TEACHING BUSINESS TECHNOLOGIES THROUGH MANAGEMENT CURRICULUM IN INDIA

Abstract

The use of business technologies in management curricula in India has become increasingly important in recent years. In India, many universities and business schools have recognized the importance of integrating business technologies into their management curriculum. They offer courses and specializations in areas such as Business Technology Management (BTM), Information Technology Management (ITM), Digital Business Management, and more. Students who specialize in business technologies in their management curriculum are equipped with the knowledge and skills to manage technology-based projects, implement and manage information systems, analyze data, and make informed decisions using business intelligence tools. Overall, the integration of business technologies in the management curriculum in India is crucial for producing skilled professionals who can effectively manage and leverage technology for the success of businesses in today's digital age. In the events of change and integration, an assessment of the educational curriculum and giving guidelines to education may bring far-fetched results.

This paper attempts to explain business technology in the management curriculum, roles of business technology, types of business technologies, analysis of the latest technologies, and a contents analysis about the place of business technology in the curriculum. To match the results of analysis and comparison of data, a few suggestions have been forwarded to innovate the curriculum to integrate the latest business technologies.

Keywords: Curriculum, Innovation, Biz-Tech, Robotics, Business Intelligence, Automation, IoT, IoB

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I. INTRODUCTION

Business technology refers to any electronic system or device that assists employees in performing their duties. The common parlance of business technology is nothing but the use of science, data, engineering, and information applications by companies to achieve goals [1], Business technology includes computers, software applications, printers, mobile devices, and internet systems. It is a combination of management strategies, organizational structures, organisational behavioural and other technical tools, and the technological governance that aims i optimise the use of technology in any enterprise [2]. The goal is to meet customer expectations and increase productivity while maintaining efficient business operations. Business technology management involves managing and organizing a company's technology resources, including procuring new technologies, integrating them into workflows, and monitoring their performance. Business technology is essential for digital transformation and enhancing command over operations.

Business Technology Management (BTM) is an emerging trans-disciplinary professional discipline and research area of business administration that aims to bridge the gap between management and information technology [3] [4]. It encompasses everything from procuring new technologies to integrating them into the company's workflows to monitoring their performance. It is a set of processes and services that unite the business technologies and the business management strategies of an enterprise to extract the contribution of total BT solutions in the form of value potential [3]. BTM draws on a breadth of capabilities to help organizations focus on people, processes, and technology to drive more value from technology and elevate it to a more central strategic role. Bachelor of Science in Business and Technology Management (BTM) of the School of Sciences and Technologies is more oriented toward the current and future high-growth areas i.e. BTM. In the business world, tech management often involves the following tasks: getting the technology, using technology, and developing technology. Current business education curriculum(s) in India are yet to give an appropriate momentum to the teaching of business technology and on learning; which is a question of the present techno-driven time.

II. RESEARCH QUESTIONS AND OBJECTIVES

BTM as a fast-emerging subject demands attention from students, teachers, policymakers, curriculum designers, employers, counsellors, entrepreneurs, and many professionals. Understanding the needs in the background, a few questions require answers. The researchable questions are

- What is the exact representation of business technology in the context of business management?
- What are the technologies that are used as business technology?
- Does management curriculums are concerned with BTM?
- How much does the Indian B-Schools curriculum take care of such BTM?

Exploring the answers to the above four questions requires an exploration and analysis. This article attempts to accomplish the objectives through exploration, explanations, and analysis.

III. REPRESENTATION ON BTM

First, let us find specific definitions of Business Technology. A very common definition of business technology –"is the use of science, data, engineering, and information applications by the companies to achieve their goals. It explores the characteristics and development of business technology, help in learning..." [5]. From the users' point of view "business technology is those technologies which are used by employees may include computers, internet systems, printers, mobile devices and the software applications. All this helps them organize and prioritize work. Business technology can also help divide work as well, giving employees different goals to make larger tasks easier. Managers can use business technology to look for daily business level, stock utilisation, targets achieved, and application tracking for recruitment"[2] [6]. From methodological and application points of view "business technology is considered as the method of organizing and coordinating the work of technology management throughout an organization. It is a combination of strategic management tools, organizational structures, and technological governance that aims to ensure the use of technology across the enterprise. Business technology enables optimizing the overriding goal to meet customer needs and expectations [7]. Business technology can be considered as the strategic element of business. Therefore, business technology is a strategy for organising and coordinating the technology management functions across the entire enterprise. It is a set of management practices, tools, organisational structures, and technology governance designed to ensure the use of technology and optimise resources by using technology across the enterprise with the overarching aim of satisfying customers [8]. Another view is that business technology refers to any electronic system or device that assists employees in performing their duties. This can include computers, software applications, printers, mobile devices, and internet systems.

From an application point of view, business technology can be defined as the use of technology to solve business problems and improve business processes. It encompasses various types of technology, including computer networks, systems, software, and mobile devices, and can be used to manage business operations such as resource planning, customer relationship management, and data processing. The goal is to meet customer expectations and increase productivity while maintaining efficient business operations. Business technology management involves managing and organizing a company's technology resources, including procuring new technologies, integrating them into workflows, and monitoring their performance. Business technology today is a very much-needed element for digital transformation and enhancing command over operations.

Business technology helps employees to organize and prioritize their work. For the managers, it enables them to look for new hires. The aspects of business technology, include-analytics, marketing, branding, and enterprise risk management. On the other hand, business technology management (BTM) is a discipline that aims to improve business outcomes by giving organizations a consistent way to translate technology investments into business value [9] [10]. It involves managing and organizing a company's technology resources, from procuring new technologies to integrating them into the company's workflows to monitoring their performance. BTM combines management strategies, tools, organizational structures, and technological governance. It aims to ensure the use of technology across the enterprise; and ensure systematic inoptimizing the overriding goal of meeting customer needs. It is an emerging trans-disciplinary research area and professional discipline in business

administration that bridges the gap between Management and Information Technology [11]. The TBM Council is a non-profit organization comprised of technology leaders that sets the groundwork for establishing a business unit out of IT, and its members include C-level technology officers with titles like CIOs, CTOs, and CFOs [12].

IV. ROLES OF BUSINESS TECHNOLOGY

Business technologies can play a crucial role in production by improving efficiency, reducing costs, and increasing quality. Some of the ways that technology can be used in production include:

1. **Automation**: Automation technology is used to streamline and optimize production processes, substituting manual labour to increase efficiency [13].

2. **Robotics**: Robotics technology is deployed to perform any repetitive or dangerous tasks, freeing up human workers so that human beings in a system can focus more on complex and creative tasks [14].

3. **3D Printing**: 3D printing technology is used to create prototypes and even finished products, reducing the time and cost required for traditional manufacturing processes [15].

4. **Internet of Things (IoT)**: IoT technology can be used to monitor and optimize production processes, reducing waste and increasing efficiency.

5. **Cloud Computing**: Cloud computing technology can be used to store and analyze production data, allowing companies to make data-driven decisions and optimize their processes.

6. **Artificial Intelligence (AI)**: AI technology can be used to optimize production processes by analyzing data and identifying areas for improvement.

7. **Virtual and Augmented Reality (VR/AR):** VR/AR technology can be used to train workers and simulate production processes, allowing companies to identify and address issues before they occur.

   By leveraging these technologies, businesses can improve their production processes, reduce costs, and increase their competitive advantage.

V. TYPES OF BUSINESS TECHNOLOGIES

The business organisation runs with system(s). In other words, businesses are the combinations of systems integrated into the organisational functional systems. In business systems, many technologies are deployed under the system [5]. It is difficult to elicit a clear typology of technology deployment in a business system. Most business technologies are deployed to maintain the level of agility workflow in an organisation. However, the common types of technologies integrated with the business system as well as business functions are;

Table 1: Functional Integration of Biz-Tech

Technological Tools	Business Functions	Used for
Trello, Asana, and Jira	Project Management	Can help teams organize tasks and collaborate on projects.
Slack, Microsoft Teams, and Zoom	Communication and Collaboration	Facilitate real-time communication between team members and stakeholders.
Salesforce and Hubspot Software	Customer relationship management (CRM)	Can help businesses manage interactions with customers and leads.
Marke to and Hubspot	Marketing automation tools [16]	Helps in automating marketing campaigns and lead nurturing.
Tableau, Power BI, and Google Analytics Software	Business intelligence and analytics	Help businesses make data-driven decisions.
Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform [17]	Cloud computing platforms	Provide businesses with flexible, scalable computing resources.
Firewalls, antivirus software, and intrusion detection systems	Cyber security	Protect businesses from cyber threats.

Source: Author's Compilation

1. **Organisation of Business Technologies:** Business technologies can be classified and organized in many ways, especially depending on the specific needs of the organization. However, here are a few common ways that business technologies are organized. They are-

    - **By Department:** Many organizations have specific departments that are responsible for certain business technologies. For example, there may be an IT department responsible for managing the company's computer systems and software, a marketing department responsible for managing the company's website [18] and social media presence, and a sales department responsible for managing the company's customer relationship management system (CRMs)[19].

    - **By Function:** Another way to organize business technologies is by their function. For example, there may be technologies that are primarily used for communication (such as email and video conferencing tools), technologies that are primarily used for project management (such as project management software), and technologies that are primarily used for financial management (such as accounting software).

    - **By Level of Integration:** Some organizations organize their business technologies based on how tightly integrated they are with other systems. For example, there may be completely standalone technologies (such as a scheduling app), technologies that are integrated with other systems but still operate independently (such as a payment

gateway), and technologies that are fully integrated with other systems and rely on them for core functionality (such as an enterprise resource planning (ERP) system).

2. **Latest Business Technologies:** New technologies connecting to business are emerging day by day. It is also true that the technological emergence in the field of business is exponential.

Table 2: Latest Business Technologies

Popular Name	Full Name	Key Benefits to Business	Use of Technology	Level of Maturity
AI	Artificial Intelligence	Automate and optimize processes, provide insights	Chatbots, fraud detection, image recognition, predictive maintenance, personalization, recommendation engines, etc.	Mature
ML	Machine Learning			
RPA	Robotic Process Automation	Automation of repetitive and rule-based tasks	Data entry, invoicing, HR onboarding, financial reporting, etc.	Mature
EC	Edge Computing	Reduced latency, improved performance	Autonomous vehicles, real-time analytics, video streaming, IoT, etc.	Emerging
QC	Quantum Computing	Solve complex problems traditional computers cannot	Cryptography, drug discovery, optimization, machine learning, etc.	Emerging
VR	Virtual Reality	Immersive experiences, user interaction with digital environments	Gaming, education, training, marketing, tourism, etc.	Mature
AR	Augmented Reality			
Block chain	Blockchain	Secure and transparent transactions	Supply chain tracking, digital identity, voting, payment processing, etc.	Emerging
IOT	Internet of Thing	Improved efficiency, automation, and monitoring	Smart homes, industrial automation, healthcare monitoring, energy management, etc	Mature
5G	5^{th} Generation	Increased speed, reduced latency	Enhanced mobile broadband, autonomous vehicles, smart cities, etc.	Emerging
Cyberse curity	Cybersecurity	Protection of data, networks, and systems	Network security, threat intelligence, identity management, encryption, etc.	Mature

FSD	Full Stack Development	End-to-end development of software applications	Web development, mobile app development, e-commerce, etc.	Mature
Computing Power		Increased computing power for complex calculations	Scientific research, weather forecasting, financial modelling, artificial intelligence, etc.	Mature
Datafication		Collection, analysis, and use of data	Marketing analytics, customer insights, operational efficiency, personalized experiences, etc.	Mature
Digital Trust		Building trust in digital interactions	Online banking, e-commerce, social media, digital identity, etc.	Mature
IoB	Internet of Behaviours	Analysis and use of data from human behaviour	Retail analytics, healthcare monitoring, smart cities, etc.	Emerging
Predictive analytics		Analysis and use of data to predict outcomes	Customer retention, fraud detection, supply chain optimization, risk management, etc.	Mature
DevOps		Integration of development and operations processes	Continuous integration/continuous deployment (CI/CD), software testing, infrastructure as code, etc.	Mature
3D Printing		Printing of physical objects from digital designs	Prototyping, product design, medical implants, customized manufacturing, etc.	Mature
AI-as-a-Service		Access to AI technology through cloud computing	Chatbots, predictive analytics, natural language processing, image recognition, etc.	Emerging
Genomics		Study of genes and their functions	Precision medicine, genetic engineering, disease diagnosis, personalized	Mature

Source: Charles A. (2023), Top 19 New Technology Trends Emerging in 2023 [20], also in [1], [21], [23, [29]

VI. BUSINESS TECHNOLOGY IN MANAGEMENT CURRICULA

The use of technology in business education and management is gaining importance. The integration of technology has enabled employees to streamline their workload and complete projects more efficiently. Business technology can include any electronic object or system that helps employees accomplish tasks, including computers, internet systems, printers, mobile devices, and software applications [23]. A degree in business and technology management combines management, finance, and IT. The use of technology has also led to the development of various management courses and specializations like business technology management and information technology management [24]. Moreover, technology business management (TBM) has been developed to drive the technology operating strategy of organizations. TBM provides visibility into technology spend and enables a collaborative partnership across teams for prioritizing. The use of technology has also enabled organizations to track sales and leads using customer relationship management (CRM) systems.

The syllabus for courses in this field(s) may include key concepts and dynamics of technology in business, management issues related to technology acquisition, application, protection, and maintenance, policies and strategies for managing technology and managing ideas and knowledge in a technology-based environment [25] [26]. The degree programs in business and technology management may lead to careers in business information systems analysis; information systems support management, project management, and e-business development[26].

1. **Biz-Tech in Indian Management Curriculum:** Business technology is an important aspect of modern business practices and has become increasingly relevant in the Indian business context. In recent years, there has been a growing recognition of the importance[27] of incorporating business technology into the Indian business curriculum, particularly as the country continues to embrace digitization and move towards a more technology-driven economy.

2. **Gap of Biz-Tech in Indian Curriculum:** To examine the gap in the delivery of business technology curriculum in the B-Schools in India, 120 postgraduate CBCS and 60 postgraduate national education policy-guided syllabus was downloaded. For Graduate management, 150 curriculum CBCS and 100 graduate syllabi under NEP were downloaded from Indian institutions imparting business management course curricula. The contents were thoroughly examined to elicit business technology contents in the syllabus.

   The biz-tech contents incorporated in the syllabus were tabulated (table-3) to **summarize findings.**

Table 3: Biz Techs in Indian Management Curriculum

Systems Based Biz-Tech	Biz Techs in Contents	PG CBCS Curriculum	PG NEP Syllabus	Graduate CBCS Curriculum	Graduate NEP Syllabus
		N= 120	N=60	N=150	N=100

		Percent of N	Percent of N	Percent of N	Percent of N
Computing	MS Word	20	15	56	60
	MS Excel	25	36	48	58
	Quick Book	5	25	12	18
Account-Tech	Tally	28	46	12	34
ERP	SAP	23	30	x	x
	ORACLE	28	38	x	x
	Micro- Soft	25	45	15	35
Customer Relationship Mgt. (CRM)	CRM Software	10	29	06	08
	Marketing Automation	x	x	x	x
	Social Media Mgt	09	40	x	x
Customer Service Mgt (CSM)	Chatbot, Live Chat	x	12	x	x
	Email Mgt.	16	29	12	25
	Help Desk Software	x	x	x	x
Data Analytics	Microsoft Power BI, Tableau, and QlikView.	14	48	x	x
	DataMining SPSS, Rapid Minner	23	35	x	x
	R. SAS	15	28	x	x
	Machine Learning: Tensor Flow, PyTorch	21	52	x	x
Big Data Technologies	Hadoop, Spark	10	35	x	x
	Apache Cassandra	12	41	x	x

VII. FINDINGS

The curriculums in Indian management education are evidencing an emaciated importance on teaching the contents of Business Technology (BT). The main findings from the table-3, are-

- At the post-graduate level before the National Education Policy (NEP) implementation there was a Choice Credit System (CBCS) curriculum. During the time of CBCS, emphasis on business technology as the content of teaching had minimal importance. The intervention of NEP has augmented to introduce more Biz-Tech content than the CBCS at both postgraduate and undergraduate courses.

- Biz-Tech content teaching got a place in the curriculums, but those contents are very basic for the postgraduate and undergraduate courses of management education in India. At the undergraduate level, the very basics of Business Technology contents were been given emphasis.

- The latest contents of technology which has already become mature and considered as the key business technology (in Table 2) are yet to get their due importance in the curricula.

- The main areas where business technology is integrated into the Indian business curriculum are subjects such as accounting, finance, marketing, and operations management. For example, students can learn how to use accounting software and tools such as Tally, QuickBooks, and SAP, to manage financial records and transactions. Similarly, in marketing courses, students can learn a little bit about digital marketing techniques and how to use social media and other digital platforms to promote products and services.

VIII. IDEAS FOR INNOVATION AND INTEGRATING BIZ-TECHNOLOGIES

Considering the gaps in the practices of business technologies in the curriculums of management, the search for ways for innovation is the right answer to the situations in question. Therefore, the following are the ideas forwarded for innovation as well as for the integration of Business Technologies in the curriculum, they are-

1. **Introduce cutting-edge technology:** One of the most effective ways to teach Business Technology is by including the latest technology in the curriculum. Teachers can introduce new tools and technologies that are being used in the industry, such as blockchain, artificial intelligence, or the Internet of Things. This can help students stay updated with the latest trends and learn how to incorporate these technologies into business operations. Students must understand the philosophy of life, for investing in technology learning [28].

2. **Implement project-based learning:** Project-based learning can be an effective way to teach Business Technology. Instead of traditional lectures, students can work on real-world projects to apply the knowledge they've learned. This approach can help students develop problem-solving skills and learn how to work in teams [29], which are essential skills in the business world.

3. **Foster critical thinking skills:** Critical thinking is an essential skill for students to develop when studying Business Technology. Teachers can incorporate activities that encourage students to analyze data and information to make informed decisions. For example, they can assign case studies or group discussions to encourage students to think critically about business problems.

4. **Introduce experiential learning:** Experiential learning can be an effective way to teach Business Technology. Students can learn by doing, such as participating in internships, industry partnerships, or workshops. This can help students gain hands-on experience and develop a deeper understanding of the industry.

5. **Focus on soft skills:** Soft skills, such as communication, collaboration, and leadership, are crucial in the business world. Teachers can incorporate activities that focus on developing these skills. For example, they can assign group projects or presentations that require students to work together and communicate effectively [30].

6. **Offer online learning:** Online learning can provide students with flexible learning opportunities. Teachers can offer online courses or hybrid courses that combine online and in-person learning [31]. Today “the job seekers need to showcase their talent through

breadth and depth of learning with the support of learning for macro and micro-credentials"[32] [33]. This approach can help students learn at their own pace and provide access to a wider range of resources.

7. **Foster entrepreneurship:** Encouraging students to think like entrepreneurs can be an effective way to teach Business Technology. Teachers can incorporate activities that focus on developing entrepreneurial skills, such as business planning or pitching ideas. This approach can help students learn how to identify business opportunities and develop innovative solutions.

IX. CONCLUSION

Academic policymakers and curriculum designers must understand and choose the important area where business technology can be integrated into their curriculum [34]. Curriculum designers must have to have their entrepreneurial zeal in designing and innovating the curricula. Students can learn about emerging technologies and how they can be used to create new products and services, as well as how to leverage technology to enhance business operations and improve efficiency. Students can take the support of designing their investment thinking in terms of curricula and skills learning [33] for career building. Curriculum designers and faculty must understand the need for the competency of students to use business technology in the workplace. The institutes imparting business education must provide access to the latest technology tools and resources. As we are realising that cloud-based software, cloud-based computing, data analytics tools, and other technologies are becoming commonly used in the business world, depriving them of these skills may create half-skilled managers. Overall, the integration of business technology into the Indian business curriculum can help prepare students for the demands of the modern business world and give them a competitive edge in the job market [37]. Incorporating curriculum innovation is crucial for teaching Business Technology [36]. Overall, curriculum innovation in Business Technology can help students stay updated with the latest trends, gain hands-on experience, and develop essential skills for present as well as future work and the business world. As Indian management education is yet to capture the flavour of teaching business technologies, educational policymakers, and curriculum innovators may look

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