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Viksit Bharat @2047: Science, Innovation and Entrepreneurship for Sustainable Economic Development

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ABSTRACT
Viksit Bharat @2047 represents India's aspiration to become a prosperous, inclusive and sustainable developed economy. Science and technology can support this goal when research is translated into useful products, competitive enterprises and accessible public services. This paper discusses how science, commerce and entrepreneurship can improve productivity, employment, market access and social welfare. It considers digital commerce, artificial intelligence, fintech, agriculture, healthcare and renewable energy, alongside challenges such as weak research–industry links, skill gaps, digital inequality, cybersecurity and financing constraints. Using a descriptive, conceptual approach based on secondary sources, it recommends stronger collaboration among educational institutions, industry, financial institutions and government. Scientific progress should be assessed by its contribution to jobs, competitiveness, inclusion and sustainability.

Keywords: Viksit Bharat @2047, Science and Technology, Commerce, Innovation, Entrepreneurship, Digital Economy, Financial Inclusion, Sustainable Development.

1. INTRODUCTION

Viksit Bharat @2047 requires more than higher national income. It also calls for productive employment, competitive businesses, quality education, accessible healthcare, efficient infrastructure and responsible use of natural resources. Science generates knowledge and evidence-based solutions; technology applies that knowledge through products and services. Commerce connects innovations with

users through finance, marketing, distribution, accounting and management.

For example, improved agricultural storage can reduce losses, but its impact depends on affordability, supply networks and finance. Digital payments can ease transactions for small businesses, while data analytics can improve inventory decisions. Research, entrepreneurship, finance and markets therefore need to work together. The Department of Science and Technology and the Anusandhan National Research Foundation support India's research and innovation ecosystem [1][2].

2. OBJECTIVES OF THE STUDY

To examine the connection between scientific innovation and economic development in India.
To explain how emerging technologies can improve productivity and competitiveness.
To consider digital commerce, fintech and entrepreneurship in economic inclusion.
To identify barriers to commercial application of scientific research.
To recommend ways to connect science, commerce and sustainable development.

3. RESEARCH METHODOLOGY

This paper uses a descriptive and conceptual method based on secondary information, including official policy documents and institutional publications related to science, technology, innovation and economic development. It considers possible effects on productivity, operating costs, market access, enterprise growth and social welfare. It does not claim to present original survey findings or independently collected statistical data.

4. SCIENCE AND TECHNOLOGY AS DRIVERS OF DEVELOPMENT

4.1 Innovation, Productivity and Research

Scientific advances can improve production methods, quality, resource use and operational efficiency. Automation, modern equipment and data-informed decisions may reduce waste and improve service. Businesses must also consider purchase costs, maintenance, staff training and suitability. Technology's value can be assessed through cost, quality, delivery time, profitability and customer satisfaction.

Research and development can generate new products, processes and technical capabilities, although results may take time. Support

should cover both fundamental and applied research. The Anusandhan National Research Foundation provides a framework for strengthening research and collaboration among institutions, industry and government [2].

4.2 From Research to Commercial Use

Commercialization turns research into products, services or practical business models. It may require prototypes, testing, intellectual-property protection, finance, regulatory approval, manufacturing and marketing. Colleges and universities can help bridge research and markets through innovation centres, entrepreneurship programmes and industry collaboration. Success should consider affordability, public benefit, employment and environmental impact, not sales alone.

5. SCIENCE IN KEY COMMERCIAL SECTORS

5.1 Digital Commerce and Artificial Intelligence

E-commerce, digital catalogues, online payments and digital advertising help small businesses reach customers beyond local markets. Sales data can guide stock and marketing decisions. Yet fraud, counterfeit goods, privacy concerns and unequal digital access require consumer protection and digital literacy.

Artificial intelligence can assist forecasting, customer service, fraud detection, document processing and inventory planning. Businesses and commerce students should verify AI outputs and protect confidential information. The IndiaAI Mission aims to strengthen AI infrastructure, skills, research, start-ups and responsible applications [3]. Human oversight remains important in decisions affecting credit, employment and customer rights.

5.2 Fintech and Financial Inclusion

Digital payments, online banking and electronic accounting can make transactions faster and improve financial records. These records may support cash-flow planning and business decisions. Digital finance must also include fraud prevention, data protection, consumer awareness and reliable grievance redressal.

5.3 Agriculture and Rural Enterprise

Soil testing, efficient irrigation, weather information, improved crop varieties and better storage can support productivity and reduce losses. Digital market information may help farmers compare prices and find buyers. Affordable technology, training and infrastructure are essential. Innovation can also encourage rural enterprises in food processing, cold storage, packaging and transport.

5.4 Healthcare and Renewable Energy

Diagnostics, medicines, medical devices and telemedicine can improve healthcare when supported by quality standards, privacy and affordable access. Production costs, insurance, distribution and pricing influence who benefits. Solar and wind power, battery storage and energy efficiency create opportunities for cleaner production and green businesses, including solar installation, recycling and sustainable packaging. Investment costs and environmental effects should be assessed alongside financial returns.

6. COMMERCE AS A BRIDGE BETWEEN SCIENCE AND SOCIETY

Commerce helps turn scientific ideas into practical economic value. Cost-benefit analysis, capital budgeting and cash-flow forecasts help assess technology investments. Marketing research identifies customer needs, acceptable prices and distribution requirements. Accounting and business analytics measure costs, inventory, revenue and operational performance.

Entrepreneurs can develop solutions in healthcare, agriculture, clean energy and digital services. Innovative firms may need mentoring, finance, technical testing and market access. Commerce education contributes through business planning, accounting, marketing, financial analysis and entrepreneurial skills.

7. EMPLOYMENT AND HUMAN CAPITAL

A science-led economy needs workers who can adopt technology and continue learning. Emerging industries may require data analysts, laboratory technicians, renewable-energy specialists, quality-control staff and technology-oriented managers. Automation may change routine jobs, making reskilling important. Education should combine subject knowledge with communication, analytical reasoning, digital competence and problem-solving. Commerce students can benefit from training in fintech, business analytics, digital marketing and technology management.

8. CHALLENGES TO SCIENCE-LED DEVELOPMENT

Research capacity: some institutions need stronger funding, laboratories and specialised expertise.

Research–industry gap: discoveries may not reach markets without collaboration.

Finance: start-ups and small firms may struggle to fund testing, equipment and expansion.

Digital inequality: differences in connectivity, affordability and digital literacy restrict access.

Skills mismatch: training may not keep pace with workplace needs.
Ethics and cybersecurity: data misuse, fraud and algorithmic bias can weaken trust.
Environmental costs: energy use, resource extraction and electronic waste need management.
Unequal benefits: technology gains may be concentrated unless smaller firms and underserved groups are supported.

9. STRATEGIES FOR VIKSIT BHARAT @2047

Strengthen research: support high-quality fundamental and applied science with long-term goals.
Build partnerships: encourage joint projects, internships and technology transfer between institutions and industry.
Support small businesses: improve access to finance, digital tools, technical advice and markets.
Modernise commerce education: include digital finance, analytics, technology management and sustainable business.
Expand scientific literacy: promote critical thinking, digital awareness and accessible training.
Adopt technology responsibly: protect personal data, strengthen cybersecurity and ensure accountability.
Promote green enterprise: support renewable energy, recycling, sustainable agriculture and resource efficiency.
Measure outcomes: assess productivity, job quality, business survival, accessibility and environmental performance.

10. DISCUSSION

Science alone does not automatically create inclusive development. Knowledge must connect with finance, management, entrepreneurship, public policy and market access. The relationship can be summarised as: Scientific Research → Technological Innovation → Commercial Application → Productivity and Enterprise Growth → Employment and Public Welfare. Research may have limited impact without application; innovation may stall without funding; and commercial success may create social or environmental costs without safeguards. An integrated approach should value scientific excellence alongside economic, social and environmental outcomes.

11. CONCLUSION

Viksit Bharat @2047 requires India to generate knowledge, adopt useful technology and convert innovation into broad-based prosperity. Science supports new products, improved production and better public services, while commerce contributes finance,

management, marketing, distribution and entrepreneurship. Together, they can strengthen enterprises, improve productivity and create skilled employment.

Progress depends on addressing research capacity, financing, digital access, skills, cybersecurity and sustainability. Cooperation among government, educational institutions, research organisations, industry, financial institutions and citizens can help ensure innovation benefits more people. The success of Viksit Bharat should be measured not only by technologies developed, but also by how effectively they improve people's lives.

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