Invention: first occurrence of idea Innovation = idea+commercialization + value IT
Innovation: The application of new or significantly improved information technologies to create value through new or enhanced products, services, or processes. Novelty: new or significantly improved
Implementation: actually deployed Value Creation: tangible benefit IT-Centric:core enabler is IT
IT Innovation Pro: Competitive Advantage: Early adopters gain an edge (e.g., Uber, Airbnb). Efficiency: Automation and cloud tools cut costs and speed up work Better Customer Experience: Personalisation improves satisfaction (e.g., Netflix, Spotify) New Market Creation: New technologies open fresh industries (smartphones → app economy). Societal Impact: Supports health, education, and accessibility (telemedicine, edtech).
GPT: Technology with economy-wide impact, enabling waves of innovation Pervasive use across industries Continuous improvement (cheaper, faster) Spawns complementary tech (e.g., apps from smartphones)
Drives organizational change eg AI
AI: ChatGPT IoT: Smart home sensors Blockchain: Bitcoin 5G: Remote surgery Edge: Factory AI Quantum: Drug discovery AR/VR: Training sims Robotics: Amazon warehouse AI + IoT + 5G + Edge
Intelligent Edge Systems
Diffusion of Innovation Process where innovation spreads through channels over time in a social system. Elements: Innovation (product/process/business model), Channels (word-of-mouth, media), Time (rate of adoption), Social system (influencers: opinion leaders, media, govt).
Innovation-Development Process: Recognize problem, Research (basic/applied), Development, Commercialization, Diffusion/Adoption, Consequences.
Technology Adoption Lifecycle Model (Rogers): Innovators Risk-takers, first to try new tech, Early Adopters Opinion leaders who shape trends. Early Majority Practical users who wait for proof before adopting. Late Majority Skeptical, adopt only when technology becomes affordable. Laggards Traditional Resistant to change.
Chasm: Gap between Early Adopters and the Early Majority. Many high-tech products fail here because mainstream users need reliability and proven value. Crossing the chasm increases the chance of reaching mass-market dominance.
Cumulative Adoption Curve (S-Curve): Shows adoption growing slowly at first, rising sharply as mainstream users join, then flattening when the market becomes saturated. Represents cumulative uptake over time, not just rate of adoption.
Innovation Adoption Process (Rogers): Knowledge learning about the innovation. Persuasion forming an attitude toward it. Decision choosing to adopt or reject. Implementation using the innovation. Confirmation seeking reinforcement for the decision.
Factors Affecting Rate of Adoption (Rogers): Relative Advantage How much better the innovation is compared to what it replaces. Compatibility: How well it fits with users' existing values, habits, needs. Simplicity/Complexity: The easier it is to understand and use, the faster the adoption. Trialability Ability to test on a small scale (e.g., free trials). Observability Visibility of positive results that influence others to adopt.
Gartner Hype Cycle: A framework that tracks how emerging technologies evolve over time. It shows a technology's maturity from hype to real value so organisations can see what's overhyped, maturing, or ready to adopt. It highlights emerging technologies and their potential impact, helping organisations decide when to invest, experiment, or hold off.
Measured: Uses expert judgement plus qualitative indicators like Search volume, social media trends, Funding and investment patterns, Media coverage
Five Phases of Hype: Innovation Trigger A new idea attracts attention, early prototypes appear, but real products are missing, and its commercial viability is still uncertain. **Peak of Inflated Expectations** Publicity drives high expectations, with a few early successes and many failures, leading some companies to experiment while most stay cautious. **Trough of Disillusionment** Interest fades as early projects disappoint, many vendors leave, and only the strongest improve their technology to survive. **Slope of Enlightenment** Practical uses emerge, mature second- or third-generation versions appear, and organisations start pilots while cautious adopters remain slow. **Plateau of Productivity** The technology stabilizes, adoption grows in mainstream markets, and standards, ROI, and real-world value become clear.
Dominant Category: Segment that captures largest market share or shapes consumer expectations. **Technology:** Practical application of knowledge for a task or purpose. Eg medical technology, data storage methods. **Product Category:** All products offering the same general functionality. Eg Automobile
Dominant Design: A product design that becomes the standard in its category. Influenced by Technological factors: efficiency, compatibility, performance. Firm actions: strategic positioning, marketing, patents. Stakeholders: consumers, regulators, critics shaping perception. It signals market maturity and sets a standard that other firms follow. Helps consumers compare products and guides firm strategy for future development.
Emerges through: Initial product experimentation, Adoption by significant market share, Competition and cost reduction commoditisation of components, Standardisation (de facto or de jure) Phases: Fluid phase: Uncertainty, experimentation, Specific phase: Stable design, incremental product and process innovation
Technology Cycle: Discontinuity: Radical innovation creates new possibilities. Ferment: Competing designs are tested; experimentation phase. Dominant Design: One design becomes the industry standard. Incremental: Improvements in product, process, and efficiency. Next Discontinuity: New breakthrough starts the cycle again.
Factors Leading to Dominant Design: Standards Formal (De jure): Set by authorities (e.g., W3C: HTML/CSS, ISO:MPEG.) Market-driven (De facto): Emerge from widespread adoption or company influence (e.g., PDF, Java). Standards ensure quality and compatibility; they can be proprietary or open. Market Forces: Learning Effects: More usage more knowledge faster tech improvement. Network Effects: Value rises with more users: Direct (Email, Twitter) Indirect (PC + software) Two-sided (eBay, Airbnb) Local (Facebook, Instant Messaging)
Creates a self-reinforcing cycle; more users more complementary products more users (e.g., Microsoft platform strategy). Government Regulation Governments can enforce dominant designs for economic or consumer benefits (e.g., DVB-T for digital TV in Australia, GSM in EU).
First Mover: Enters the market before a dominant design is established. High risk but potential to set the standard. Example: NeXT, Apple Newton (failed). **Second Mover (Fast Follower):** Enters after the dominant design is set. Produces "me-too" products, competes on cost/efficiency rather than innovation. Lower risk. Example: Lyft following Uber. **Fast Second:** Enters as the dominant design emerges, shaping it while mitigating risk. Balances readiness with timing, often used by established firms. Example: Amazon e-commerce, Canon digital cameras.
Disruptive Innovation: Smaller companies with fewer resources successfully challenge established incumbents. Key Idea: It's a process over time, not a single product or service. **Why Disruption Happens:** Low-End Foothold: Incumbents overserve demanding customers, ignoring low-end customers. Disrupters provide "good enough" products at lower cost. New-Market Foothold: Disrupters create entirely new markets, turning non-consumers into consumers
Sustaining Innovation: Improves existing products for high-end customers (incremental or breakthrough, e.g., better iPhone camera). Disruptive Innovation: Targets overlooked markets, starts "good enough" (cheaper/simpler), then improves to disrupt upmarket.
Low-End Disruption (Bottom-up in existing network): Incumbents focus on high-end, profitable customers, often overshooting the needs of less-demanding segments. New entrants target these overlooked, low-end customers with simpler, cheaper, "good enough" solutions. Over time, entrants improve their offerings, eventually moving upmarket to compete with mainstream customers.
Process: Incumbent Overshoot: High-end products exceed requirements of some customers; low-end needs ignored. Entrant Foothold: New firms target overlooked segments with affordable, suitable solutions. Upmarket Move: Entrants improve performance while keeping low-cost advantage. Mainstream Adoption: When mainstream customers adopt, disruption completes. Eg Chromebooks (education vs laptops), Mobile wallets (PayPal vs banks)
New-Market Disruption (New network for non-consumers): Innovation creates a new market that incumbents are not serving. Converts non-consumers into consumers. Initially targets unmet or unserved needs. Over time, quality improves, attracting existing customers from incumbent offerings.
Process: Identify Non-Consumers: Find a market ignored by incumbents. Serve New Needs: Offer a product/service tailored to this new market. Improve Performance: Gradually enhance quality and features. Mainstream Adoption: Existing customers adopt the new solution, expanding market share. Eg No-code platforms (Bubble vs programmers), Remote tools (Zoom vs in-person)
Value Chain: Describes how value is added at each stage of a product or service. Originally suited for manufacturing but extended to industry-level value flows. Industry Value Chain: Shows how value is created and transferred between participants (e.g., licensing, products, services). Eg: Data value chain (production → processing → impact).
Value Network: Extension of value chains; focuses on the entire system rather than one product. Highlights relationships and interactions between participants across the network. Eg: Health Care Value Network. Disruptor Risk: Entering an existing network may force adaptation to its rules, potentially co-opting the innovation.
Use of Value Chains/Networks: Understand industry structure and relationships between companies. Identify your company's position within the market. Decide strategic goals and opportunities. Spot potential areas for disruptive innovations.
Innovator's Dilemma: Established companies focus on their most profitable, high-end customers. They innovate to meet these customers' needs (sustaining innovation) but risk being disrupted at the low-end or by new markets. **Dilemma:** To maximize profitability, firms move upmarket, but this leaves opportunities for entrants to disrupt overlooked segments. Eg: Kodak ¿ Digital cameras, Blockbuster ¿ Online movie streaming
Ambidexterity Strategy: Purpose: To resolve the Innovator's Dilemma. The ability of a firm to simultaneously explore and exploit. Mechanism: One part of the organization focuses on exploitation (serving existing customers well). The other part focuses on exploration (innovation and entering new markets). Prepares firms to adapt over time without losing their core business.
Cognitive Computing and Services: Simulating human thought processes using self-learning algorithms, data mining, pattern recognition, and natural language processing. Purpose: Computers can mimic human reasoning and decision-making. Eg: Microsoft Cognitive Services: Computer vision, language processing, multi-platform support.
Evolution of Innovation: Traditional (Closed) Innovation: Most RandD done in-house. Linear funnel: ideas go from research ¿ development ¿ market. Limited collaboration: knowledge largely contained internally. Trends Leading to Open Innovation: Worker mobility, outsourcing, globalization. Better ICT tools, easier access to venture capital. More opportunities for collaboration and co-creation.
Open Innovation: A distributed innovation process based on purposively managed knowledge flows across organizational boundaries, using pecuniary and non-pecuniary mechanisms in line with the organization's business model. Principle: Innovation can come from both inside and outside the firm, and knowledge can flow out as well as in.
Types of Open Innovation: Outside-in: Incorporates external ideas and technology into the company. Example: Microsoft acquiring GitHub. Inside-out: Commercializing internal ideas outside the company, e.g.,licensingIP.Example:Qualcomm'slicensingmodel.Coupled:Co-creationwithpartners,sharingexpertise,andresources.Example:BMW,Intel
Benefits of Open Innovation: Access to a larger base of ideas and talent. Reduces RandD risk and cost by leveraging external technology. Enables new business opportunities through collaboration. Shares risks and pools resources. Can be more cost-efficient than large internal RandD teams.
Risks of Open Innovation: Less control over external resources. Complexity in managing relationships, IP, and confidentiality. Higher coordination costs. Potential erosion of internal capabilities if relying too much on outsiders. Competitors may gain skills through your collaborations.
Balancing Open and Closed: Many companies use a hybrid approach: maintain some internal R and D while actively engaging with external sources. Example: P and G shifted from mostly closed innovation in 2002 to about 50/50 internal/external by 2007.
Open Innovation allows companies to access talent and ideas outside their organization. Encourages collaboration across industries and borders, speeding up problem-solving. Reduces costs and risk by leveraging external knowledge and infrastructure. Effective for urgent, high-impact challenges (e.g., healthcare during a pandemic). Topcoder (NASA, eBay for challenges); Kaggle (data science competitions, e.g., cervical cancer screening); Nokia Open Innovation Challenge
Distributed Innovation: Defined as a system where innovation originates from multiple sources, not just the product manufacturer. Sources include: Users, Rivals or competitors, Partners or collaborators
Modularity as an Enabler: Modularity is the degree to which a system (e.g., software or product) can be divided into independent, interchangeable modules. Pros: Allows components to be combined in many configurations. Encourages innovation at multiple levels: user, company, or industry. Simplifies collaboration between different contributors.
Ex: Firefox add-ons (user level); Software on company platforms (producer level); PC components from different firms (industry level). A standard interface is key: it allows modules from different sources to work together seamlessly.
Approaches to Distributed Innovation: **Product Platforms:** Core platform for others to build on (Apple iOS). **Web APIs:** Let outsiders use company services (Google Maps API). **Crowdsourcing / Crowd-funding** Ideas, solutions, or funding from many (Kickstarter, NASA). **Open Data:** Public datasets for innovation (Kaggle, government portals). **FOSS:** Free, modifiable software (Linux, Apache). **User Innovation:** Users create/adapt products (3D-printed mods). **Platform Ecosystems:** Partners build around a central platform (Google Play, Azure). **Accelerators / Programs:** Support startups via funding/mentorship (Y Combinator).
Product Platforms: Foundation of components around which a company builds related products ("product family engineering"). Allows companies to efficiently create a range of products with the same core functions for different customer types and price points.
Implementation Approaches: Make source code available: external innovators can modify software Core Java platform. Provide toolkits: developers build software based on documentation and tools SAP XML Toolkit. Plug-in/add-on support: customize software without source code access Google Chrome Extensions. Complete product platforms: write rich applications on the platform. Android, iPhone app ecosystems. Provide live data/functionality via APIs: external developers build services using company data Facebook API.
Benefits: External platform: Enables new businesses and business models. Internal platform: Faster development ¿ quicker to market, Lower cost through reuse, Higher adaptability, Innovation benefits multiple products
Web APIs: Interfaces for web-based services to interact, usually RESTful APIs. Enable modularity on the web. Used for: Maps, Payments, Messaging, Automation.
Rise of APIs: Faster, cheaper, smarter innovation. Rethinking the value chain: data aggregation and opening it to others can create value.
API Business: Models API as a product: direct monetization, competitive/unique value. API enhancing existing product: supports monetization of the main product. API promoting existing product often free, drives interest and traffic. Ex: Salesforce: 50 per revenue via APIs. Expedia: 90 per revenue via APIs.
Crowdsourcing: A participative online activity where individuals contribute work, money, knowledge, or experience voluntarily, benefiting both the organization and themselves.
Typical Process: Organization defines a task or challenge. Open call issued to a wide network. Crowd participates voluntarily. Contributions are collected, evaluated, and used by the organization.

Why People Participate: Earn money, develop skills or portfolio, Network and socialize, Challenge themselves

Types of Crowdsourcing: Intermediary platforms: Connect crowd with tasks (Top Coder, Amazon Mechanical Turk). RandD platforms: Solve technical challenges (InnoCentive, NineSigma). Marketing, Design and Idea platforms: Creative contributions (99designs, Threadless). Collective intelligence and Prediction: Data modelling and analytics (Kaggle). Peer production: Collaborative content creation (Linux, Wikipedia). Public crowdsourcing / Citizen science: Scientific or social contributions (Foldit, NASA Open Innovation).
Benefits for Organizations: Access to diverse ideas and skills beyond internal R and D. Accelerates innovation and problem-solving. Demonstrates open collaboration and transparency. Can create value that benefits both contributors and the company.

Crowdfunding: A type of crowdsourcing focused specifically on raising funds from a crowd. Common platforms include Kickstarter, GoFundMe, Indiegogo. Crowdfunding is essentially financial crowdsourcing.
EG: IBM InnovationJam – internal and external idea crowdsourcing. Foldit – gamified citizen science for protein folding research.

Open Data: Data freely available for anyone to use, modify, and share, usually with minimal restrictions. Static data: tables of static data Live data feeds: e.g., RSS feed or data service. Example: Scientific Data (nature.com). Open source and open data are important for: benchmarking, dissemination, replication, citations, reputation, state of the art, and building a community
Value in Open: Data Economic value: increased efficiency, new products and services, consumer surplus (cost savings, convenience, better products). Big data impact: replacing or supporting human decision-making. Business opportunities: new products and services. Governments play a central role
Self-Reinforcing Cycle: Benefits increase as individuals perceive advantages, help improve accuracy/detail of info. Momentum if private industries/public agencies cultivate vibrant open-data ecosystem, implement policies protect stakeholders. Companies: Put technologies/talent to collect/analyze data. Individuals (consumers/citizens): Vigilant/savvy providers/users of open data.
Proprietary Software: Built by/for a specific person, organization, or group. Owner holds intellectual property rights. Owner controls how the software is used. Tomcat, Oracle Databases Free and Open-Source Software (FOSS): Source code is available. Can be modified and redistributed by others. Android, Chrome, Linux. Copyleft (changes shared): Linux kernel, MariaDB, Eucalyptus, Non-copyleft (changes not required to be shared): Apache web server, OpenCV, Chromium
Free Software (FSF): Free: freedom, not price. Four Essential Freedoms: Run the program for any purpose (freedom 0), Study/change the program (freedom 1), Redistribute copies (freedom 2), Distribute modified versions (freedom 3). Access to source code is required for freedoms 1 and 3.
Copyleft: Licensing method to ensure software and derivatives remain free, Example: GNU Public License (GPL), Encourages unrestricted sharing, modification, and use.
Open-Source Software (OSS): Focuses on pragmatic access to source code rather than user rights. OSS license requirements: Free redistribution, Source code accessible, allow modifications/derived works,Protect author's code integrity, No discrimination against people, groups, fields of endeavour, products, other software, Technology-neutral
Difference Between Free Software and OSS: Free software: social movement, focused on user freedoms (Stallman), Open source: development methodology, pragmatic, business friendly. Terms often combined as FOSS or FLOSS.
Open-Source Hosting: Provides version control, issue tracking, code reviews Examples: GitHub (¿420M repositories), SourceForge (¿500k projects). New Business Models for FOSS: "Pay what you want" models allow software to remain free while generating revenue, Example: Elementary OS
Importance of Foss: Faster and cheaper development use existing open-source code. Lower testing and maintenance community-tested and maintained. Better compatibility works well with other software. Focus on innovation spend effort on unique features.
Open-Source Business Models: Companies make money by offering paid support, selling enterprise-ready editions, using dual licensing, or releasing open source to gain strategic advantages (like growing an ecosystem or attracting developers).
Company Examples: Big tech firms use open source to speed up innovation, attract talent, and benefit from community contributions. Facebook, Google, Apple, and Microsoft all open-source major technologies to strengthen their platforms and encourage wider adoption.
Open-Source Lab Model: University labs partner with industry sponsors to build major open-source projects (like Spark and Mesos). Companies gain early access and influence, while universities get funding, real-world feedback, and opportunities to support startup spin-offs.
Challenges of Using FOSS: Organizations need to follow complex license rules, avoid accidentally mixing restrictive licenses (like GPL) into proprietary code, check the quality of external contributions, and watch out for known security issues in open-source components.
How to Address These Challenges: Companies put open-source policies and governance in place, though many still lack them. They also use specialized tools to track licenses, scan code, and manage risks. Examples include Black Duck, Openhub, which help with compliance, code analysis, and vulnerability checkin.
Geographic Information Systems (GIS): GIS is a system that collects, stores, analyses, and visualises data linked to location. It was once focused on land records, agriculture, natural resources, and city planning, but its use has expanded widely.
Why it is important now: Modern technologies such as machine learning, IoT devices, mobile apps, and social media generate huge amounts of location-based data. This creates opportunities for real-time mapping, tracking, and better decision-making
OpenStreetMap (OSM): OSM is a free, editable map of the world created by volunteers. It relies on crowdsourcing, open data, user contributions, and open-source ideas. Anyone can add information using GPS traces, field surveys, aerial images, or public datasets.
OpenStreetMap Foundation: This is an independent non-profit that supports and promotes OSM without controlling how the map is built. Its mission is to grow and provide free geospatial data for anyone to use.
Why OSM drives innovation: Because the data is open, developers can easily build mapping tools, companies can create products without paying licensing fees, and public sector groups can offer services at low cost. Because it is crowd-sourced, millions of contributors keep it updated, correct mistakes quickly, and add very detailed local information.
Tools and innovations built on OSM: A fast routing engine that uses OSM data. It supports navigation apps, traffic analysis tools, and routing for logistics. **KartaView:** A street-level photo platform where users upload images to improve mapping quality. It works similarly to services like Street View. **OpenPilot (comma.ai):**An open-source driver assistance system that combines map data and sensors to support lane detection and driving assistance. It shows how open map data and open-source software can power advanced transport technologies.
Why Open Source Maps Matter: Cheaper than commercial map APIs. Fully transparent developers can inspect and improve data. Encourages innovation by reducing barriers to entry. Helps humanitarian work, NGOs, and small businesses.
FOSS Licensing: Licences decide what you can do when using open-source GIS or mapping software. They define your duties for redistribution, modification, attribution, and whether you must release your own code.
Licence types: Permissive (MIT, BSD, Apache): Easy to use, few conditions, and no need to publish your changes. Good for commercial use. **Copyleft (GPL, AGPL):** If you modify and distribute the software, you must release your source. Keeps all improvements open. MIT / BSD: Minimal restrictions, keep the copyright notice, no warranty. Encourages wide adoption. GPL: Requires releasing modified source when distributed. Protects openness. Public Domain: Free for anyone to use, but uncommon in modern software.
Managing FOSS in Companies; When using open-source mapping or GIS tools, companies must follow licence rules, avoid incompatible licences, and prevent GPL code from contaminating proprietary software.
Tools: Black Duck, FOSSology, Palamida, OpenHub. **Help with:** Identifying open-source code in products, checking licence compliance, Detecting security vulnerabilities.
User Innovation: When end-users or consumers modify or create products to better meet their own needs, rather than waiting for suppliers to innovate. Importance of User Innovation: Drives new product ideas that suppliers might not think of. It can lead to commercially successful products and even new companies. Encourages faster, targeted innovation in fields like IT, science, and sports. Ex: A gamer creates a mod for a video game, which the developer later integrates into the official game.
Lead Users: Users who face needs before the market and often create their own solutions. Key Traits: Anticipate future needs, gain high benefit from solutions, Invest resources, Knowledgeable and dissatisfied with current products
Effectiveness: Involving lead users can produce breakthrough innovations because typical users may be limited by conventional thinking. **Limitations:** May not predict demand for radical products. Focusing only on users can lead to incremental, less competitive innovations
User Innovation in IT – Case Studies: **World Wide Web:** Created by a scientist to help researchers communicate; became globally significant. **Firefox Add-ons:** Developers build plug-ins for personal use, later shared widely. **Apache Web Server:** Users modified early "httpd" server; collaboration led to Apache becoming the top web server by 1996. **MySQL:** Created to overcome limitations of mSQL; acquired by Sun Microsystems for USD 1B. **Yammer (Geni):** Internal tool at Geni; spun off after internal success; acquired by Microsoft for usd 1.2B. **Slack:** Evolved from failed games into a team communication tool; IPO valued over usd 20B. **Lego Ideas**: Users propose and vote on new sets; crowd-driven innovation in physical products.

Maker Movement: A DIY, collaborative culture that promotes creativity, experimentation, and open innovation. Supports hardware, prototyping, electronics, 3D printing, and Raspberry Pi projects through makerspaces and community sharing. Drives user-led innovation in physical products by combining technology, creativity, and collaboration.
Platform Business: Brings together producers and consumers for high-value exchanges. Key assets: information and interactions these generate value and competitive advantage.
Roles in a Platform Ecosystem: Producers: Create offerings for the platform. Consumers: Buy or use platform offerings. Platform Providers: Supply interfaces to access the platform. Platform Owners: Own intellectual property and control participation
Pipeline: Adds value to resources and releases products, e.g., traditional manufacturers. Platform: Creates value by enabling interactions between producers and consumers, e.g., Amazon, Apple
Moving from Pipeline to Platform Focus: Resource control -> Resource automation Platforms leverage networks rather than owning all resources. Internal optimisation ->External interaction Facilitate interactions among network participants. Customer value -> Ecosystem value Focus on total value generated across the platform network.
Measuring Platform Success: Interaction failure: Breakdown between producer and consumer interactions. Engagement: Participation level driving network effects. Match quality: Quality of interactions (supply meets demand efficiently). Negative network effects: Over-supply, over-demand, or misuse can harm the platform.
Platform Types and Ex: Modular tech / architecture: Intel x86, Apple iPhone apps. Marketplace / exchange: eBay, Etsy, Airbnb, Kaggle. Social / network: Facebook, Twitter. Open-source / collaboration: Linux, Apache
Platform Principles: Platforms enable efficient interactions by providing standards, infrastructure, and governance rules. They focus on ecosystem value, amplified by network effects. Well-designed platforms drive industry transformation, new revenue streams, and communities. They support distributed innovation through crowdsourcing, APIs, open data, open-source software, and user-led contributions.
Unicorn: Privately held startup valued at USD 1 billion or more. **Decacorn:** Startup valued at USD 10 billion or more. **Undercorn:** Unicorn that goes public or is acquired for less than its last private valuation.
Growth of Unicorns: Rapid increase in unicorn creation, Compelling, easy-to-adopt products, Winner-takes-all markets (dominant design), Competitive late-stage capital, Vibrant public markets new technologies and disruptions
E-Commerce (36per): Consumers pay online; examples – Uber, Airbnb. Audience (27per): Free for users, monetized via ads/leads; example – Snapchat. Enterprise Software (20per): Paid by businesses for large-scale software; examples – Cloudera, MagicLeap. SaaS (12per): Cloud-based subscription/freemium; examples – Slack, MongoDB. Consumer Electronics / IoT (6per): Consumers pay for hardware; example – Xiaomi
Startup: A temporary organization designed to search for a scalable, repeatable, and profitable business model under conditions of extreme uncertainty. Customer Development: Get out of the building, test assumptions, pivot based on feedback. Business Model Canvas: Sketch hypotheses for value proposition, customers, revenue, and operations. Agile Development: Rapid, responsive product iteration to adapt quickly to market needs.

Established Company: Market: Known, Customers: Known, Product: Known, Product development: Smooth, proven methods, Future product features: Learn from customers, Business model: Executes existing model, Structure: Stable
Startup: Market: Mostly unknown (hypothesis), Customers: Mostly unknown, Product: Minimum feature set, Product development: Pivots and rapid iterations, Future product features: Test hypotheses, Business model: Searches for best model, Structure: Fluid
Problems with Traditional New Product Introduction (NPI) Model: 9 Deadly Sins (why it fails for startups): Assuming you know what the customer wants, Assuming you know what features to build, Focus on launch date instead of learning, Execution-focused over hypothesis-testing and iteration, Rigid business plans assume no trial and error, Job titles confuse roles needed in a startup, Sales/marketing just execute a plan, Presumption of success → premature scaling, Management by crisis ->death spiral
Customer Development Process: Designed for startups where customers, features, market, and competition are unknown. Steps: Capture vision → turn into business model hypotheses, develop plan to test hypotheses with customers, Test hypotheses → check if the business model is repeatable and scalable, Build end-user demand, build sales channels, Scale business → transition to a normal company, Goal: Achieve Product-Market Fit – when a product satisfies strong market demand
Customer Development Manifesto: Rule 1: There are no facts inside your building → get outside. Rule 2: Pair customer development with Agile development. Rule 3: Embrace failure as part of the search. Rule 4: Continuous iteration and pivots. Rule 5: No business plan survives first customer contact → use Business Model Canvas. Rule 6: Design experiments to validate hypotheses. Rule 7: Agree on market type → it changes strategy. Rule 8: Startup metrics differ from established companies. Rule 9: Fast decisions, cycle time, and speed matter. Rule 10: Passion is key. Rule 11: Startup roles differ from corporate job titles. Rule 12: Preserve cash until needed. Rule 13: Communicate and share learning. Rule 14: Success begins with team buy-in
Agile: A flexible project management approach designed to handle uncertainty by delivering value iteratively, incorporating customer feedback, and adapting to change.
Principles: Iterative and incremental development, Fast feedback loops, Continuous improvement, focus on quality, Adaptability to changing requirements
Key Concepts: User Stories: Small, testable units capturing customer needs, Daily Standups: Quick team updates on progress and blockers, Incremental Builds: Deliver small, usable versions frequently. Small Teams: Mostly full-time, cross-functional groups
Common Agile Methodologies: Lean: Eliminates waste, prioritizes valuable features, Uses small batches, rapid feedback, and "pull" work via customer demand, Emphasizes team efficiency and automated testing. **Scrum:** Framework for iterative product development, Empirical approach: hypothesize → try → reflect → adjust. **Kanban:** Focus on continuous delivery, Visualizes workflow, limits work in progress, improves team efficiency
The Lean Startup: Combines Customer Development with Agile. Focuses on fast learning, coding, and measuring. Views startups as institutions under extreme uncertainty, not just small big companies. Key Principles: Entrepreneurs are everywhere: You don't need a garage to start. Entrepreneurship is management: Startups need new management approaches. Validated learning: Learn how to build a sustainable business through experiments. Innovation accounting: Track progress, set milestones, prioritize work. Build-Measure-Learn: Turn ideas into products, measure feedback, then pivot or persevere.
Minimum Viable Product (MVP): Definition: The simplest version of a product that lets you collect the maximum validated learning with minimum effort. Purpose: Test hypotheses, learn quickly, avoid building unnecessary features. Process: Build essential features → release → measure feedback → iterate.
Product-Market Fit: Being in a good market with a product that satisfies that market. Signs of poor fit: Slow growth, weak word-of-mouth, long sales cycles, indifferent press/reviews.
Lean Startup methodology (PMF): Identify Target Customer: Pick a specific user segment. Underserved Needs: Find problems current solutions miss. Value Proposition: Show how your product solves the problem better. MVP Features: Keep only essential features to test value. MVP Prototype: Build a simple, testable version. Test: Get user feedback → pivot or persevere.
Customer Discovery: Form Hypotheses: State problem and solution hypothesis, Draft business model canvas. Test the Problem: Get out of the building → interview potential customers, Build wire-frames/prototypes, Validate understanding of customer needs. Test the Solution: Build low-fidelity MVP/prototype, Verify solution matches customer needs, Confirm alignment between Value Proposition and Customer Segment → Product-Market Fit. Verify or Pivot: Are people convinced the problem is high-value?, Do you understand the business model enough to test sales?, Is the opportunity big enough for a business?

Value Proposition Canvas (VPC): Part of the Business Model Canvas; helps design and test strong value propositions by understanding customers deeply and iteratively refining solutions. Goal: Achieve Fit between customer needs and what your product offers.
Customer Profile: Jobs: Functional, social, emotional tasks/goals. Pains: Obstacles, risks, undesired outcomes. Gains: Required, expected, desired, unexpected benefits Value Map: Shows how your product creates value.: Product Offering: The product/service. Pain Relievers: Reduce key pains. Gain Creators: Deliver important benefits Fit: Achieved when the product excites customers by addressing jobs, relieving pains, and creating gains.
Value Proposition Pyramid: Functional Value: Practical benefits: Saves time, simplifies, makes money, reduces risk, organizes, integrates, connects, reduces effort, avoids hassles, reduces cost, quality, variety, sensory appeal, informs. Emotional Value: How it makes customers feel: Reduces anxiety, rewards loyalty, nostalgia, design/aesthetics, badge value, wellness, therapeutic, fun, attractiveness, provides access. Life-Changing Value: Helps customers grow or improve life: Provides hope, self-actualization, motivation, heirloom, affiliation/belonging. Social Impact Value: Contributes to society: Self-transcendence (e.g., Tesla EVs)

Business Model Canvas (BMC): Framework to describe, design, challenge, and pivot a business model. Use in startups: Track known results and hypotheses to test.
Block 1 Customer Segments (CS): Defines groups of people or organizations the business aims to serve. Customers are the heart of the model; profitable customers are essential.
Types of Customer Segments: Mass Market: Broad group with similar needs; e.g., consumer electronics, cars. Niche Market: Specialized segment with specific needs; e.g., Qualcomm for smartphone makers. Segmented: Slightly different needs within segments; e.g., Apple's MacBook line. Diversified: Serve multiple unrelated customer segments; e.g., Amazon (retail + cloud services). Multi-Sided Platforms: Interdependent customer groups; e.g., AI platforms connecting companies and annotators
Block 2 Value Propositions: Defines the bundle of products/services creating value for a Customer Segment. Solves customer problems or satisfies needs. Composed of: Product and Services: what is offered. Gain Creators – how the product creates customer gains. Pain Relievers: how the product alleviates customer pains. Fit: Achieved when value map aligns with customer profile (jobs, pains, gains).
Block 3 Channels: Describes how the company communicates with and reaches Customer Segments to deliver value. Channels are customer touchpoints impacting experience. Functions: Raise awareness, help evaluate offerings, enable purchase, deliver products/services, provide post-purchase support. Types: Online (web, email, chat, ads, payments), offline. Channel Phases: Awareness → Evaluation → Purchase → Delivery → After Sales.
Block 4 Customer Relationships: Describes the type of relationship with each Customer Segment. Motivations: Acquisition, retention, upselling/cross-selling. **Types:** Personal Assistance:Direct human support (e.g., call centres). Dedicated Personal Assistance :Assigned rep for key clients (e.g., private banking). Self-Service: Customers help themselves (e.g., online FAQs). Automated Services: Personalized self-service (e.g., Netflix recommendations). Communities:Customers interact and share knowledge (e.g., online forums). Co-Creation: Customers help create value (e.g., Amazon reviews, YouTube content).
Block 5 Revenue Streams: Represents how the company earns money from Customer Segments. Key questions: How much value can be captured? Which methods to capture it? **Types:** Asset Sale: Selling ownership of a product (e.g., Amazon selling electronics).Usage Fee: Pay per use (e.g., Lime scooter rides). Subscription Fee: Recurring payment for continuous access. (e.g., Spotify Premium).Lending/Renting/Leasing:Temporary use of an asset for a fee.(e.g., Zipcar rentals).Licensing: Charging for use of IP (e.g., software licenses).Transaction/Brokerage Fees: Fee for facilitating transactions (e.g., eBay). Advertising: Revenue from displaying ads (e.g., Google Ads).
Block 6 Key Activities: The most important actions a company must take to make its business model work. Examples: Microsoft → software development , Dell → supply chain management
Block 7 Key Resources: Key assets required to create value, reach customers, and earn revenue. **Types:** Technology: Software or platforms that power the product (e.g., Microsoft Azure). Data: Information that drives insights or AI (e.g., self-driving car datasets). Human: Skilled people executing strategy (e.g., scientists, sales teams). Intellectual: Legal protections like patents or copyrights (e.g., Huawei 5G patents). Physical: Tangible assets like factories or logistics (e.g., Amazon fulfillment centers). Financial: Money and funding to operate and grow
Block 8 Key Partnerships: Network of suppliers and partners that help the business model function. **Types** and Examples: Strategic alliances (non-competitors) → Apple and IBM for enterprise apps, Cooperation (competitors) → airlines sharing flights, Joint ventures → Sony and Ericsson mobile phones, Buyer-supplier relationships → automotive supply chains
Block 9 Cost Structure: All costs incurred to operate the business model. **Types:** Fixed Costs → salaries, rent, factory maintenance. Variable Costs → SaaS server usage fees, raw materials
Capital Raising for IT Innovation: Startups secure funding through rounds (Series A–D) to finance RandD, product development, marketing, and operations. Notable examples: Scale AI USD 100M, SpaceX USD 750M, Microsoft USD 10B in OpenAI.
Funding Example: Uses: RandD, engineering, marketing, customer service, licensing. Sources: Investor funding, grants, tax incentives, loans. Key Insights: Early-stage startups often face the "Valley of Death" (initial losses before revenue growth). Failures can occur despite large funding (e.g., Argo AI, DAQRI); long-term investment can pay off (e.g.,Amazon). Financial capital is a critical resource for innovation and scaling in IT startups.

Venture Capital and Funding Rounds: Funding Rounds: Startups progress from Seed → Series A, B, C. . . → IPO.Examples: Canva: USD572.6M over 14 rounds (Seed 2013 → Series D 2021).Tokopedia: USD 2.6B over 9 rounds (Seed 2009 → Series G 2018). Capital Raising Process: Startups pitch to investors to secure funds.
Pitch **structure (Melbourne Accelerator Program):** Problem and solution, Market size and opportunity, Traction/progress, Competition and differentiation, Business model and growth plan, Founding team,Future roadmap
Key Players in Venture Capital: Angel Investors: Early-stage, high-risk capital. Venture Capital: Larger investments for scaling startups (e.g., a16z, GV, AirTree). Strategic Investors: Corporates investing forsynergy or strategic advantage.
Alternative Pathways: Incubators and Accelerators: Provide mentoring, resources, and early funding. Examples: Techstars, Melbourne Accelerator Program, Y Combinator, Startmate, MVP Ventures Program (NSW Government).
Taylorism (Scientific Management): Focused on efficiency: break work into tasks, measure performance, reward accordingly. Works for repetitive, predictable tasks (e.g., factory production). Not suitable for creative or innovative work, like startups or tech RandD.
Creating a Culture for New Ideas: Liquid Networks: Diversity of expertise encourages idea exchange and breakthroughs. Slow Hunch: Ideas develop gradually over time; need patience. Connecting vs Protecting: Sharing ideas leads to better outcomes; isolation can cause stagnation. Non-market and networked approaches foster more innovation than purely market-driven ones. Supports experimentation, risk-taking, and development of new capabilities.
Company Structure and Innovation Size and Agility: Large companies face bureaucracy, slower RandD; small firms are more agile. Large firms can "feel small" by creating autonomous units (e.g., Skunk Works). Ambidexterity: balance exploring new opportunities and exploiting existing ones (e.g., WhatsApp, GitHub, OpenAI).
Structural Dimensions Affecting Innovation: Formalisation: Rules guiding employee behaviour. Standardisation: Uniformity of processes. Centralisation: Decision-making authority concentrated at top Mechanistic vs Organic Structures: Mechanistic: High formalisation/standardisation; efficient but limits creativity. Organic: Low formalisation/standardisation; encourages experimentation, less consistent.
Ambidextrous approach: Use organic for RandD/innovation, mechanistic for production/mature operations
Innovation Culture and Structure: Microsoft: Hackathons, collaboration, focus on big bets (cloud, AI), leverage partners.Lockheed Martin :Skunk Works: Small empowered teams, flexibility, experimentation, performance-based rewards.Apple: Autonomous teams, user-focused design, open to external ideas, innovation slows in new categories.Google: Small-company culture, 20per time, moonshot projects, embrace risk and learning
Judging IT Innovations: Evaluate the value and potential impact of new IT products, services, or ideas. Helps innovators understand how their ideas are perceived and improves assessment of their own projects.Judging is partly subjective but guided by clear criteria for fairness. Criteria vary depending on competition, product category, or target users.
Typical Judging Criteria: Technology/Engineering:Technical quality and execution.Design:Aesthetic, usability, and user experience.Innovation: Novelty, uniqueness, or improvement over existing solutions.Feasibility:Viability,scalability,andbusinessmodel.Impact/MarketPotential:Valuetousers,potentialreach,andcompetitiveness.
Judging Panel: Should include industry experts, business executives, and academics. Diverse expertise ensures balanced evaluation; training ensures consistency. EX: Microsoft Imagine Cup: Global student tech competition; prizes, mentoring, and world finals. Harvard i3 (Invent-Imagine-Impact): Year-long program; judged on team, plan, and measurable impact.
Innovation System / Ecosystem: An innovation system is an open network of organizations that interact under a set of rules (framework conditions) to produce and diffuse innovations with economic, social, or environmental value. Innovation cannot happen in isolation; it thrives in a networked ecosystem with collaboration, funding, and knowledge sharing.
Universities → Entrepreneurs → Capital → Knowledge sharing → Innovation outputs
Key Factors for Success: Strong, research-driven universities:Endowments fund RandD and risk-taking projects.Globally experienced repeat entrepreneurs:Serial founders sharing experience.Sophisticated risk capital:Venture funding for early-stage, high-risk startups.Social capital:Networks, mentorship, and collaboration.Knowledge sharing:Forums, meetups, accelerators (e.g., Y Combinator).Tolerance for risk-taking:Entrepreneurs, investors, employees, and partners take calculated risks.Creative destruction:New ventures replace outdated businesses.Constructive failure:Learning from failed experiments accelerates progress. Positive aggregate returns:Big successes compensate for many failures (e.g., eBay, Facebook).Supportive government policy:Tax incentives, flexible labor laws, RandD funding, favorable treatment of stock options.
Lessons from Innovation Ecosystems: Silicon Valley and Bay Area: Ecosystem-;Talent: Networks of universities, startups, investors, mentors, government drive success. Access to capital, angel investors, seed funds. Skilled workforce: Stanford, UC Berkeley, global talent. Culture of innovation: Risk-taking, disruptive thinking, new industries. Knowledge sharing: Mentorship, supportive networks. Tolerance for failure: Failures seen as learning opportunities
Key Principles Across Ecosystems: Support innovation, knowledge sharing, and risk-taking Collaboration among government, universities, investors, and industry. Accessible support structures (accelerators, incubators, funding). Learn from global leaders to guide local policies. e.g., UAE (human, financial, tech capital) and China (Beijing/Shanghai – large market, govt support, skilled workforce). Sydney's hubs (Fishburners, Stone and Chalk), government RandD incentives, CSIRO/Data61, and corporate support (Microsoft Pegasus).

Question 3.5: Provide two examples for the following:

- What are the Customer Pains? (**3 Marks**)
- What are the Customer Gains? (**3 Marks**)
- What are the Customer Jobs? (**4 Marks**)

Customer Pains

- **Limited independence**: People with visual impairment may rely heavily on others for mobility and daily tasks.
- **Technology barriers**: Existing assistive devices may be bulky, expensive, or hard to use.
- **Social isolation**: Difficulty accessing visual information can reduce participation in social or professional activities.

Customer Gains

- **Improved autonomy**: Ability to navigate and interact with the environment independently.
- **Enhanced perception**: Access to visual data (e.g., infrared) could offer new capabilities beyond natural sight.
- **Confidence boost**: Feeling more capable and included in everyday life.

Customer Jobs

- **Navigating spaces**: Moving safely through homes, streets, or public areas.
- **Accessing information**: Reading signs, screens, or printed materials.
- **Interacting socially**: Recognising people, participating in conversations, or attending events.

Question 3.4: A traditional model (such as the waterfall model) may not be a good choice for delivering an MVP. Justify your answer for selecting the Lean development methodology. (**10 Marks**)

Why the Waterfall Model is Not Suitable for MVP Development:

- **Linear and Rigid Process**: The waterfall model follows a strict sequence which makes it difficult to adapt to new insights or customer feedback during development.
- **Late Customer Feedback**: Customer validation only occurs after full development, which risks building a product that doesn't meet real user needs.
- **High Risk of Waste**: If assumptions are wrong, the entire product may need to be reworked, leading to wasted time and resources.
- **Not Designed for Uncertainty**: Waterfall assumes clear requirements upfront, which is unrealistic for innovative products like Neuralink's Blindsight, where both technology and user needs are evolving.

Why Lean Development is Better:

- **Build-Measure-Learn loop**: Encourages fast prototyping, testing, and learning from users.
- **Customer involvement**: Engages users early to ensure the product solves real problems.
- **Validated learning**: Tests assumptions before scaling, reducing risk.
- **Flexible and adaptive**: Supports quick pivots based on feedback.
- **Resource-efficient**: Focuses only on essential features, avoiding waste.

Application to Blindsight:

Neuralink can launch a basic MVP to restore grayscale vision, gather feedback from people with visual impairment, and iterate based on their experience. If advanced features like infrared cause confusion, Lean allows the team to pivot quickly and improve usability.

Question 3.3: Imagine that the company undergoes two iterations during the Customer Search. What are the important factors that you would like to consider during the following:

1. Customer Development (**2 Marks**)
2. Customer Validation (**3 Marks**)
3. How may the pivot look in the first iteration, and how would you address the concerns identified in the first iteration? Note that you must assume any concerns that may result in a bad customer experience. (**5 Marks**)

During Customer Development, the company should:

- **Form hypotheses** about the customer problem and solution.
- **Get out of the building** to engage with real users - people with visual impairment and medical professionals to understand their needs.
- **Test the problem** by using prototypes or wireframes to validate whether the proposed solution (Blindsight) addresses a real and valuable issue.
- **Ensure alignment** between the proposed value proposition and the actual customer segment (e.g., people with visual impairment, clinicians, caregivers).

In Customer Validation, the company should:

- **Build a high-fidelity MVP** (e.g., a working prototype of the neural implant or simulation).
- **Test sell** to early adopters-patients willing to try experimental treatments and clinicians open to new technologies.
- **Develop positioning** based on feedback: how should Neuralink describe Blindsight to different stakeholders (e.g., as a medical device, assistive tech, or cognitive enhancement tool)?.
- **Verify scalability**: Is the business model repeatable and scalable across different markets (e.g., hospitals, rehabilitation centers)?

Pivot:

Assumed Concern: Users report discomfort or confusion due to unnatural image rendering (e.g., infrared or radar visuals are hard to interpret).

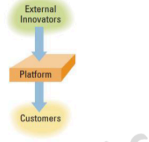
Pivot Strategy:

- **Refocus the MVP** to prioritise restoring basic grayscale vision before adding advanced features like infrared.
- **Simplify the interface**: Introduce adaptive visual filters that mimic natural sight more closely.
- **Improve onboarding**: Provide training modules or simulations to help users adapt to the new visual input.
- **Revalidate the problem**: Conduct deeper interviews to understand what "seeing" means to different users - some may value independence over enhanced perception.

Question 3.2: Assume that Neuralink plans to provide a Platform ecosystem for sustainable innovation in the future. Make a diagram to explain the Platform ecosystem for this innovation. Identify important key players. (**5 Marks**)

Neuralink would create an ecosystem where it would have better control over the mediation between the consumers and providers, similar to the diagram below. This way, they could control the intellectual property rights and earn revenue in the long term.

(any other model with proper justification would also be acceptable).



Key Players:

- Device Manufacturers: Produce implant hardware, surgical instruments, and supporting equipment.
- Software Developers: Build vision-processing algorithms, apps for image enhancement, and sensory augmentation.
- Healthcare Providers: Hospitals, surgeons, and rehabilitation centers that perform implantation and provide aftercare.
- Regulators: Agencies ensuring compliance with medical safety and ethical standards.
- Data Partners: AI companies offering neural mapping, image recognition, and predictive analytics.
- End Users: Individuals with visual impairments, advocacy groups, and caregivers influencing adoption and feedback loops.

Question 2.1: Explain the difference between an organisation's Mechanistic and Organic structures. What cultural changes can be made to the structure of an organisation with the mechanistic structure to embrace innovation? (**6 Marks**)

An organisation's **Mechanistic structure** is characterised by high formalisation, standardisation, and centralised decision-making, with rigid hierarchies and clearly defined roles. This structure is efficient for stability and routine tasks but limits creativity and flexibility. In contrast, an **Organic structure** has low formalisation, decentralised decision making, and flexible processes that encourage collaboration, adaptability, and innovation.

To make a mechanistic organisation embrace innovation, cultural changes can include **encouraging collaboration** through cross-functional teams, **reducing formalisation** to allow flexibility, and **promoting risk-taking** so failure is viewed as learning. Organisations can **allocate innovation time** (e.g., Google's "20% time"), **reward creativity** through incentives, and introduce **skunk works teams** - small, autonomous groups focused on disruptive projects. These changes foster an environment where new ideas can thrive even within a traditionally rigid structure.

Question 2.2: How can a startup create value during the Customer Development Process in the Value Proposition Canvas? Provide one real-world example from the past (any industry) or based on your assumption (for any industry adopting any technology) that will help create value in the value chain. (**6 Marks**)

A startup creates value by aligning its Value Map (products, pain relievers, gain creators) with the Customer Profile (jobs, pains, gains). During Customer Discovery, the startup identifies key customer problems and validates assumptions through interviews and prototypes. In Customer Validation, it tests whether the solution delivers real value and achieves product-market fit.

Example: A fintech startup developing a mobile payment app can create value by addressing customer pains (slow transactions, high fees) and offering gain creators (instant transfers, low cost). By iterating based on feedback, the startup ensures its value proposition resonates with the target segment, strengthening its position in the value chain.

Section 3 – Scenario-Based Questions (40 Marks)

"Blindsight is a proposed product from Neuralink that aims to restore vision to people who are blind and ultimately will be able to see in infrared and ultraviolet or radar wavelengths. The device would involve implanting a small, wireless device into the brain. This device would then stimulate the visual cortex, bypassing the eyes and directly sending signals to the brain that would be interpreted as images. While Neuralink has not yet released any specific details about the device or its capabilities, using brain implants to restore vision is a promising area of research. Blindsight could revolutionise the lives of millions of people with blindness. The potential breakthrough lies in developing blindsight technology through neural implants that bypass damaged visual pathways and directly interface with the brain's visual cortex. This innovation could revolutionise the treatment of blindness, but it requires a shift from the company's current focus and expertise in cognitive enhancement."

Answer the following:

Question 3.1: What type of innovation is it? Provide an explanation and at least two reasons for your answer. (**5 Marks**)

Blindsight is a **disruptive innovation creating a new market** because it introduces a technology that fundamentally changes how vision restoration is approached. Instead of relying on traditional optical aids or surgeries, it uses neural implants to bypass damaged visual pathways and directly stimulate the brain's visual cortex.

- Reason 1 - Disruption: It challenges existing solutions like braille devices, screen readers, and optical correction tools by offering a superior alternative that could make these technologies obsolete.
- Reason 2 - New Market Creation: It opens an entirely new market for advanced neurotechnology in healthcare, not just for restoring vision but potentially for enhancing human sensory capabilities (infrared, ultraviolet vision). This creates opportunities for new ecosystems involving AI, medical devices, and rehabilitation services.

Question 2.5: It is evident that the majority of startups fail in their early stages. What are the three major factors that cause startup failures? (**7 Marks**)

1. **Lack of Product-Market Fit** - Many startups launch products without validating real customer needs. This leads to poor adoption because the solution does not solve a significant problem or deliver enough value. For example, startups often overestimate demand for niche features without testing assumptions.
2. **Insufficient Capital** - Startups typically operate with high burn rates during development and customer acquisition. Without adequate funding or revenue streams, they run out of cash before achieving scale. This is common in hardware or deep-tech startups with long R&D cycles.
3. **Weak Business Model** - Even with a good product, startups fail if they lack a clear revenue model or cost structure. Mispricing, unclear monetization strategies, or over-reliance on future funding make operations unsustainable. For instance, many early sharing-economy startups collapsed due to unclear paths to profitability.

Other contributing factors include poor team dynamics, inability to pivot when assumptions fail, and intense competitive pressure. However, the above three are the most critical because they directly impact survival and growth.

Question 2.4: Explain the relationship between the Dominant Design and Technology Hype Cycle. (**6 Marks**)

The Technology Hype Cycle describes how new technologies evolve through five stages: Innovation Trigger, Peak of Inflated Expectations, Trough of Disillusionment, Slope of Enlightenment, and Plateau of Productivity. In the early stages, multiple competing designs emerge as companies experiment and respond to hype. These designs often reflect different visions of how the technology should be used.

As the hype fades and the market begins to understand the technology's real potential, a dominant design tends to emerge- usually during the Slope of Enlightenment or Plateau of Productivity. This design becomes the standard, offering a balance of usability, performance, and compatibility.

The emergence of a dominant design reduces uncertainty for both producers and consumers. It enables economies of scale, simplifies development, and encourages ecosystem growth. For example, in the smartphone industry, the dominant design of touchscreens and app ecosystems became standard after initial experimentation with various formats. This helped stabilize the market and drive widespread adoption.

Question 1.3: Imagine a startup (any industry adopting any technology) in the "Innovators" phase of the Technology Adoption Lifecycle Model and assuming the dominant design already exists, what factors should this startup consider when choosing the dominant design? (**5 Marks**)

When choosing a dominant design, a startup should consider:

1. Customer Acceptance - Does the design align with mainstream customer expectations and reduce adoption risk?
2. Compatibility - Works with existing infrastructure, standards, and complementary products.
3. Cost & Scalability - Affordable to produce and scale for mass market.
4. Performance & Reliability - Meets minimum performance benchmarks set by the dominant design.
5. Network Effects - Ability to leverage ecosystem partners and increase value as adoption grows.

(2 or 3 points with a brief description would suffice if related to the given scenario)

Question 1.4: What are the contributing factors for the startups to become coopetition instead of disrupting an existing market with new innovations? (**5 Marks**)
Startups may choose coopetition (collaborating with competitors) instead of pure disruption due to:

- High entry barriers - Costly infrastructure or regulatory requirements make partnerships attractive.
- Shared resources - Access to distribution channels, technology, or customer base of incumbents.
- Network effects - Collaboration accelerates adoption and ecosystem growth.
- Risk reduction - Reduces uncertainty and financial risk compared to full market disruption.
- Complementary strengths - Combining innovation from startups with scale and credibility of incumbents.

(2 or 3 points with a brief description would suffice if related to the given scenario)

Question 2.3: How can the Lead Users help sustainable innovation? What factors make normal users not so effective in IT innovation? Provide five reasons. (**10 Marks**)

Lead Users are early adopters who experience needs ahead of the market and often innovate solutions themselves. They help sustainable innovation by providing insights into future market needs, co-creating products, and accelerating adoption. Their feedback reduces uncertainty and improves design for scalability.

Why normal users are less effective:

1. **Lack of vision for future needs** - Normal users focus on solving immediate problems and rarely anticipate emerging trends, making their input less useful for long-term innovation.
2. **Limited technical expertise** - They often lack the knowledge to suggest advanced or disruptive solutions, resulting in feedback that is incremental rather than transformative.
3. **Lower risk appetite** - Normal users prefer proven solutions and avoid experimenting with untested technologies, slowing down radical innovation.
4. **Incremental feedback only** - Their suggestions typically involve minor improvements to existing products rather than proposing breakthrough ideas that redefine markets.
5. **Influenced by existing dominant designs** - Normal users are accustomed to current standards and interfaces, which biases them toward familiar solutions and discourages creative thinking.

Question 1.5: Imagine a startup that develops enterprise software for the finance industry. Explain how can open-source software contribute to the dominant design. (**5 Marks**)

- **Standardization** - Using widely adopted open-source frameworks (e.g., Linux, PostgreSQL) ensures compliance with industry norms, making integration with banks and financial institutions easier.
- **Interoperability** - Open-source APIs and libraries allow seamless connectivity with existing financial systems (e.g., payment gateways, regulatory reporting tools).
- **Community-driven innovation** - Global developer communities continuously improve security and performance, which is critical for finance applications.
- **Lower cost** – Reduces licensing fees, enabling the startup to allocate resources to compliance and scalability, which is key for enterprise adoption.
- **Trust and transparency** - Open-source code can be audited for regulatory compliance, building trust with financial institutions and regulators.

Question 1.1: What is the Product-Market Fit? How can the value proposition model help achieve a good Product-Market Fit? (**5 Marks**)

Product-Market Fit (PMF) is the degree to which a product satisfies a strong market demand. It means being in a good market with a product that can meet the needs of that market. Achieving PMF is critical before scaling because it ensures customers find real value in the product.

The Value Proposition Canvas helps achieve PMF by:

- Customer Profile: Identifying customer jobs, pains, and gains.
- Value Map: Designing products/services with pain relievers and gain creators.
- Fit: Aligning the value map with the customer profile so the product solves important problems and delivers desired benefits.

When the value proposition addresses key jobs, alleviates major pains, and creates meaningful gains, the product is more likely to achieve strong PMF.

Question 1.2: Explain why "Crossing the Chasm" is difficult for startups. Can the dominant design help make it easy for startups to make this transition successfully? Provide an explanation with reasons. (**5 Marks**)
Crossing the Chasm is hard because:

- Early adopters embrace risk, but the early majority demands proven, reliable solutions.
- Startups lack credibility, resources, and established channels.

Dominant Design helps by:

- Providing a standard that reduces uncertainty.
- Signaling stability and compatibility, making mainstream adoption easier.
- Enabling economies of scale and network effects.

Reason: Aligning with dominant design builds trust and lowers perceived risk, easing the transition.