Transforming Education through EdTech based Entrepreneurial Ventures

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Abstract

This paper provides a comprehensive overview of the transformative impact of EdTech on education through entrepreneurial ventures. The contemporary educational landscape is experiencing a significant transformation, driven by the ascendance of educational technology (EdTech). The Covid- 19 pandemic accelerated online learning and gave birth to several EdTech start-ups in India and across the globe. This paper thoroughly investigates the pivotal role of entrepreneurial initiatives within the EdTech domain, shedding light on their profound influence on the global dissemination and reception of education. Through a comprehensive analysis, the authors explore notable trends, enumerate discernible benefits, navigate prevalent challenges, and project the future potential of EdTech innovations. Employing a rigorous examination encompassing diverse case studies and empirical data, a comprehensive understanding of the intricate dynamics shaping the relationship between EdTech advancements and educational systems is presented. By meticulously dissecting the entrepreneurial dimension in this dynamic arena, the authors endeavor to provide nuanced insights into the evolving educational landscape, elucidating the catalytic role played by entrepreneurial ventures in steering its trajectory. Apart from outlining the current landscape of EdTech startups in India and their future potential, the present paper also assesses the Strengths, Weaknesses, Opportunities, and Challenges (SWOC) the Edtech companies.

Keywords: Educational Technology (EdTech), Entrepreneurial Ventures, Edtech companies, Entrepreneurial initiatives

Introduction

Education technology or EdTech refers to the use of digital tools and technologies to enhance teaching and learning experiences. In recent years, EdTech has witnessed exponential growth, spurred by advancements in technology and an increasing demand for accessible, flexible, and personalized education. Since 2018, India had launched 1,782 EdTech start-ups and globally, more than 4,800 K–12 EdTech start-ups have been launched (IBEF, 2021). As on 2024, the top 14 EdTech ventures which provide services in India are BYJU'S, Extramarks, Infinity Learn, EduGorilla, Unacademy, iQuanta, Trainer Central, upgrade, Next Education, Leverage Edu, Vedantu, Toppr, Simplilearn, Udmy, WhiteHat Jr. (acquired by BYJU'S), Aakash Institute and edX (Das, 2024). Entrepreneurial ventures have played a pivotal role in driving this growth, introducing innovative solutions that challenge

traditional educational models.

We now live in an era where computers (laptops, tablets and other gadgets) are no more considered as luxurious goods; and having knowledge of computer as well as advanced artificial intelligence is an essential criteria for the educators to go to classroom to teach the students. Millennials are the first generation to arrive on campus with laptops, while Generation X used desktops in computer labs. This shift compels educators to adapt to advanced artificial intelligence. Above all, in 2020, the education sector has to adopt profound transformation due to the COVID-19 pandemic. EdTech start- ups have thrived turning the COVID-19 pandemic into an opportunity. The EdTech approach aims to customize learning based on students' skills, interests, and strengths, relying on technology integration with education processes. According to India Brand Equity Foundation (IBF), the growth of EdTech ventures is because of two main reasons. They are: (a) exponential growth of internet penetration in India and (b) Government initiatives driving the Indian EdTech industry. The NEP 2020, has already given emphasis on the importance of leveraging technology in education solutions and supported creation of leaning content in regional languages, calling it a high priority. The NEP 2020 recognises that curriculum innovation is essential and educators must be cognizant of potential technological barriers as advanced technologies can influence instructional delivery, providing learners with knowledge and skills conveniently.

Significance of the study

Over the last two decades, entrepreneurship has arguably become the most influential economic force the world has ever seen. This expansion has been accompanied by a significant increase in entrepreneurship education. The growth and development of curricula and programs dedicated to entrepreneurship and new-venture creation have been remarkable. The number of colleges and universities offering entrepreneurship courses has risen from just a few in the 1970s to over 1,600 by 2005. Despite this vast expansion, achieving complete academic legitimacy for entrepreneurship remains a challenge. Although some degree of legitimacy has been attained, significant challenges persist. We can examine the trends and challenges facing entrepreneurship education in the 21st century. The number of colleges and universities offering entrepreneurship courses in India has grown significantly from 2005 to 2024. In 2005, entrepreneurship education was in its early stages, with relatively few institutions offering dedicated programs. Today, apart from the B schools, other technical institutions and prestigious technical institution of the country like IITs, NIITs and CITs, etc., have started introducing formal entrepreneurship education programme and start-up cells. The higher educational institutions in remote places, for example, colleges and universities in Assam have introduced entrepreneurship as compulsory paper and created start-up cells and sometimes organize start-up melas (Paul & Chanu, 2023). Such changes are because of the increased emphasis on innovation and start-ups as well as several initiatives like:

(a) Government Initiatives: Programs of the Government of India like Startup India, make in India, and the Atal Innovation Mission have encouraged educational institutions to focus on entrepreneurship.

(b) Rewards for Institutional Support: The institution's activities on establishing incubation centers, entrepreneurship cells, and dedicated courses to foster entrepreneurial skills are seriously considered while assessing the ranking of institutions in the country.
(c) Industry Collaboration: Partnerships with industry and international bodies, partnership with educational institutions and industrial units have further boosted the growth of entrepreneurship education.

Hence, analyzing the transformative impact of EdTech on the education sector and role of entrepreneurial ventures in promoting EdTech is need of the hour.

Literature review

The impact of the 2008 financial recession on organizational dynamics has been widely acknowledged as transformative, imposing severe resource constraints and ushering in unpredictable conditions that posed substantial challenges to organizational sustainability (Guerrero *et al.,* 2016). Following this socio-economic upheaval, higher educational institutions have encountered escalating pressures due to heightened rates of unemployment, reductions in public budgets, declining demand for traditional higher education programs, surging tuition costs, and the necessity to compete in an increasingly globalized environment (Guerrero & Urbano, 2019). Moreover, the unprecedented challenge posed by the COVID-19 pandemic has further intensified pressures within the education sector, affecting over 1.5 billion students worldwide who are unable to attend physical schools (Kandri,2020). In response to this health crisis, universities have demonstrated resilience by swiftly transitioning physical activities to various online formats, including open-access online training, course hubs, webinars, conferences, expert videos, and multimedia materials. However, looking beyond the pandemic, universities are poised to encounter a multitude of challenges across all organizational dimensions—managerial, operational, functional, relational, and financial—as they endeavor to meet the evolving needs of stakeholders, including students, employers, government, and society. The advent of the digital economy has fundamentally transformed the landscape for universities, facilitating new modes of communication and technology adoption that have brought about profound organizational changes in internal processes, strategic decision-making, and enhanced versatility in real-time activities across multiple locations (Brynjolfsson & Kahin, 2002; Teece, 2018). The digital economy has ushered in a competitive environment for universities by introducing new paradigms in the delivery of higher education services across traditional borders (Teece, 2018). Digital technologies have made a paradigm shift in the entire education system. It is not only a knowledge provider but also a co-creator of information, a mentor, and an assessor (Haleem, *et.al.,* 2022) Digitalization has not only transformed the core activities of universities but also underscored the imperative for dynamic entrepreneurial capabilities to remain competitive, while also opening up new market opportunities aligned with the needs of digital workplaces (OECD, 2016; CISCO, 2018; WEF, 2018). Technological advancements stemming from the digital age, such as the Internet, smartphones and other digital technologies, have empowered individuals to articulate their expectations from service providers more discerningly (Hardey, Loader, &Keeble, 2009).

Presently, higher education institutions are urged to forge strategic partnerships with EdTech firms, ensuring the preservation—and even enhancement—of program quality. Embracing digital transformation

is paramount as the future of education increasingly transitions from physical infrastructure to digital platforms, with EdTech serving as a pivotal enabler in improving Gross Enrollment Ratios (GER). EdTech is poised to act as a catalyst, facilitating institutions in enhancing their offerings and meeting the educational needs of aspiring learners in the digital age (Sikandar& Rahman, 2020). There has been a transformative impact of EdTech startups, accelerated by the COVID-19 pandemic, on the education sector, particularly in India, highlighting the emergence of blended learning and the imperative for personalized, inclusive instruction facilitated by emerging technologies, while acknowledging challenges like the digital divide and the need for integration into traditional educational systems (Yadav, 2024). The EdTech ventures can also bring a tremendous impact on overall economy as the primary influence of EdTech ventures is on the EdTech economy; well-financed EdTech ventures can expand their offerings, grow market share and deepen their penetration into education. Apart from this, investors and EdTech ventures pursue new models of education that can reshape conventional practices of teaching, learning andmanagement, or produce new competitive alternatives, such as DTC learning platforms that bypass educational institutions altogether (Davis, *et,al*. 2022). The transformation in education, role of EdTech, performance of EdTech, and some other issues associated with EdTech are highlighted in the studies of de Andrade, *et.al.*, (2023), McDiarmid,,& Zhao.(2023), Rodriguez-Segura, (2022). McGrath & Åkerfeldt (2019). Gupta, (2020) , Reich (2020), Weller (2018), Yadav, *et.al.*, (2018).

After reviewing, it can be clearly seen that there has been transformation in the education sector and increased the demand for EdTech start-ups. However, there is need for studies which investigate emerging trends in EdTech, its challenges, the effectiveness of EdTech in enhancing learning outcomes and accessibility. Hence, the present paper is an attempt towards investigating the above-mentioned issues.

Objectives:

1. To analyze the transformative impact of EdTech on the education sector, with a particular focus on the role of entrepreneurial ventures.
2. To assess the benefits and challenges associated with the adoption of EdTech solutions in various educational contexts.
3. To evaluate the effectiveness of EdTech in enhancing learning outcomes and accessibility.

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Research Methodology:

Since the present paper is aimed to thoroughly investigate the complex dynamics between digital education platforms and entrepreneurial ventures, the qualitative research approach has been employed in this study. The present study is exclusively based on Secondary Data. Various Research papers, journals, case studies etc. were used to collect data. The case studies have been used to provide a detailed examination of the role of digital education in businesses, shedding light on the observed

impact and contributing to a more comprehensive interpretation of the findings. A SWOC analysis has also been conducted to present to strength, weakness, opportunities and challenges of EdTech.

Findings and Discussions

(a) Emerging Trends in Educational Technology (EdTech)

1. Online Learning Platforms**:** Online learning platforms, exemplified by Coursera, edX, and Khan Academy, have significantly democratized access to education by offering courses from esteemed institutions to learners worldwide. These platforms boast adverse array of subjects, often available at no cost or at a fraction of traditional educational expenses, thus markedly increasing the accessibility of quality education.

2. Adaptive Learning Technologies: Adaptive learning technologies leverage data and analytics to tailor learning experiences on an individualized basis. Tools such as DreamBox and Knewton dynamically adjust educational content to align with the unique needs of each student, thereby fostering greater engagement and yielding improved learning outcomes.
3. Gamification and Interactive Learning: Gamification integrates elements of game design into educational settings with the aim of enhancing motivation and engagement among learners. Platforms like Kahoot! And Duolingo employ gamification strategies to render learning more interactive and enjoyable, consequently leading to heightened retention rates.

4. Artificial Intelligence and Machine Learning: Artificial intelligence (AI) and machine learning (ML) are increasingly harnessed to furnish intelligent tutoring systems, automated grading mechanisms, and personalized feedback loops. Pioneering companies such as Carnegie Learning and Century Tech are spearheading the development of AI-driven solutions aimed at optimizing educational delivery and assessment processes.

(b) Advantages of Educational Technology (EdTech)

1. Enhanced Accessibility: Educational technology (EdTech) transcends geographical boundaries, facilitating access to quality education for students residing in remote or underserved regions. This proves especially beneficial in areas lacking conventional educational infrastructure.

2. Tailored Learning Experience: EdTech, fosters personalized learning environments tailored to accommodate the unique learning styles and paces of individual students. This personalized approach contributes to improved academic performance and outcomes.

3. Flexibility and Convenience**:** EdTech platforms afford learners the flexibility to craft their own learning schedules, enabling them to pursue education at their preferred pace and convenience. This flexibility is particularly advantageous for adult learners and working professionals seeking to enhance their skills or undergo career transitions.
4. Cost-Effectiveness: Many EdTech solutions present cost-effective alternatives to traditional

educational models. Online courses and digital text books obviate the need for physical infrastructure and printed materials, thereby reducing overall educational expenses.

(c) Challenges Confronting Educational Technology (EdTech)

1.Bridging the Digital Divide: Despite its potential to broaden access to education, the digital divide poses a formidable obstacle. Students from economically disadvantaged areas lack access to requisite technologies and dependable internet connectivity, thereby constraining the effectiveness of EdTech initiatives.

2.Ensuring Quality Assurance: The proliferation of online learning platforms underscores the importance of upholding the quality and credibility of educational content. Robust regulatory frameworks and accreditation standards are imperative to safeguarding the integrity of educational offerings in the digital sphere.

3. Addressing Data Privacy and Security Concerns: The utilization of data analytics in EdTech gives rise to apprehensions regarding student privacy and data security. Safeguarding sensitive information and adhering to stringent data protection regulations emerge as pressing imperatives for EdTech entities seeking to maintain trust and confidence among stakeholders.

4. Facilitating Teacher Training and Adaptation: The successful integration of EdTech hinges upon the readiness of educators to embrace new technologies and undergo requisite training. Overcoming resistance to change and ensuring educators possess the necessary skills to leverage EdTech tools effectively are pivotal in fostering its seamless integration within traditional educational settings**.**

(c) The Role of Entrepreneurs in EdTech

Entrepreneurship plays a pivotal role in driving innovation within the educational technology (EdTech) sector. Both startups and established firms are leading the charge by harnessing state-of-the-art technologies, securing substantial investments, and expanding their solutions to cater to a global audience. In the realm of EdTech, entrepreneurs distinguish themselves through their adeptness at discerning inadequacies in conventional educational models and devising inventive remedies to tackle these obstacles. The initiatives not only spur technological advancements but also foster transformative changes aimed at enhancing the efficacy and accessibility of education on a broader scale. Entrepreneurs in the EdTech space employ a variety of strategies to navigate the complex landscape of educational innovation. One key strategy involves leveraging data analytics to gain insights into student learning behaviors and preferences. By harnessing the power of big data, entrepreneurs can tailor educational content and experiences to meet the individual needs and learning styles of students, thereby enhancing engagement and learning outcomes. Another important strategy utilized by EdTech entrepreneurs is partnership and collaboration with educational institutions, governments, and other stakeholders. By forging strategic partnerships, entrepreneurs can gain access to valuable resources, expertise, and funding opportunities to support the development and implementation of innovative educational solutions.

(d) EdTech start-up ecosystem in India

The EdTech start-up ecosystem in India has witnessed a remarkable ascent, positioning the country a hub of innovation and entrepreneurial activity. Leveraging cutting-edge technologies, Indian EdTech start-ups have garnered widespread attention from various stakeholders including venture capitalists, corporate entities, and government agencies. Many of these start-ups have successfully utilized prototypes to attract investment, thereby fueling the sector's growth, particularly amidst and post the Covid-19 pandemic. Notably, the EdTech sector presents lucrative opportunities for angel and corporate investors seeking significant financial returns while contributing to the advancement of education in the nation. The burgeoning demand for EdTech services has created ample investment opportunities in both venture capital (VC) and listed equity markets. The enduring impact of the Covid-19 crisis continues to drive investment in innovative EdTech ventures.

According to recent statistics compiled by Tracxn Technology Limited, a Bangalore-based firm specializing in start-up discovery, India is home to a staggering 8,768 EdTech start-up companies (Tracxn, 2021). Notably, four of these companies—Byju's ($16.5 billion), Unacademy ($3.4 billion), Eruditus ($3.2 billion), and UpGrad ($1.2 billion)—have achieved unicorn status (Business Insider India, 2021). EdTech companies typically enter the Indian market through various modes such as joint ventures, partnerships, franchising, or subsidiaries, in compliance with Indian Company Laws. In 2020, the majority of top investment-attracting companies were concentrated in the test-preparation segment, with a notable presence in K-12, skill development, enterprise solutions, and certification sectors. However, penetration into the higher education sector remains relatively limited.

A global analysis report on education venture capital funding for 2021, published by HolonIQ in 2022 reveals significant shifts in investment trends. While Chinese EdTech investment is experiencing a downturn, there has been a remarkable surge in investment activity in the United States and Europe. India's EdTech start-ups have witnessed substantial growth, with funding reaching $3.8 billion in 2021, positioning the country as the second-largest destination for EdTech investment, trailing only behind the United States ($8.3 billion). Europe ($3.0 billion) emerges as the third most favored destination, followed by China ($2.7 billion).

(e) SWOC Analysis of Edtech Ventures

Though the EdTech ventures have grown up significantly, in the present Indian society, still there are number of weaknesses and challenges of such ventures. Therefore, a SWOC analysis which is known as Strengths, Weaknesses, Opportunities, & Challenges analysis of Edtech Ventures is hereby conducted and it is shown below.

Table1. SWOC analysis of Edtech Ventures in India

Strengths	***Weaknesses***
(a) *Cost efficient*; (b) *Flexible learning*; (c) *Effective learning*; (d) *Personalized learning*; (e) *Accessibility to an inaccessible market*; (f) *Scale and integrity*; (g) *Industry-academia interaction*; (h) *Skill development*; (i) *Brings better coordination and governance; and* (j) *Easy to collect feedback and analysis*	*(a) Edtech cannot be a substitute to traditional education;* *(b) Commodification of education;* (c) *Distraction by students* and they always *Tempted to use devices for procrastination;* *(d) Lack of critical inputs from teachers and less transparency;* (e) *Students are no intrinsically motivated and no proper feedback mechanism*; (f) *Possible dilution in quality of offering*; (g) *Privacy and security* of data issues; (h) *Cultural mindset-Indian education system is continued to be an examination oriented; and* *(i) Customer mindsets-Clients are looking for value addition to the existing services;*
Opportunities	***Challenges***
(a) *Digital Communication;* (b) *Adaptive Learning;* (c) *Personalized Learning;* (d) *Content hungry Urban population*: *Improved internet connectivity;* (e) *Job opportunities to tech savvy people and gig or freelance jobs;* (f) *Government support for digital transformation in education sector; and* (g) *Corporate Training Programmes and Management Development Programmes:*	a) *IPR issues*; b) *Digital readiness and Non availability of robust and connectivity/bandwidth in non-urban areas;* c) *Facing Stiff competition;* d) *Less profit margin;* e) *Regulatory bodies in the higher education sector are not supportive for collaboration with universities;* f) *Misalignment in approach-Global vs local;* g) *Crowded Edtech landscape*: *focusing only on K-12 of Test-Preparation segments;* *h) Lack of differentiation and retaining the customers;* *i) High acquisition cost of customers-spending more money on advertisement and marketing; and* *j) Investment and scape: Investors are specialist or generalist venture capitalist*

Source: developed by the authors based on the review of literature

(f) Case Studies

1. **Udemy**

Udemy, a massive open online course (MOOC) provider, initially founded in the US, has now become a global purveyor of vocational courses. Instructors craft online content tailored to their respective courses, enabling students to pursue learning based on their interests and earn certifications. Established in 2007, Udemy has experienced consistent growth, offering over a thousand training courses accessible via mobile platforms.

2. Unacademy

Initially launched as a YouTube channel and later expanded into a full-fledged platform in 2015 by Gaurav Munjal, Roman Saini, and Hemesh Singh in Bangalore, Unacademy offers live classes, video content, notes, and more for various government competitions and examinations. Providing both free and subscription-based content across multiple subjects, Unacademy boasts a network of approximately 18,000 educators delivering knowledge through online channels.

3. **Vedantu**

Founded in 2014 in Bangalore by Vamsi Krishna, Pulkit Jain, Saurabh Saxena, and Anand Prakash, Vedantu operates as an online tutoring platform, facilitating virtual classes for students on various subjects. Recognized as one of the most promising platforms in the online education sector, Vedantu employs a real-time virtual learning environment called WAVE (Whiteboard Audio Video Environment), developed in-house.

4. Grade Up

Grade Up is another education-focused application offering services nationwide for competitive exam preparation, headquartered in Noida. Established in 2015 by Shobhit Bhatnagar, Vibhu Bhushan, and Sanjeev Kumar under the parent company Grade Stack Learning Pvt. Ltd., Grade Up disseminates content through various platforms such as YouTube, applications, and study materials.

5. Coursera

Established by Stanford Professors Andrew Ng and Daphne Koller, Coursera is renowned for its comprehensive array of online courses, specializations, and degree programs sourced from prestigious universities and corporate entities worldwide. Boasting a global learner base exceeding 82 million, Coursera exemplifies the scalability and profound impact of online learning platforms on modern education.

6. Dream Box

Dream Box stands as a prominent adaptive learning platform designed to enhance K-8 math education. Leveraging real-time data analytics, Dream Box customizes instructional content to meet the unique learning needs of individual students. The platform's efficacy is evidenced by notable improvements in student achievement and levels of engagement.

7. Duolingo

Duolingo represents a leading language-learning platform renowned for its innovative use of gamification to engender enjoyable and interactive language learning experiences. With a user base surpassing 500 million, Duolingo epitomizes the transformative potential of educational technology in revolutionizing language education through personalized and immersive learning environments.

Conclusion

Education stands as the paramount force in shaping the youth for tomorrow and facilitating socialization. In order to achieve development, any nation must possess the means to equip its students with technologically advanced occupational skills. With the rapid pace of globalization and technological advancements, a new global economy driven by technology and fueled by information has emerged. This new economy carries significant implications for both nature and educational institutions. As the half-life of information continues to diminish and access to data expands exponentially, institutions must evolve beyond mere transmission hubs for prescribed knowledge. Instead, they must foster a culture of lifelong learning, emphasizing the acquisition of skills and knowledge that enable continuous growth (Lalkaka, 2002).

The ascendancy of EdTech propelled by entrepreneurial endeavors, heralds a profound transformation in the educational sphere. Through the provision of accessible, personalized, and cost-effective learning solutions, EdTech stands poised to democratize education and mitigate socio-economic disparities. Nevertheless, confronting challenges such as the digital divide, ensuring quality

assurance, safeguarding data privacy, and facilitating comprehensive teacher training is imperative to unlock the full potential of EdTech. As technology perpetually evolves, the trajectory of education is increasingly intertwined with innovative EdTech solutions and the entrepreneurial ethos that propels their development. Thus, fostering a conducive ecosystem for EdTech innovation and addressing pertinent challenges will be pivotal in shaping the future of education on a global scale.

The growth drivers underpinning the EdTech ecosystem in India are multifaceted, primarily driven by four key factors: (a) a burgeoning youthful population, (b) the increasing disposable income of parents, (c) the declining cost of internet data, and (d) the availability of affordable handheld devices conducive to learning. Projections indicate a doubling of smartphone users by 2025, rising from 500 million in 2020. While EdTech startups have indeed disrupted ancillary coaching and test-preparation segments, their impact on the core education value chain remains limited. The integration of digital technology into the education system is envisaged as complementary rather than a wholesale replacement of traditional educational modalities. EdTech companies must remain cognizant of this reality as they develop their offerings. Despite the accelerated adoption of digital technology in the education sector prompted by the Covid-19 pandemic, sustained efforts are required to maintain stakeholder engagement. This entails a commitment to continuous innovation and the introduction of new offerings.

Educational technology (EdTech) start-ups confront formidable challenges, including limited customer bases, pricing ambiguity, insufficient diversification, lack of product distinctiveness, and high customer acquisition costs. To navigate this competitive landscape, EdTech enterprises must adopt multifaceted strategies emphasizing scalability, innovation, integration, learner empowerment, and expansion into complementary sectors. Leveraging augmented reality (AR) and virtual reality (VR) technologies extensively can enhance user experiences and simulate physical learning elements unavailable in traditional classroom settings. Furthermore, EdTech start-ups must prioritize equipping learners with essential digital skills to meet the demands of future job markets. Diversification into adjacent EdTech segments, such as study notes provision and tutoring services, offers avenues for prolonged sustainability. Massive Open Online Courses (MOOCs) present another avenue for targeting higher education and corporate learners effectively.

In the coming days a number of colleges and universities in India will be offering entrepreneurship courses/ programs. The prestigious Indian Institutes of Technology (IITs) and Indian Institutes of Management (IIMs) to numerous state universities and private colleges have already started offering entrepreneurship courses/ programs. This change reflects the increasing recognition of entrepreneurship as a key driver of economic development and job creation in India. While several key developments like Government Initiatives, Institutional Support, Industry Collaboration have driven this growth, there is need to create a new form of entrepreneurial environment in the country. Since the world has moved towards more technologically oriented environment, it is suggested that the educational institutions should have collaboration with the EdTech enterprises to produce more innovative, creative and rent giving entrepreneurs.

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