

- **Mid Course – Taking Stock**
- **What we have planned for the second half**
- **Mid Sem Project Team Submission**
- **Mid Sem Exam Feedback**

Mid Course – What we have covered



| S. No. | Date and Day | Themes | Sesssions | Faculty/Speaker |
|--------|-----------------------------|-------------------------------------|---|--|
| 1 | 26-07-2021 Monday | The Innovation Trail | Innovation Trail | RJ, AK |
| 2 | 29-07-2021 Thursday | What it takes to be an Entrepreneur | What is entrepreneurship ? Opportunity identification & 5 filter framework | RJ, AK |
| 3 | 02-08-2021 Monday | What it takes to be an Entrepreneur | Ideas to Ventures with young entrepreneurs. | RJ + Guest Speakers |
| 4 | 05-08-2021 Thursday | Presentations | Team Ideas Pitching- 8-10 min pitch | Teams |
| 5 | 09-08-2021 Monday | What it takes to be an Entrepreneur | Team Ideas Pitching- 8-10 min pitch + what it takes to be an entrepreneur | RJ + AN |
| 6 | 12-08-2021 Thursday | Business Model Canvas | Business Model Canvas I | RJ + Guest Speakers |
| 7 | 16-08-2021 Monday | Business Model Canvas | Business Model Canvas II | RJ + AN |
| | 19-08-2021 Thursday | Holiday (Muharram) | | |
| 8 | 23-08-2021 Monday | Opportunity Identification | What it takes to be an entrepreneur (Bharat Desai) BMC Case study (Cheeky Chunk) | Bharat Desai + RJ, RJ + Cheeky Chunk Guest Entrepreneur |
| 9 | 26-08-2021 Thursday | Customer Discovery | Customer Value Proposition + Customer Discovery | AN |
| 10 | 30-08-2021 Monday | Marketing / Go to Market | B2C + B2B Marketing | RJ |
| 11 | 02-09-2021 Thursday | Marketing / Go to Market | Full Funnel Digital Mktg | AN, RJ |
| 12 | 06-09-2021 Monday | Marketing / Go to Market | Marketing of Hi-Tech Products | RJ |
| 13 | 09-09-2021 Thursday | Marketing / Go to Market | Sales & Distribution | AN + RJ |
| | 11-09-2021 to 18-09-2021 | | Mid-Semester Examinations (This Course 15th Sep) | |

Second half – What we intend to cover

- **Focus on Sectors**
 - **Tech Sector**
 - **Medical Devices**
 - **Blockchain Technology**
 - **Social Sector**
- **Functions**
 - **New Product Development**
 - **Technology Cycles**
 - **Intellectual Property**
 - **Finance**
- **What we are heading to**
 - **Validating Business Model**
 - **Business Plan & Pitching**

Today's Session : My 3 startups



Rajen Jaswa

[Linkedin →](#)

Raj Jaswa is an accomplished technology entrepreneur. He became the CEO of Ddyno in 2009. During 2003-2008, he volunteered full-time for TiE Silicon Valley, first serving as Director and then as President; he continues to serve on its Global Board of Trustees. Raj was also co-founder, Chairman, and CEO of Selectica (1996 to 2002), which went public in 2000 and was included in the Forbes 500 and other prominent lists. Previously, Raj co-founded Opti in 1988, where he served first as Executive VP of Sales and Marketing and then as President until 1996. Raj has a B.Tech degree in Electrical Engineering from IIT Bombay, a Masters degree in Electrical Engineering from the University of Toronto, and an MBA from Stetson University.

Next Session : Thursday, 23rd Sep

ENT 603: Introduction to Innovation, DS School of Entrepreneurship, IIT Bombay, 23 Sep 2021

Product Innovation: Idea to Impact (Stories and Lessons from Med-Tech Sector)

Prof. Bhallamudi Ravi

Institute Chair Professor, Mechanical Engineering
PI, Biomedical Engineering & Technology Innovation Centre
Professor-in-Charge, Desai Sethi Centre for Entrepreneurship
Indian Institute of Technology Bombay, Mumbai-400076

ABSTRACT

There is immense potential to create 'made in India' success stories by addressing the unmet needs of the society. In this session, we will discuss the 'valleys of death' between proof-of-concept, prototype, product and market in the journey of a technology entrepreneur. This is illustrated by the story of an indigenous product – smart digital stethoscope for remote auscultation. We will also delve 'behind the scenes' to understand a systematic process for collaborative innovation developed at BETIC, IIT Bombay. It involves problem definition by end-users (doctors in the case of healthcare), concept development by researchers, product validation & delivery by entrepreneurs, and its deployment supported by investors. Finally, various elements of the ecosystem to connect research, education, innovation and entrepreneurship ('R.E.INV.ENT') are highlighted. These insights will be useful to all those involved in product innovation or in building relevant ecosystems.

Next Session : Product Innovation, Idea to Impact



SPEAKER PROFILE: Prof. B. Ravi is an Institute Chair Professor of Mechanical Engineering at IIT Bombay. He is well known for his work in metal casting through AutoCAST, E-Foundry and SMART Foundry projects. In 2014 he set up BETIC – Biomedical Engineering & Technology Innovation Centre, whose team members developed 50 and patented medical devices, incubated 16 startup companies, licensed several products to industry, and won many prestigious awards. In 2019, he took over as the head of DS School of Entrepreneurship, which has trained over 2000 students in entrepreneurship and led to over 30 start-ups during the last five years. As a member of governing or advisory councils of several institutes and expert committees of various government agencies, Prof. Ravi contributes to project reviews, policies and practices related to translational research, engineering education, product innovation and technology entrepreneurship.



Nishant Tikekar

[Linkedin →](#)

Dr. Nishant Tikekar is Adjunct Associate Professor-of-Practice at DSSE, IIT Bombay. Dr. Tikekar brings a good mix of academic as well as corporate experience. Over the course of his career, he has published and reviewed articles in peer-reviewed journals, launched a spinal implant for a startup company, worked in the corporate sector, and managed an Incubation Centre. Bulk of his work experience has been in the USA and India. He is an expert in lean manufacturing and is a Six Sigma Green Belt certified professional. He has also been a member of several professional societies.

Next week : Blockchain Technology & its applications



Salil Donde

[Linkedin →](#)

Prof. Salil has wide and deep experience in fintech (data, analytics, blockchain, software), financial services and insurance. He is a board member or advisor to several companies including Invatron, FocusVision, Ventiv, Tailwind, EQT and Lucedius. He was earlier CEO of AphaPoint Corp, Executive VP, Global Information Services of Nasdaq, and CEO of Marshall & Swift/Boeckh, USA. He is a strategic thinker with operational expertise and a track record of consistently increasing shareholder value. He has proven capabilities in private equity sponsored companies and public enterprises. He has a B.Tech in Mechanical Engineering from IIT Bombay, Masters from Clemson University and MBA from Columbia University Business School.

Mid Sem Project Team Submission – Due Midnight tonight

- Mid Sem Project Team Submission (15%) – Team submission
 - BMC Write up for your team
 - Similar to BMC Document shared for “Orchard View”
 - You can skip the following sections
 - Financials
 - Revenue Projections
 - Funding
 - Sustainable Differentiation under Differentiation
 - Max 6 page document
 - Pls upload on Moodle and on MS Teams

Submission Due Date : 20th Sep ,Monday Midnight

Mid Sem BMC Submission : Orchard View Template

Business Opportunity

We deliver agriculture data to growers, using computer vision technology which helps manage crop yield and reduce cost for farmers.

- Our cart periodically tours the orchard and takes images of the leaves and trees.
- Based on computer vision technology we help detect issues based on changing leaf coloration
- This data helps growers and pest control advisors identify the issues in the tree and take the right set of preventive measures.

Target Market

Customer Profile

Our technology can be applied to most fruit and nut growers with some adaptation.

We plan to tackle the following in our initial outreach – almond, walnuts, citrus and grapes. (Primarily driven by geography, market value of crops, growing season and business need in the orchards)

Segmentation

The diagram shows three concentric circles representing market segments: Available Market (\$2 B), Addressable Market (\$400 MM), and Beach Head (\$200 MM).

Value Proposition

Burning Need

Almonds /Walnut
Average orchard size is 300 acres – 500 acres.

Current methods deployed by farmers to detect issues in trees are either based on sampling, aggregate information or driven by highly labor intensive process.

Periodic management of issues help improve yield of their orchard and also reduce potential future losses.

Digitized information allows farmers to collaborate with pest control advisors and consultants in a seamless manner to get immediate value

Differentiation

Competition

Where is your product in relation to market competitors now?

A 2x2 matrix with 'Comprehensive' vs 'Sampling' on the y-axis and 'Insightful' vs 'Actionable' on the x-axis. Orchard View is in the top-right quadrant. Other competitors include Aircraft based imaging, Physical Scouts, Lab Tests, and PCA.

Go-to-Market

Channels

- Directly to Grower community (Reach out to them individually or through Co Ops)
- In partnership with Pest Control Advisors and independent consultants
- Potential arrangements with Heavy Equipment manufacturers

Relationships

- Work in partnership with Almond / Walnut Board of California
- Partnership with Co-Op and other independent consultants in the market place
- Work with research divisions of large growers in the industry

Financials

Assumptions

- Service Fee : \$25/acre trip
- Demand penetration of 20% of the total market in 5 years

Projections

| | Y1 | Y2 | Y3 | Y4 | Y5 |
|----------|----------|----------|--------|--------|---------|
| Rev. | \$0.58 | \$3.05 | \$5.96 | \$9.81 | \$15.34 |
| Net Inc. | (\$1.26) | (\$0.29) | \$1.18 | \$2.19 | \$4.83 |
| % | -219% | -10% | 20% | 22% | 31% |

Funding Requirements

- Seed Funding : \$1 MM
- Series A : \$3 MM

Business Opportunity

Our product will help orchard growers identify potential signs of stress and disease in their crops, alleviating a \$1.2B pain associated with crop disease. We enable faster diagnoses by a Pest Control Advisor (PCA), allowing the grower to take corrective measures more quickly and accurately. In the long-term, our software will automatically diagnose the most common and visually apparent issues, reducing the cost of diagnosis and treatment.

Target Market

Customer Profile

Our product-market fit is tightest for high-margin orchard crops such as almonds, walnut grapes, and oranges. The penetration of sensor technology into these crops is low compared to commodity row crops such as corn and soybean. Coodity row crops are watered and fertilized by tractors, which provide a natural physical platform on which to mount a sensor system that can also automatically adjust the amount of water and chemical applied to each small section of the crop. In contrast, high-margin orchard crop rely on built-in irrigation systems (e.g., micro-sprinkler, drip) that provide much coarse control over resource allocation and also do not provide a vehicle on which to mount a sensor.

Almonds are the number one cash crop in California and the almond industry has experienced 10% growth over the past decade. Almond production is geographically concentrated in California's Central Valley, the region accounting for roughly 95% of almond production in the United States, which in turn produces over half of the almond in the world. Geographic density favors solution, which involves transporting carts to each customer farm. Almond crop disease represents a \$5M expense to these growers.

Grapes are California's second largest crop and also share the geographic density and proximity of almonds. Wine vineyards spend \$7M to manage the stress levels in grapevines at a minute level, oftentimes purposefully stressing the plant to some degree to achieve desired flavor properties.

Oranges are a high-risk crop. In recent years, the bacterial disease known as citrus greening or Huanglongbing has devastated orange crops in Florida and Texas, and is no spreading across the country to the West Coast. Once infected, a tree ceases useful fruit production and dies within a few years, representing a \$20M loss to a grower. The key symptom of the disease is that it changes the fruit color from orange to green and limits the size of the fruit. Early detection of the disease is crucial in order to quarantine and prevent its further spread.

The figure below highlights issues in orchards that can be recognized using imaging technology.

Segmentation

Our initial target market is almond, walnut, citrus, and grape orchards throughout the U.S. We have selected these crops because of their high volume and revenue (\$10.2B), intensity of need, and geographic coverage. This technology can be adapted to most fruit and nut plants and other crops in agriculture, representing a \$123B total available market.

An indicator of total potential market size is the total cost of fertilizer, disease control, irrigation, insects, and PCA advisement for these crops. Using a cost-and-return analysis for almonds from UC Davis, the cost per acre is \$785. Assuming that the other crops have similar costs for these items, the cost of materials that would be impacted by use of our product would be \$2B for almonds, walnuts, grapes, and oranges.

We estimate the approximate size of our target addressable market as the total acreage of the crop multiplied by the price of our service for a year (3 trips at \$25/acre). This approximation was constructed from extensive almond farmer outreach as a proxy for other crops. The initial addressable market is \$1.1B.

Value Proposition

The Burning Need

Orchard growers rely on manual techniques - physically touring a small area of the farm or taking a few leaf samples from various locations and sending them off to be tested in a lab - to monitor the status disease, pest infestation, malnutrition and water stress in their orchards. The price of a single missed detection compounds geometrically, as malnutrition, disease, and pests spread geometrically over time.

Growers use Pest Control Advisors (PCAs) who use the naked eye to detect some of these issues by periodically sampling the orchard. Some also use aerial photography, captured at a few thousand feet, to understand the status of their orchard at an aggregate level. Many of the PCAs who work with growers are actually representatives of chemical/fertilizer companies trying to sell their products. Though these experts may have great expertise, there is an inherent conflict of interest between helping the farmer and making a sale. Growers spend an estimated 15% more in pesticides than needed to

Key Insights: Geographic density for the crops, Higher need than other crops within the same acre, Geographic density for the crops, Higher need than other crops within the same acre, Geographic density for the crops, Higher need than other crops within the same acre.

Market Data: Total Available Market (\$123B), Addressable Market (\$1.1B), Beach Head (\$200MM).

Our Solution

The diagram illustrates the workflow: Main Images (2x2 grid) are processed by a 2x2 grid of processing units (Light Source, GPS, Data Logger, Data Processor) to produce a final output (Data Processor output).

To collect the data, we employ a multispectral camera suite mounted on an all-terrain cart that is linked to an onboard data-logging machine. The camera suite is composed of cameras in the visible and near infrared spectral range, and an active visible and infrared light source. A GPS unit is attached to the cart and connected to the data logger. The cart is driven at a speed of 15 mph through the crop rows and the onboard DAQ captures data from the GPS unit and cameras every five seconds saving this to a USB-mounted flash storage device. The driving is done at night with the active light source providing sufficient and consistent illumination of the leaves in the camera frame.

After data-collection, the USB storage device is transferred to a server that runs the image processing software. The quantity of data captured by the camera suite (5 terabytes/hour) precludes the use of a cloud-based processing system. Our computer vision segmentation and stress-detection algorithm is applied to the images, pinpointing images and geographic coordinates of possible plant stress. This data is then presented to the end-user, either a farmer or a PCA, who can view the findings on a map on a desktop computer or mobile device. The user can zoom in on individual issues displayed on the map and look at the original picture with stressed region highlighted. This allows an expert to make a visual-based diagnosis without having to venture out into the field, allowing for quicker diagnosis.

Go To Market

Channels

Our primary channel is to sell directly to growers. However, we will partner with PCA and chemical companies to obtain faster market penetration. PCAs from chemical companies would value this technology because it would help them perform their job better, as a PCA from Crop Protection Services has said. Despite the conflict of interest and desire to bias crop recommendations toward chemical sales, chemical companies ultimately need to demonstrate value to farmers to keep their business. Our service could

Differentiation

Competition

A 2x2 matrix with 'Comprehensive' vs 'Sampling' on the y-axis and 'Insightful' vs 'Actionable' on the x-axis. Orchard View is in the top-right quadrant. Other competitors include Aircraft based imaging, Physical Scouts, Lab Tests, and PCA.

Actionable, comprehensive data are the defining metrics of our competitive landscape. Growers want data that will help them carry out actions to increase yield and reduce cost. Further, PCAs and physical scouts can only look at a very small percentage of an orchard—they will inevitably miss some problem areas and infestations.

Aircraft imaging can take images of the entire orchard on a macro scale to measure chlorophyll content. Some farmers interviewed used aerial imaging as a way to find macro problem areas due to lower chlorophyll content (NDVI) in certain areas. Aerial images, however, are coarse and do not provide the resolution for growers to take

immediate and targeted action. Without fine-grain images of individual leaves, aerial imaging lacks a rich source of information relevant to plant health.

There are several other technology companies in the agriculture space. Companies like Pure Sense, Solun, and mOnis are also attacking this exciting space but are not competitors. In the future, these companies could in some way combine their offering to become our competitors or partners.

Sustainable Differentiation

In year 1, our primary focus will be to collect data across the primary target crops of almonds, walnuts, oranges, and grapes and refine the algorithm to detect issues in each crop. We will construct the on-cart sensor system and develop the first version of the end-

Project Teams – Continued..

- **Wrapping up Customer Discovery**
 - Clear Customer Personas
 - BMC Hypotheses have been validated
 - Product / Service has been fleshed out
- **Getting Customer Validation**
 - Does the product/service meet need ?
 - How much will they pay ?
 - Where will they buy ?
- **Working towards Business Model and a Business Pitch**

10 – slide Pitch presentation : Last week of October

Mid Sem Feedback



- **BMC Write up**
 - **Customer Segments – Listing very good, some detailing, focus missing**
 - **Customer Value Proposition**
 - **Decent, but always linked to the customer segment focused on.**
 - **Listing of features & benefits**
 - **Customer Relationships**
 - **Thought of as building relationships, not about acquiring customers**
- **Channels, Revenue streams – done well**
- Customer Segments: List the potential customer segments for 3DZ. Which customer segment could this be a burning need or a big gain creator for? Don't just write the segments, explain your thinking behind the same.
- Value Proposition: Articulate a customer value proposition for 3DZ. Ensure that you have covered the "What is 3DZ? Who is it for? What does it deliver better than everyone else?" Think a set of 5 features that would make 3DZ appeal to its target audience
- Customer Relationships: How will you acquire, keep, and grow customers for 3DZ?
- Channels: How will you reach your target segment?
- Revenue Streams: What could be the potential revenue streams for 3DZ?

Folks Read the Questions in the Paper before you write answering

Mid Sem Feedback



Q2: Short Answers: Please answer ANY 5 of the following questions: 5*3: 15 marks. Please make sure that the question number is correctly mapped to the answer

2.1 When you read Peter Diamandis's Metatrends deck, which of the Metatrends resonated the most with you and why?

2.2 We have all experienced the uncertain and difficult times of the pandemic in our own different ways. Identify a burning need from your own life and describe a product / service idea to address this need (No need to worry about feasibility / achievability of the product /service)

2.3 Explain customer value proposition using an example from any product / service category. It must detail for which customer segment and what is the value delivered. (Hint: think of what customer pains are relieved and / or what customer gains are created)

2.4 What do TAM, SAM and Target Market mean? Why are each of these important in an entrepreneur's journey, at the early stage which of these should an entrepreneur focus on?

2.5 Think of the guest entrepreneurs in our class and the journeys that they shared. Write 3 qualities needed to be an entrepreneur that you have learnt (you don't have to say which quality you learnt from which guest entrepreneur).

2.6 Can you explain the terms LTV and CAC in the context of a startup's customers? What is the metric involving these terms that entrepreneurs need to be conscious of at all times?

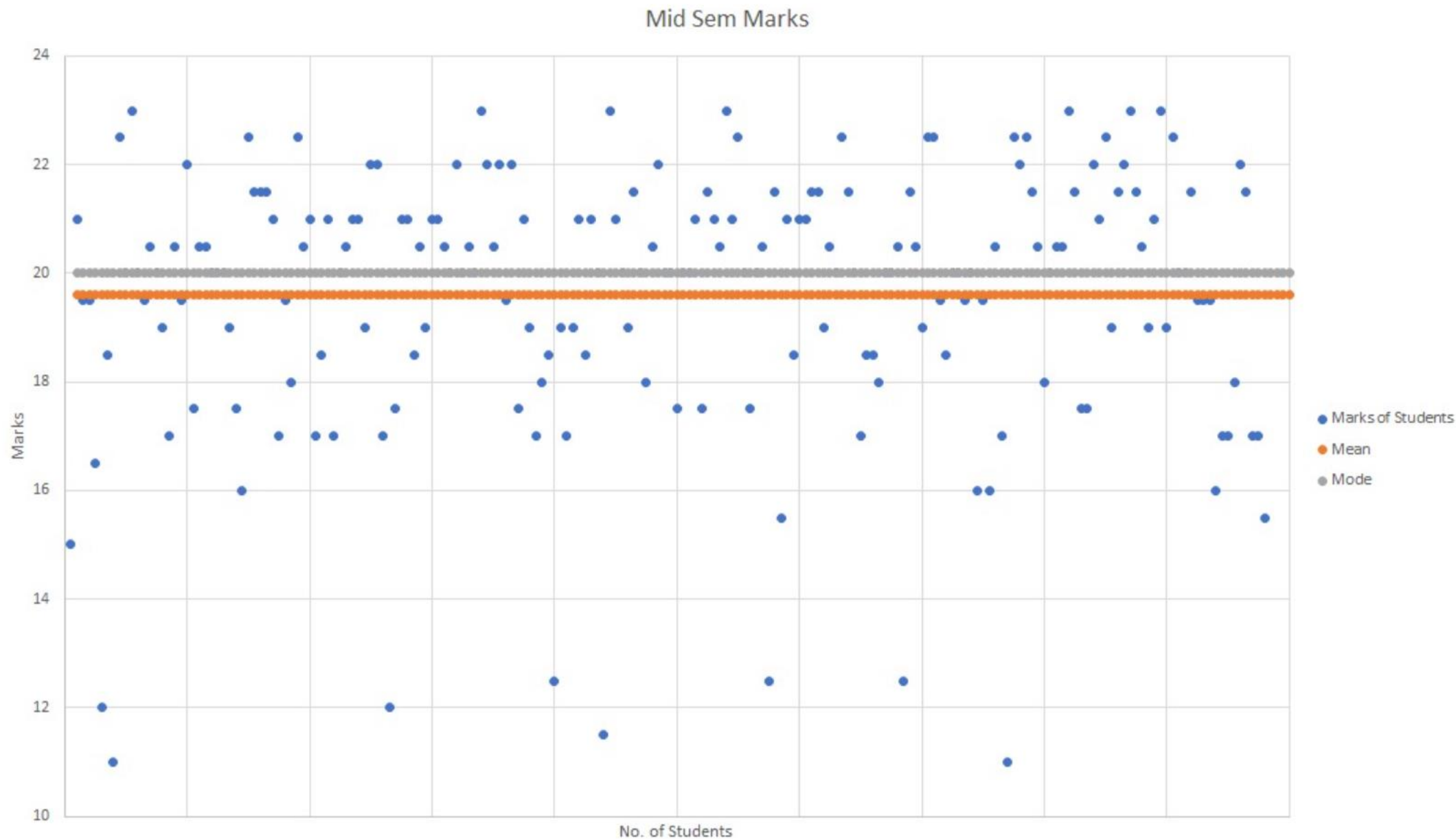
2.7 Using Moore's Technology Adoption Life Cycle, can you explain why it is important for a tech venture to find a partner in industry at its early stages?

2.8 List a couple of key decisions that entrepreneurs need to take with regard to their sales and distribution strategies? Can you highlight what could happen if they took the incorrect decisions?

2.9 Please give an example of a product / service that existed 10 years ago but is not present today. According to you, what made the product / service irrelevant to today's consumers?

- **Some folks didn't see the choice offered**
- **Metatrend – Why it resonated ?**
- **Burning Need Product / Service Idea**
- **CVP – explained your own idea**
- **TAM, SAM , Target Market – Decent**
- **Qualities of Entrepreneurs**
- **LTV / CAC not explained**
- **Moore's TALC – not attempted and not done well**
- **Sales & Distribution Strategies – Consequences not done well**
- **Obsolete product / service – didn't ask for brand**

Mid Sem Marks



Discussion Session (only IF NEEDED) : Tuesday 8 to 10 pm

