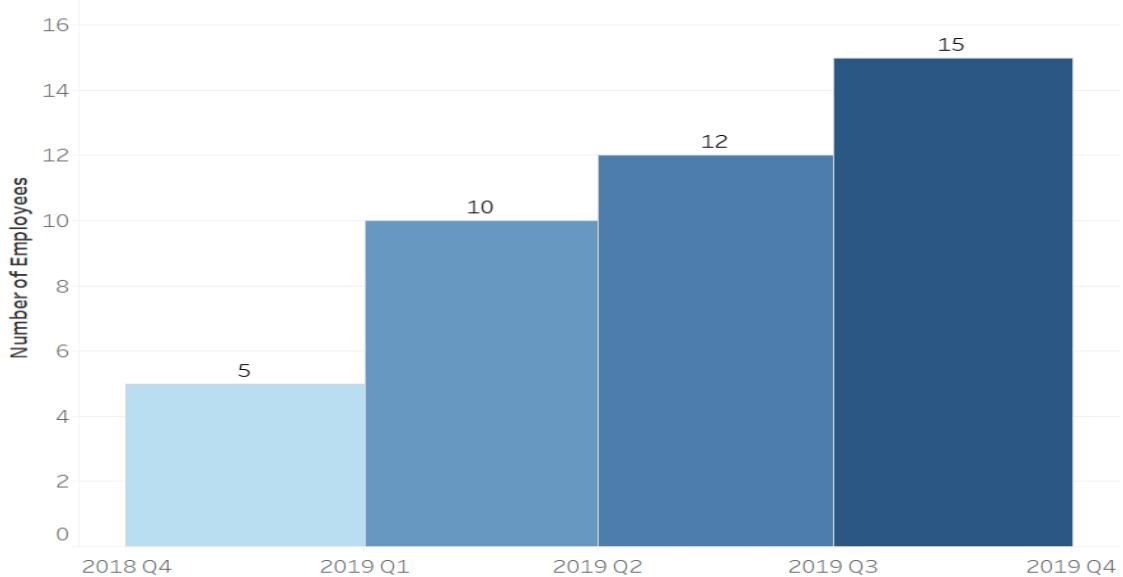


Figure 8: Company Size Growth prediction with growth in business

Month	No. of Services	Labor	Rent	Robot Break even cost	Marketing Break Even	Profit / Loss
1	3600	12500	500	2300	625	-15225
2	4500	12500	500	2300	625	-14325
3	6000	12500	500	2300	625	-12500
4	9000	12500	500	2300	625	-9500
5	12000	12500	500	2300	625	-6000
6	16000	12500	500	2300	625	-2000
7	17500	12500	500	2300	625	-500
8	18000	12500	500	2300	625	0
9	18500	12500	500	2300	625	6000
10	19000	12500	500	2300	625	7500
11	21000	12500	500	2300	625	10500
12	21500	12500	500	2300	625	11000
13	30000	17500	800	2300	625	14200
14	36000	17500	800	2300	625	20200
15	38000	17500	800	2300	625	22200
16	40000	17500	800	2300	625	24200
17	42000	17500	800	2300	625	24700
18	42500	17500	800	2300	625	25200
19	43000	17500	800	2300	625	25700
20	43000	17500	800	2300	625	26000
21	43500	17500	800	2300	625	26500
22	44000	17500	800	2300	625	27000
23	44500	17500	800	2300	625	27500
24	45000	17500	800	2300	625	28000

Capital Investment	3,00,000
Net profit after 12 months	35,000
Net profit after 24 months	3,25,000

Figure 9: Finance and Forecast. Profit and Loss statement