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Role of New Technology and Atomization of Business Operations on efficiency of Startup Entrepreneurs in India: An Empirical study

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Abstract
The efficiency of Indian startup entrepreneurs has been greatly increased by the incorporation of new technologies and the atomization of corporate activities. Startups may increase productivity, decrease operating expenses, and simplify operations by using cutting-edge digital solutions including automation software, cloud computing, and artificial intelligence. Startups may swiftly adjust to shifting market needs and grow their operations effectively by atomizing company activities via the use of scalable and modular technology. Their adaptability enables them to take advantage of opportunities and maintain their competitiveness in ever-changing market conditions.Additionally, modern technologies enable business owners to reach a wider audience and realise greater potential for development by enabling them to interact with clients, access a worldwide market, and work more productively with partners. In India, the startup scene has completely changed as a result of the convergence of new technologies and the atomization of corporate processes. This has increased growth, encouraged innovation, and given entrepreneurs more ability to carry out their visions more successfully. Study survey was conducted among 283 entrepreneurs from different entrepreneurial sectors to know different Role of New Technology and Atomization of Business Operations on efficiency of Startup Entrepreneurs and found that Cost Efficiency, Resource Optimization, Flexibility and Adaptability and Risk Management are different factors that determines role of New Technology and Atomization of Business Operations on efficiency of Startup Entrepreneurs in India.
Keywords: Indian startup entrepreneurs, New technologies, Atomization of corporate activities, Efficiency, Productivity and Adaptability, Scalable and modular technology, Global market access.

Introduction

The incorporation of new technology and the automation of corporate processes have driven a significant change in India's startup ecosystem in recent years. This voyage of transformation has changed the face of entrepreneurship and presented previously unheard-of chances for development and innovation. Indian business owners have taken use of state-of-the-art instruments to increase productivity, optimise efficiency, and compete

globally with the advent of smart supply solutions and Industry 4.0 innovations. This brief introduction lays the groundwork for understanding how technology and automation are enabling Indian startups and their founders.The incorporation of new technology and the automation of business processes have caused a significant revolution in India's startup scene during the last ten years (Ghosh, 2022). A surge of invention and entrepreneurship was sparked by entrepreneurs from a variety of industries who saw the potential of these developments to upend conventional wisdom and improve operational effectiveness. In contrast to traditional business methods, entrepreneurs used innovative tactics to tackle modern problems and grab new chances in a world market that was changing quickly.

One of the primary strategies used by Indian startups to comply with international business requirements is the integration of smart supply solutions (Mahajan & Popma, 2022). Entrepreneurs might increase their competitiveness globally and promote sustainable development by using these technologies to enhance supply chains, enhance product quality, and expand into new markets. Startups were able to establish themselves as leaders in their respective sectors and make their development into other markets possible via this strategic use of technology, which improved their agility, responsiveness, and customer happiness. Furthermore, the way that company strategy has evolved to include innovation has changed the Indian entrepreneurial scene (Lester, 2018). Startups that adopted an attitude of constant experimentation and improvement drove the creation of innovative solutions and game-changing business models, revolutionising the industry and encouraging creativity. In addition to helping companies stand out in cutthroat marketplaces, this focus on innovation sparked economic expansion, the creation of jobs, and social advancement, setting the groundwork for a thriving and dynamic entrepreneurial ecosystem.

Industry 4.0 and the emergence of exponential technologies further accelerated this shift, enabling startups to increase efficiency and optimise operations (Mashelkar, 2018). Entrepreneurs could reduce costs, maximise resources, and quickly grow their businesses by integrating robots, automation, and artificial intelligence. This would prepare them for long-term success in a global market that is becoming more and more competitive. India's emergence as a worldwide centre of innovation and creativity, drawing in capital, talent, and business prospects from all over the globe, may be attributed to the confluence of technology and entrepreneurship. The revolutionary potential of robots and artificial intelligence in altering Indian businesses is highlighted by Dhanabalan and Sathish (2018). Startups may be able to open up new opportunities for productivity, creativity, and expansion by using these technologies within the context of Industry 4.0, which would promote both social progress and economic success. This mutually beneficial link between technology and entrepreneurship highlights how crucial it is to keep learning, adapting, and working together in order to fully realize the potential of India's entrepreneurial ecosystem and successfully negotiate the complexity of today's economic environment.

Literature Review

The field of "eco-innovations" and sustainability in solid waste management was explored by Yadav et al. (2022), who emphasised the role that "technological advancements" and organisational frameworks have in boosting operational efficiency in waste management startups. This focus on using technology to solve environmental issues not only increased productivity but also promoted an innovative culture inside the startup community. Moreover, Nuthalapati et al. (2020) stressed the need of "open innovation" in boosting technical advancement and streamlining value chain operations in the food sector of India. Through partnerships with outside parties and the adoption of "open innovation" strategies, entrepreneurs gained access to new markets, resources, and technology that improved their competitiveness and operational efficiency in the ever-changing food industry.

Initiatives like "Start-UP India, Stand-UP India" (Adhana, 2016) have been essential in fostering an environment that supports the development and creativity of startups in the fields of policy and entrepreneurial culture. The government encouraged the growth of startups in a variety of industries by offering assistance and incentives to aspiring business owners. This encouraged a culture of entrepreneurship and risk-taking, which is crucial for promoting efficiency and innovation. Furthermore, according to Modgil et al. (2022) the COVID-19 pandemic acted as a spur for digital entrepreneurship in India. Startups seized possibilities in the face of hardship by using

digital technology, remote work arrangements, and e-commerce platforms as they swiftly adjusted to the new normal. This digital transformation demonstrated the tenacity and flexibility of entrepreneurs in the face of difficulties by improving operational efficiency and creating new opportunities for development and innovation in the Indian startup ecosystem.

As part of the 'Make in India' strategy, Chenoy et al. (2019) stressed the significance of skill development, with a special emphasis on "new-age" capabilities, in order to accelerate the manufacturing industry. These 'new-age' abilities, which included technical know-how and creative problem-solving, enabled business owners to adjust to changing consumer needs and take advantage of new possibilities in the manufacturing sector. Additionally, Chatterjee (2020) emphasised the need for an AI strategy in India by illuminating the regulatory environment, obstacles to adoption, and initiatives taken by the government to promote AI-driven innovation. Through the strategic use of AI technology, startups were able to improve decision-making, automate procedures, and allocate resources optimally, which improved operational efficiency and spurred sustainable development across a number of economic sectors.

Sharma and Randhawa (2019) provide insights on India's expanding agritech sector in the context of agritech companies. Agritech startups have made significant contributions to the efficiency and sustainability of the agricultural sector by streamlining farming operations, boosting productivity, and reducing risks through the utilisation of agricultural technological advancements like precision farming, IoT-enabled sensors, and data analytics. Furthermore, government programmes were crucial in igniting digital innovation inside Indian MSMEs and SMEs (Kadaba et al., 2023). By means of laws designed to stimulate digitalization and entrepreneurship, the government established a favourable atmosphere that allows companies to capitalise on digital technology, optimise their operations, and penetrate novel markets. This digital revolution has empowered small and medium-sized businesses to prosper in an increasingly digital economy, which has improved the efficiency and competitiveness of startups and contributed to inclusive economic development.

Thareja et al. (2016) also emphasised the significance of skill sets for modern-day efforts like "Make-In-India." This idea emphasises how startups may improve their efficiency and competitiveness by constantly innovating and assessing their processes to make sure they meet changing industry standards and market needs. Furthermore, Banga (2019) examined India's digital readiness for foreign trade, providing insight into the nation's capacity to use digital technology in international trade. Startups' efficiency in doing international business increased as they embraced digitization more and more to strengthen supply chains, simplify operations, and access new markets. The use of digital tools and platforms has facilitated entrepreneurs in surmounting geographical obstacles, penetrating novel markets, and engaging in global competition. This has contributed to the enhancement and expansion of India's trading ecosystem.

The importance of "science, technology, and innovation" in determining how Indian agriculture would develop by 2030 was highlighted by Singh et al. in 2022. Startups were able to contribute to the sustainable growth of the agricultural sector by improving resource utilization, reducing risks, and boosting production by using advances in agricultural technology. Vempati (2016) provided insight into India's involvement in the "artificial intelligence" (AI) revolution, emphasising how AI technologies have the ability to bring about revolutionary change in a range of sectors. Indian startups used AI-driven solutions to streamline operations, customize client interactions, and get a competitive advantage in international markets. Through the strategic use of AI, startups were able to improve operational effectiveness, develop novel goods and services, and experience long-term development in the more "digitalized economy."

Bagale et al. (2021) investigated the impact of small and medium-sized firms (SMEs) on the adoption of digital technology. They highlighted the crucial role that SMEs play in propelling innovation and digital transformation. Cloud computing, data analytics, and e-commerce platforms are examples of "digital technologies" that companies have used to improve productivity, save expenses, and expand into new industries. The "digitalization" of company operations allowed entrepreneurs to better grow their operations, react to client requests, and adjust to

changing market dynamics. Behera (2021) examined the effects of digital transformation, emphasising how entrepreneurs used new technology to improve operations and simplify procedures. Startups have been able to strengthen communication channels, automate repetitive work, and streamline decision-making processes by using digital tools and platforms. This "digital transformation" allowed companies to expand their operations more successfully, react to client requirements more effectively, and adjust fast to changes in the market. Furthermore, entrepreneurs were able to boost their agility and flexibility by breaking down complicated procedures into smaller, more manageable activities, thanks to the atomization of business operations made possible by new technology.

Objective

1. To know the factors that determines different Role of New Technology and Atomization of Business Operations on efficiency of Startup Entrepreneurs in India.

Methodology

Study survey was conducted among 279 entrepreneurs from different entrepreneurial sectors to know different Role of New Technology and Atomization of Business Operations on efficiency of Startup Entrepreneurs. “Convenient sampling method” and “Factor Analysis” were used to collect and analyze the data.

Findings

Table below is sharing respondent’s general details. Total 279 people were surveyed in which male are 65.2% and 34.8% are female. Among them 35.1% are below 37 years of age, 38.0% are between 37-42 years of age and rest 26.9% are above 42 years of age. 23.3% are from financial services sector, 21.1% from healthcare, 25.1% from retail, 24.0% from education and rest 6.4% from other start-up sectors.

Table 1 General Details

Variables	**Respondents**	**Percentage**
Gender		
Male	182	65.2
Female	97	34.8
Total	**279**	**100**
Age (years)		
Below 37	98	35.1
37-42	106	38.0
Above 42	75	26.9
Total	**279**	**100**
Startup sectors		
Financial services	65	23.3
Healthcare	59	21.1
Retail	70	25.1
Education	67	24.0
Others	18	6.4
Total	**279**	**100**

Table 2 “KMO and Bartlett's Test”

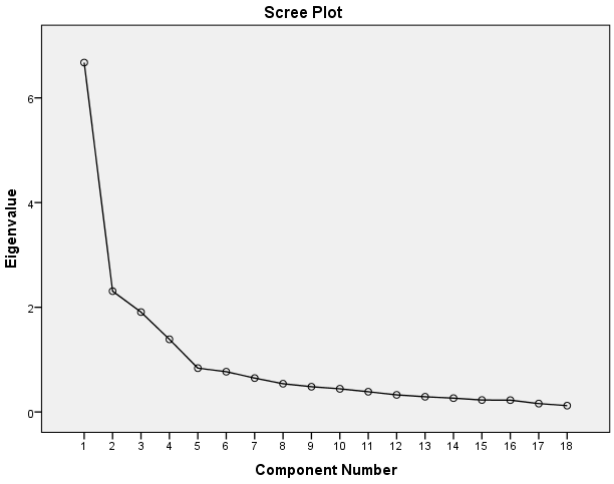
“Kaiser-Meyer-Olkin Measure of Sampling Adequacy”		.852
“Bartlett's Test of Sphericity”	Approx. Chi-Square	2948.827
	df	153
	Sig.	.000

In the table above KMO value is 0.852 and the “Barlett’s Test of Sphericity” is significant.

“Table 3 Total Variance Explained”

“Component”	“Initial Eigen values”			“Rotation Sums of Squared Loadings”		
	“Total”	“% of Variance”	“Cumulative %”	“Total”	“% of Variance”	“Cumulative %”
1	6.675	37.085	37.085	3.622	**20.120**	20.120
2	2.308	12.823	49.907	3.457	**19.206**	39.327
3	1.908	10.598	60.505	2.830	**15.722**	55.049
4	1.387	7.708	68.213	2.369	**13.164**	**68.213**
5	.837	4.653	72.865			
6	.769	4.273	77.139			
7	.647	3.597	80.736			
8	.539	2.997	83.733			
9	.483	2.681	86.414			
10	.443	2.459	88.874			
11	.387	2.148	91.021			
12	.326	1.814	92.835			
13	.291	1.615	94.450			
14	.264	1.467	95.917			
15	.228	1.269	97.186			
16	.226	1.253	98.439			
17	.160	.889	99.328			
18	.121	.672	100.000			

The “principal component analysis” method was applied to extract the factors and it was found that 18 variables form 4 Factors. The factors explained the variance of 20.120%, 19.206%, 15.722% and 13.164% respectively. The total variance explained is 68.213%.



The graph above depicts the Eigen values generated from the "Total Variance Explained table" for an elbow with 4 components.

“Table 4 Rotated Component Matrix”

“S. No.”	“Statements”	“Factor Loading”	“Factor Reliability”
	Cost Efficiency		**.890**

1	New technologies and automation minimize manual labor	.849	
2	Help startups reduce operational costs by streamlining processes	.838	
3	Help startups in optimizing resource allocation	.807	
4	Allows entrepreneurs to allocate funds to other critical areas	.738	
5	New technologies and automation help in efficient product development or marketing	.718	
	Resource Optimization		**.885**
6	Automation enables startups to make the most of limited resources	.821	
7	Handle repetitive and time-consuming tasks	.815	
8	Technologies and automation scale resources up or down as needed	.778	
9	Freeing up time for employees to focus on higher-value activities	.767	
10	With automation startup entrepreneurs can make more informed decisions about resource allocation	.706	
	Flexibility and Adaptability		**.833**
11	New technologies offer greater flexibility and adaptability to changing business environments	.886	
12	Automation enables startups to adapt quickly to changing market conditions and customer demands	.841	
13	New technologies help startups to offer remote work options to their employees	.725	
14	Help startups to provide round-the-clock support and personalized assistance	.636	
	Risk Management		**.746**
15	Automation reduces the risk of errors and inconsistencies	.809	
16	New technologies and automation minimize the likelihood of costly mistakes	.733	
17	Ensure obedience with industry regulations	.715	
18	Helps in mitigating risks associated with data security breaches	.633	

Table 4 is showing different Role of New Technology and Atomization of Business Operations on efficiency of Startup Entrepreneurs. Cost Efficiency is first factor which includes the variables like New technologies and automation minimize manual labor, Help startups reduce operational costs by streamlining processes, Help startups in optimizing resource allocation, Allows entrepreneurs to allocate funds to other critical areas and New technologies and automation help in efficient product development or marketing. Second factor namely Resource Optimization includes the variables like Automation enables startups to make the most of limited resources, handle repetitive and time-consuming tasks, Technologies and automation scale resources up or down as needed
Freeing up time for employees to focus on higher-value activities and with automation startup entrepreneurs can make more informed decisions about resource allocation. Flexibility and Adaptability is third factor and its associated variables are New technologies offer greater flexibility and adaptability to changing business environments, Automation enables startups to adapt quickly to changing market conditions and customer demands, New technologies help startups to offer remote work options to their employees and Help startups to provide round-the-clock support and personalized assistance. Fourth factor is Risk Management which includes the variables like Automation reduces the risk of errors and inconsistencies, New technologies and automation minimize the likelihood of costly mistakes, Ensure obedience with industry regulations and Helps in mitigating risks associated with data security breaches.

"Table 5 Reliability Statistics"

"Cronbach's Alpha"	"N of Items"
.892	18

The reliability for 4 constructs with total of eighteen elements is 0.892.

Conclusion

In conclusion, Indian startup entrepreneurs are now much more efficient thanks to the assimilation of new technologies and the atomization of company processes. Startups have streamlined their operations, cut expenses, and increased production by using cutting-edge technologies like automation, artificial intelligence, and cloud computing. Startups may now compete on a level playing field with established businesses because to the adoption of these technologies, which has helped them overcome conventional entrance hurdles. The process of breaking down intricate activities into smaller, more manageable parts has been made easier by the atomization of corporate processes, which has allowed startups to function with more flexibility and agility. Additionally, the growth of digital platforms and online markets has given Indian companies greater access to international markets and clientele. Unprecedented chances for development and expansion have arisen as a result. Overall, atomization and new technology have completely changed the way startups function in India, giving company owners the ability to expand, develop, and thrive in a highly competitive market. The future is bright for Indian entrepreneurs, who are positioned to spearhead economic development and innovation in the years to come as technology advances and becomes more widely available.

The study was conducted to know the factors that determines different Role of New Technology and Atomization of Business Operations on efficiency of Startup Entrepreneurs in India. The study concludes that Cost Efficiency, Resource Optimization, Flexibility and Adaptability and Risk Management are different factors that determines role of New Technology and Atomization of Business Operations on efficiency of Startup Entrepreneurs in India.

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