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QUESTIONS

1. Define technology and Technology management

2. Explain and discuss the role of technology in the overall business strategies of a firm. How does technology affect the business plan of a company? Give examples?

3. In your opinion what has been the role of technology at enterprise level in India? What are the factors that may affect the management decisions concerning technology.

4. How do you envisage the role of technology and Technology management in the new industrial environment in India

5. Differentiate between invention and innovation. Give one example for each. What are the dimensions of technology management? Explain?

6. What are the basic consideration for starting a new firm based on technological innovation? Explain what is the role of technology in the business plan of a new firm? Discuss

7. Do you agree that technology development in India have not been very encouraging while achievements in science have been remarkable? If so list the reasons. Suggest some ways to improve the situation.

ANSWER:

## **1. Define Technology and Technology Management**

**Technology:**

Technology refers to the application of scientific knowledge to create tools, machines, processes, and systems that solve problems and improve efficiency in various fields. It encompasses a wide range of areas, including information technology, manufacturing, biotechnology, and artificial intelligence.

**Technology Management:**

Technology Management is the process of planning, developing, and utilizing technological resources to achieve organizational goals. It involves:

* Identifying and acquiring new technologies
* Managing technological changes and innovation
* Aligning technology with business strategy
* Protecting intellectual property
* Ensuring the efficient use of technological resources

**Example:**  
A software company managing its technology investments, such as cloud computing and AI tools, to stay competitive in the market.

**2. Role of Technology in Business Strategies & Its Impact on Business Plans**

Technology plays a crucial role in shaping the strategies of modern businesses. It helps companies achieve efficiency, innovation, and competitive advantage.

**How Technology Influences Business Strategy:**

1. **Cost Reduction:** Automation and AI reduce operational costs.
2. **Improved Decision Making:** Data analytics provides insights for better business decisions.
3. **Enhanced Customer Experience:** Technology enables personalized services (e.g., chat bots, AI-driven recommendations).
4. **Market Expansion:** E-commerce platforms allow businesses to reach global customers.
5. **Product & Service Innovation:** Companies use technology to develop unique offerings.

**Impact on Business Plans:**

Technology influences a company's business model, operations, and financial planning.

* **Example 1: Amazon**
  + Uses big data and AI for personalized recommendations.
  + Cloud services (AWS) contribute to revenue diversification.
* **Example 2: Tesla**
  + Invests in battery technology to improve electric vehicle (EV) performance.
  + Uses automation in manufacturing for cost efficiency.

**3. Role of Technology at the Enterprise Level in India & Factors Affecting Technology Management Decisions**

**Technology's Role in Indian Enterprises:**

* **IT & Software Development:** India is a global leader in IT services (e.g., Infosys, TCS, Wipro).
* **E-Commerce Boom:** Flipkart and Reliance Jio have transformed retail and digital services.
* **Manufacturing & Automation:** Industry 4.0 is driving automation in factories.
* **Fintech Innovations:** UPI, digital payments, and blockchain are reshaping financial services.

**Factors Affecting Technology Management Decisions:**

1. **Cost of Implementation:** High initial investment can be a barrier.
2. **Availability of Skilled Talent:** The need for trained professionals in AI, robotics, and cybersecurity.
3. **Government Policies:** Initiatives like "Make in India" and tax incentives impact tech adoption.
4. **Market Demand:** Consumer preferences drive investment in emerging technologies.
5. **Competitive Pressure:** Companies must adopt new technologies to stay ahead.

**4. Future Role of Technology and Technology Management in India's Industrial Environment**

The industrial environment in India is evolving rapidly with advancements in:

**Emerging Trends in Technology:**

1. **Industry 4.0:** Adoption of IoT, AI, and cloud computing in manufacturing.
2. **Green Technology:** Sustainable solutions in energy, transport, and agriculture.
3. **Digital Transformation:** Businesses shifting to cloud, AI, and automation.
4. **Start-up Growth:** Increased investment in tech-driven start-ups in fintech, edtech, and health tech.

**Technology Management's Role in the Future:**

* Enhancing operational efficiency through automation.
* Enabling new business models (e.g., subscription-based services, AI-driven decision-making).
* Improving supply chain management with blockchain and IoT.

## **5. Difference Between Invention and Innovation & Dimensions of Technology Management**

### **Invention vs. Innovation:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | **Feature** | **Invention** | **Innovation** | | --- | --- | --- | | Definition | The creation of a new idea, product, or process. | The improvement and commercialization of an existing idea or product. | | Focus | Science and research. | Market application and business success. | | Example | The light bulb (Thomas Edison). | LED lighting, smart bulbs (Philips Hue). | |

**Dimensions of Technology Management:**

1. **Technology Strategy:** Aligning technology with business goals.
2. **Technology Forecasting:** Predicting future technological trends.
3. **Technology Acquisition:** Procuring new technologies through R&D or partnerships.
4. **Technology Transfer:** Moving technologies from research to practical application.
5. **Technology Protection:** Managing patents, copyrights, and trade secrets.

**6. Considerations for Starting a Tech-Based Firm & Role of Technology in Business Plans**

**Key Considerations for a Tech Start-Up:**

1. **Market Demand:** Is there a need for the technology?
2. **Technical Feasibility:** Can it be developed with available resources?
3. **Funding & Investment:** Capital requirements for R&D, production, and marketing.
4. **Regulatory & Compliance Issues:** Government policies and industry regulations.
5. **Scalability:** Can the technology be expanded to larger markets?

**Role of Technology in a New Firm's Business Plan:**

* Defines the company's value proposition.
* Impacts cost structure (e.g., cloud computing reduces IT infrastructure costs).
* Determines the competitive advantage (e.g., AI-powered chatbots for customer service).

**Example:** A fintech start-up using AI for fraud detection in online transactions.

**7. Technology Development vs. Scientific Achievements in India & Suggestions for Improvement**

**Current Situation:**

India has excelled in scientific research (e.g., ISRO’s Mars Mission, vaccine development). However, translating scientific achievements into large-scale technology development has been slower.

**Reasons for Slow Technology Development:**

1. **Low R&D Investment:** India spends around 0.7% of its GDP on R&D, compared to 2.8% in the US.
2. **Weak Industry-Academia Collaboration:** Research often remains in universities without commercial applications.
3. **Dependence on Foreign Technology:** India imports advanced tech rather than developing it locally.
4. **Lack of Government Support for Start-ups:** While initiatives like "Start-up India" exist, challenges remain in funding and mentorship.

**Suggestions for Improvement:**

1. **Increase R&D Expenditure:** Government and private sector collaboration in research funding.
2. **Enhance Industry-Academia Linkages:** Establish technology incubators in universities.
3. **Promote Indigenous Technology Development:** Focus on "Atmanirbhar Bharat" (self-reliance).
4. **Strengthen Intellectual Property Protection:** Encourage patents and innovation.
5. **Encourage Start-up Ecosystem:** Provide better access to venture capital and mentorship.

**Conclusion**

Technology is a key driver of business success and industrial growth in India. While the country has made significant progress in IT and digital transformation, challenges remain in technological innovation and commercialization. By increasing R&D investment, fostering start-ups, and strengthening industry-academia collaborations, India can become a global leader in technology development.