

# **Linking Science, Technology, and Management in Competence-Based Training Institutions for the Development of a Scalable and Sustainable Skilled Manpower**

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## **Abstract**

The increasing demand for skilled manpower in industries requires a strategic alignment of Science, Technology, and Management (STM) within Competence-Based Training (CBT) institutions; which are uniquely positioned to bridge the gap between theoretical knowledge and practical application and ensuring that graduates possess the requisite skills to meet evolving market demands. This paper examines how these three domains can be synergistically linked to CBT institutions to enhance the development of scalable and sustainable skilled manpower to support industrial growth, meet production demands, drive economic growth, and improve overall performance. Using a conceptual framework, the study reviews relevant literature and theories on competency-based education, industrial skill development, and strategic management to establish a model for linking STM in CBT institutions. Science provides the theoretical foundation for industrial applications, ensuring that trainees understand fundamental principles underlying technological advancements. Technology bridges the gap between theoretical knowledge and practical implementation, equipping learners with hands-on expertise in emerging tools, and automation. Management ensures the efficient organisation, implementation, optimisation of resources, and policy alignment; thereby enabling these CBT institutions to deliver high-quality, industry-relevant training programs. The findings reveal that effective management strategies, including policy formulation, stakeholder engagement, and institutional capacity building, are essential for maintaining the relevance and adaptability of CBT institutions. By integrating science and technology, CBT institutions can leverage innovative teaching methodologies, and research-driven curricula, to equip learners with practical, job-ready skills. Furthermore, sustainability in manpower development requires continuous upskilling, reskilling, and collaboration with industry partners to address technological disruptions and evolving business demands. The study concludes that a collaborative approach involving academic institutions, industry stakeholders, and policymakers is vital for creating scalable, sustainable manpower. This integrated model not only enhances the employability of graduates but also ensures that industries have access to a resilient manpower capable of driving innovation, and meeting the demands of a dynamic knowledge economy.

**Keywords:** Science, Technology, Management, Competence-Based Training, Skilled Manpower, Scalability, Sustainability, Manpower Development