A Case Study on Affordable E-learning Solutions for Rural India: Initiatives to Minimize the Digital Divide

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Abstract

The purpose of this paper is to analyse how an individual and group efforts can create social and economic value through their Social Initiatives in Education (SIE). This paper employs a multiple case study approach. The selected cases cover individuals and groups who may not have a clear model to serve the education system of the country initially but have passion to address different prevailing social problems faced by education community in the rural areas of India. This study reveals that Social Initiatives in Education (SIE) is driven by the environmental dynamics, social support, and societal outcomes. In addition, the authors found that the SIE provides society with both implicit and explicit strategic benefits. Based on the findings the authors propose an integrated model of SIE. As all cases originate from Rural India, thus the author cannot rule out the possibility that the conclusions are only valid for a certain institutional and socio-economical context. The developed model is useful for edu-preneurs who are willing to invest their time and money to blur the digital divide and ensuring equal educational opportunities to students across the country. Additionally, it will help in improving the digital literacy of the country. The study attempts to recognise the self-less efforts of individuals who collaborate to bring a positive change in the educational system by making it more accessible and affordable.

Keywords

Rural India, Social Entrepreneurs, Education, Digital Divide, Sustainable Educational Goals.

1.   Introduction

Education, undisputedly, can be considered as our most important treasure which help us in confronting future uncertainties and grabbing opportunities present in the environment. It plays a dominant role in grooming the overall personality of an individual. It can no longer be termed as secondary, but an essential and primary ingredient of a successful future. Though one cannot claim the source of education as it can be gained from anywhere and from various sources, but a formal education is what we experience in schools and colleges.

Recently, Indian Finance Minister Ms. Nirmala Sitharaman showed her utmost concern towards the impact of COVID-19 on the education of students around the country. She has even announced a host of new initiatives to incentivize the growth of online education in India amid the pandemic. The launch of 12 new TV channels, one for every grade in K-12, was a part of her announcement which can be considered as an unprecedented step to make the education accessible for every section of the society. Even the students in rural areas where lack of access to high-speed internet connection, such efforts will ensure the unhindered consumption of learning content. Additionally, it will help in boosting the scope of e-learning in India as this TV channels are designed to give access to digital content to students 24x7 and facilitate learning beyond classroom. There are several benefits of broadcasting digital content through TV channel:

•   Reaching to Indian households who do not have access to high-speed internet

•   Better child safety as compared to internet

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• Access to learning content instantly without on boarding

Thus, these initiatives are going to help students around the country to continue with their learning process smoothly and securely. In addition, it will expand the horizon of edtech companies by unlocking zillions of opportunities in the field of e-learning. The case study, thus focusses on the various initiatives taken by private players and individuals to make education and learning more accessible to under-privileged student who are deprived of even the essential commodities.

In India, e-learning is still at in nascent stage and there is a need for implementation of multimedia and information communication technology in private and public schools for effective facilitation of online education . While education ministry has announced reduction of CBSE syllabus to almost 30%, many state governments too have reduced it for the academic year 2020-21. Reduced syllabus though may reduce the burden on students amid pandemic, will definitely impact the student knowledge as some part of syllabus will be churned out. Thus, online courses will definitely play a dominant role as irrespective of situation those part of syllabus can be covered with ease.

In one of the recent discussions with teachers across the country, Education Minister focussed on need of One Nation One Digital Platform wherein every student/learner have equal access to all the learning material. He further added that, approximately 20crore has been distributed as a part of PM e-idea program for students and use of online platform are promoted through initiatives like one class one channel, DIKSHA, e-Paathshala, and with more than 800 radio programs being aired. Over the last five years, India has leapfrogged into strengthening its digital infrastructure and increasing digital penetration. Significant steps have been taken by the government to digitally enable the country through initiatives like the NDCP 2018, connecting 1,31,970 Gram Panchayats as on December 27, 2019, laying of 3,99,375 kms. of OFC through the BharatNet project and promulgating digital inclusion through the JAM (Jan Dhan Aadhar Mobile) trinity model. Digital Economy Journey, as presented by World Bank, is depicted in the figure below. The figure demonstrates the stages of digital growth and development of a nation, post the roll-out of digital infrastructure (KPMG & CII, 2020).

Fig 1 Digital Economy Journey
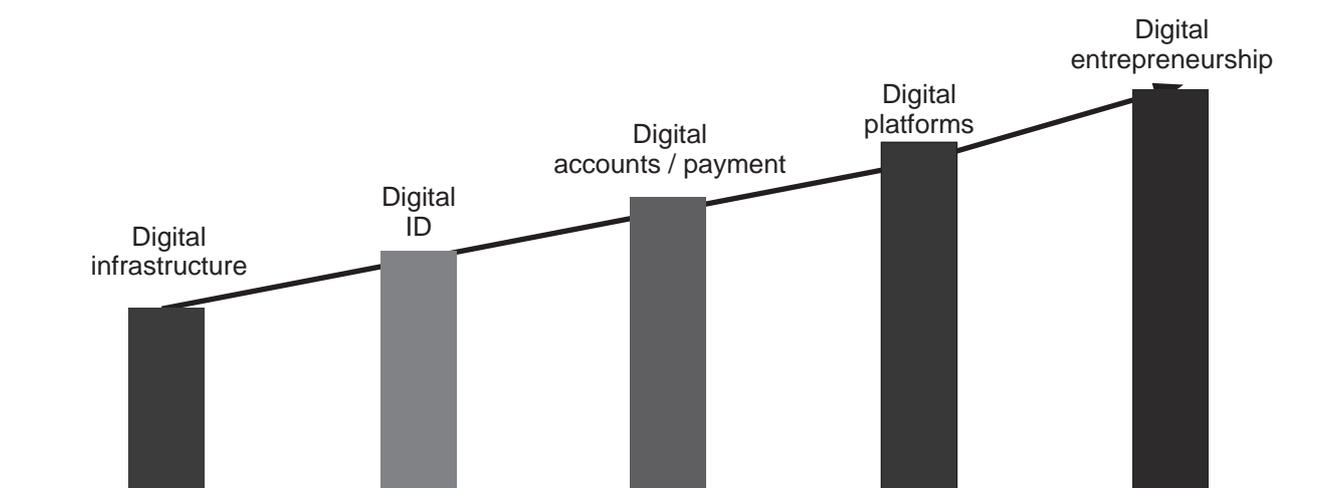
•National Broadband Mission aims to provide broadband access to all the villages by 2022. Connect India Goals (under NDCP, 2018) aims to Provide 1 Gbps connectivity to all Gram Panchayat of India by 2020 and 10 Gbps by 2022 . Thus, much is happening from the Government of the country to promote equitable education for all. Now, it's the citizen of the country who should

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take these initiatives ahead and contribute towards it.

2. What COVID-19 Bought for the US?

Late 2019 and the year 2020, together has bought a revolution and a complete turnaround in the economies around the World. These years which came out with the most fatal reality- COVID-19 (Corona Virus) and its draconian impact. And before we could understand and cope up with it, everything has changed. Academic institutions have closed worldwide with an uncertainty of their resumption, students and teachers (3.73 Crore and 14.16 Lakh) respectively as per All India Survey on Higher Education (AISHE, 2018-19) associated with Higher Education were standstill with no clarity where to go; somehow life has stagnated for indefinite period of time. But, between all these, we have learned many a things which otherwise would not have been possible. We have learned that there are many ways to gain knowledge and groom ourselves even during these kinds of pandemic. And while colleges and schools were not in operation, we have discovered new platforms to ensure that learning never stops. The pandemic has taught us that no matter how worse the situation is, we will find a way to interact, learn, and get ourselves educated. It has bought a transformation into the educational system around the world and developed a sense of collaborative learning. Everyone has realized that they have to adapt and adopt newer ways irrespective of the challenges they might face. Thus, it is important to ponder upon the changes which are taking place in the education world, its repercussions, solutions, and coming out fresh with "New Normal".

It is evident that with the end of 2020, India will have the world's largest tertiary-age population (the millennia generation) and second largest graduate talent pipeline globally (as per UNESCO). And we should be ready to absorb these mass pool of young talent, which eventually cannot be managed by current "chalk & talk" way of learning only. It should be complemented with the vast pool of e-learning platforms and learning methods. It's a fact, that we might have realized the need of e-learning some years later, let's say by 2025-30, but the outbreak of pandemic has made this acquaintance little faster and forced each one of us to accept the change. And interestingly, it's not the parents or students but rather the teachers who are leading this change. They have been forced to innovate during the current crisis. This sustained innovation may lead to a lasting change in the way we educate our kids in the post-pandemic era.

3. The Beginning of New Learning ERA

In India, we are still stuck to the 'Factory Model' of education where learning pace for every student is same and average, just like an assembly line, and the learning content remains static with no personalisation. The model is being preferred as it is convenient, economical or may be considered as a sustainable way to educate a large number of kids together with limited resources. The pandemic has made us realize the alternate mode of learning and education. The new learning station is home and the learning resources are electronic devices. The irony here is while earlier parents object students for the excess use of mobile phone now it has become the only way to access learning content and attend online classes. The fact is online mode of learning can never be an alternative to classroom learning, but a supplement and complement. At the core, students are missing socialisation i.e. learning to get along with people and work with those who are not part of your family. Given the easy access to content through technology and these new initiatives, the necessity of a school is not primarily academic, but to foster socialisation and enable outsourced parenting and learning.

Thus, various EdTech players are now strategizing to explore this uncharted territory of social and group learning to enable education beyond the boundaries of a school. The edtech giants like Edx, Coursera, Swayam, Nptel, Upgrad, Unacademy, etc. have already initiated the process to enable the collaborative learning and peer-to-peer interaction and evaluation. The

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design of these platforms enables students to learn at their own pace and time, and to navigate to any content as and when required. Most importantly, the instant feedback and evaluation along with awarding of certificates are points are attracting students to opt for e-learning.

4. Challenges to Overcome

While these initiatives are a great step towards democratising education, it comes with its own set of challenges that have to be overcome. Widening the scope of e-learning and opening up new ways to facilitate online learning in remote places with no internet connectivity is a challenge.

4.1 Student Engagement Level

The biggest factor which encourages the effective learning is the engagement level of the students. TV channels, typically a one-way communication channel, leading to weaker engagement due to lack of interaction and instant response. While this could be solved by using technology, such as live polls through an accompanying app, it remains an unsolved challenge. Though online platforms have these options, but lack of internet connectivity led us to square one

4.2 Tutoring and Doubt Solving

Mere teaching with low scope of solving doubts in the real time is again a challenge which makes the learning through these incomplete. While TV channels will be able to solve for content, the larger problem of tutoring and doubt-solving will remain unaddressed. Studies have shown that the timely availability of a mentor can improve learning outcomes significantly.

4.3 Personalisation

A TV channel programme needs to be created for the masses. This 'one-size-fits-all' model means that children who are ahead or behind the curve would not be able to benefit from the content. Moreover, TV would not be able to adapt to the different learning styles of the children, thus lacking the personalisation that tech platforms can bring in.

4.4 Social Learning

Learning is a social and interactive process. Research from Harvard University suggests that peer learning can significantly improve learning outcomes as peers face the same problems and can explain and empathise better. TV-based learning wouldn't be able to activate social learning. Industry players also need to solve for socialisation and enable social learning through technology and not just content, curriculum, and availability.

4.5 Measuring Outcomes

TV channels can only measure the input metrics and not the learning outcomes due to the lack of data collection. As a result, there would be a need for a system that can measure learning outcomes and helps in providing timely feedback.

5. Literature Review

Major challenges in Indian School Education system are:

• Old and outdated policies

• High drop-out rates post primary and middle school level

• Falling enrolments in higher secondary level

• Drop-out rates of disadvantaged communities like SC ST are higher than national average

• High student-teacher ratio (1:38) in rural areas

• Lack of professionally trained and motivated teachers

• Poor quality of teaching and learning

In his conceptual model of sustainable education, he has taken three drivers of sustainability i.e., profit, people, and planet to make the educational system sustainable one. Following is the model proposed by him

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Fig 2: Drivers of Indian Education
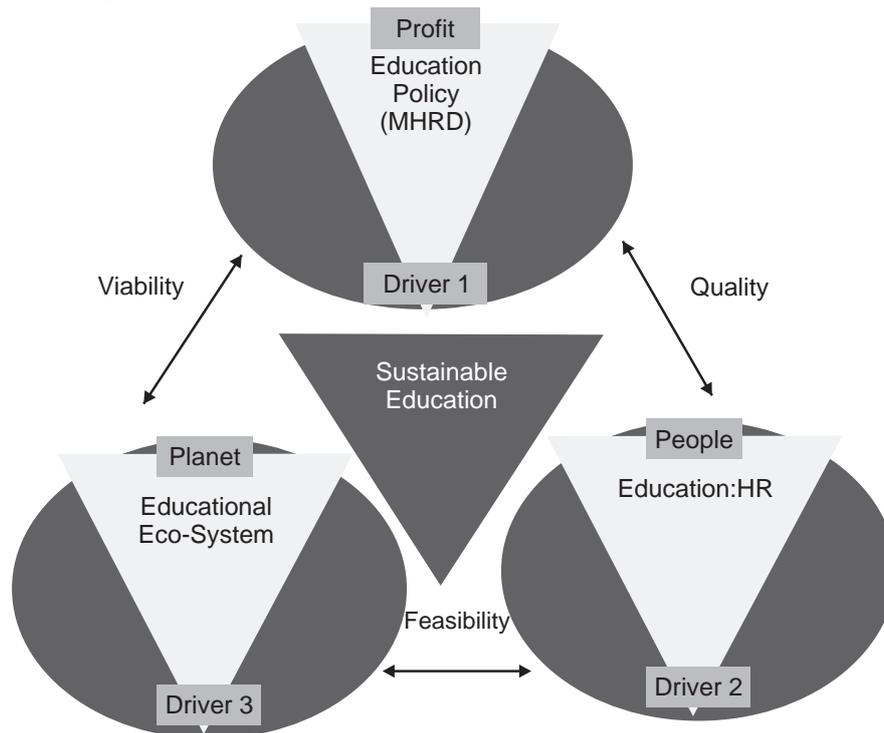
The role of ICT in the emerging environmental conditions cannot be ignored. And the inclusion of ICT tools into the education system can do wonders in addressing various environmental issues. Thus, it has become a necessity to develop ICT skills to implement and initiate various social programs like green energy programs and life-saving healthcare innovations . The report further elaborates that, with the paradigm shift in education, the instructional environment should also change so as to accelerate the innovation in education. And to facilitate such change, e-learning platforms and solutions will play the major role as technology has a power to connect the learners across the globe. Thus, the new education era will be inclined towards learner-based, self-paced, and self-regulated mode of learning, giving enough freedom to learner to explore and innovate solutions for sustainable development. In a way, learning process should be student centred, action/experienced-oriented and collaborative .

This transformation in the education ecosystem cannot be brought into the isolation, but requires the support of all stakeholders. The conceptual model of sustainable education proposed by Mohanty (2018), highlights the importance of technology in drivers of sustainability. He emphasized the role of various stakeholders to redesign the education system. Out of three pillar of sustainability, Ministry of Human Resource Development i.e. MHRD (now known as Education Ministry) has been put under the Profit (first pillar of sustainability) as it plays a vital role in policy framework and technology access. People (second pillar of sustainability) includes all stakeholders related to education sector like teachers, learners, etc. Here, he focussed on the role of training and learning programs for staff development which is very much essential for the learner's development. The third pillar of sustainability, Planet, has been highlighted as creating an educational environment and infrastructure which is eco-friendly. Thus, he focussed the inclusion of technology in making a sustainable educational system.

For any model to work, thus, the contribution of all the stakeholders is must. The conceptual model of sustainable education for India' has rightly pointed out the need of deep learning response in

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sustainable education in our educational policy which should not only aim at developing an education system but an ecosystem which can take into consideration every stakeholder linked to Indian education system.

As per UNESCO, education should address not only the learning content and outcomes generated, but develop an innovative teaching pedagogy which facilitates learning by doing. It further emphasized the adoption of whole-school approach which should aim at engaging communities in achieving sustainable change.

6. Data & Context

The Indian Education system though largest in the world after China , still lacks in quality, equity, and access for all. It requires constant efforts to not only enhance the reach of education to students of all walks of life but should work to improve the retention patterns, teacher training and availability especially in rural areas, and smooth out disparities in education . He further elaborated the role of ICT as a solution to the problem in Indian Education System. Digital Divide as described by World Bank Report, is "difference in access to hardware, technology, and right software along with shortage of Digital skills among teachers." As per Government of India Report on Key Indicators of Household Social Consumption on Education in India based on the 2017-18 National Sample Survey, following is the status of ICT infrastructure in our country.

Table No. 1: Digital Divide

The Digital Divide	
Rural households with computers	44%
Urban households with computers	23.4%
Rural households with internet	14.9%
Urban households with internet	42%

Source: https://pib.gov.in/Pressreleaseshare.aspx?PRID=1593251

Thus, considering the present condition, we don't have a sufficient ICT infrastructure across the country which creates inequity which is based on location and income. While students residing in urbans areas having internet connectivity with sufficient bandwidth keep on learning, their counterparts in rural areas or those who belong to lower income group are facing loss of learning. The COVID crises, thus, has bought into the surface the hidden form of social inequality, digital inequality .

(KPMG & CII, 2020) The next phase of data growth will be driven by digital technologies including 5G, IoT, and M2M communication and their implementation will require a robust network and investments in broadband connectivity. The Government initiative of BharatNet targeted to connect over 2.5 lakhs Gram Panchayats (GPs), only 1.19 has been connected and service ready under phase 1 but most of the networks have been found to be non-functional.

These contrasting factors make it imperative to explore business models in the field of education that are financially sustainable and address these social problems in India.

7. Methodology

The present study is an explorative approach by relying on qualitative case studies based on secondary data. It applies a comparative multiple case study approach as this method closely links empirical observations with existing theories. Moreover, this approach is useful to reduce researcher biases and to increase the likelihood of building empirically valid theories (Eisenhardt, 1989; Suddaby, 2006). In addition, this approach allows us to systematically analyze complex causal links in consideration of numerous different factors (Yin, 1981). Finally, a multiple case study approach helps to reveal differences and similarities among the cases and to embed the findings in a broader context (Eisenhardt and Graebner, 2007).

8. Case Selection and Data Collection

• The ongoing COVID-19 pandemic has impacted the learning behaviour of over 320 million learners in India and forced them to adapt e-learning modules. And while everyone is trying to adopt and adapt this new way of learning, the

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long-standing issues of inequality, digital disparity among urban and rural children, learning infrastructure in the rural areas, education, and digitisation policy have come to the surface. This poses us to the Questions:

• How to ensure equity, access, and quality in e-learning?

• How to bridge Digital Divide with immediate effect?

• What role Government and private players can play to make learning more accessible?

The below three cases have been empirically observed and carefully linked with existing theories so as to create a causal link between numerous factors responsible for the emergence of SIE. The table below reflects the brief profile of all of the three initiatives covered in this study.

Table No. 2: Description of Cases with Theories Selected

Name of the Initiative	Name of the Initiative	Online Adaptive Knowledge System (OAKS)	Maths Lab
Idea Generators Year of Establishment	Akin Babu Joseph (23), Rahul Jayanti (23), Sezel Lalwani (27), Shruthi Mohan (27), and Shubham Swaroop (22 September, 2020	MPR Vittal, Sunitha Infovision Limited 2017	Koyyur, 2017
Problem Identification (ED)	Growing digital divide between students with limited or no internet access.	To ease students and teachers hurdles during pandemic, the edtech platform was brought on board by the Telangana government to offer online classes for schools aided by it.	To do something different and unique, and make a difference to the current education system
What is the Project?	To enable Interactive Voice Response (IVR)-based audio education and volunteer assistance to children in rural India.	Focuses on conceptual and skill-based learning controlled and managed by schools	Change in education system through creativity and innovation. They can touch and feel the math models and get an understanding of the concepts, which is clearly better than the traditional 'chalk and board' method
Area Covered	Rural areas of Odisha	Implemented for 350,000 students in more than 1,000 schools spread across 31 districts of Telangana	Nada, Belthangady taluk, in Dakshina Kannada district, Karnataka

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How Project Work	Partnered with SOVA and Thinkzone (local NGO) done a pilot testing for class 1 to 4	The platform helps schools implement blended learning techniques such as flip classrooms. This includes crisp, animated self-learning video content of a maximum of 5 minutes duration on any topic, considering students' short attention span.	The lab has a 52-inch SmartTV screen, which showcases Yakub's YouTube channel 'Maths Magic.' The channel has videos on over 400 math-related topics. A smartboard has been created by a company called EyeRIS, which helps students learn and practice maths easily.
Outcomes and future scope (SIE Outcomes)	• Impacted the learning outcomes of 100 children. • Plans to extend this project to other parts of Odisha, and eventually, nationwide • Recruitment of translators in local language and academic content developer	The platform helps schools implement blended learning techniques such as flip classrooms. This includes crisp, animated self-learning video content of a maximum of 5 minutes duration on any topic, considering students' short attention span.	The lab has a 52-inch SmartTV screen, which showcases Yakub's YouTube channel 'Maths Magic.' The channel has videos on over 400 math-related topics. A smartboard has been created by a company called EyeRIS, which helps students learn and practice maths easily.
Outcomes and future scope (SIE Outcomes)	• Impacted the learning outcomes of 100 children. • Plans to extend this project to other parts of Odisha, and eventually, nationwide • Recruitment of translators in local language and academic content developer	• Adopt a village and Hub learning model • 80,000 students are active on OAKS every day and have watched upwards of 8 million minutes of content in five months • To extend our Middle East (West Asia) presence to Southeast Asia & to serve 10 million students by 2024 • Sunitha Infovision has served 3,500 schools, 1.5 million students, and 35,000 teachers, 12,000 modules of learning in English, Hindi, and Telugu	• Learning maths became fun and more practical with teaching more than 4000 students been taught so far • Planning to make a school premises greener and make similar labs for other subjects

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Problems Faced	Expenditure on technology, drafting MOU with ThinkZone, lack of monetary incentives, high call drop rate. Parent's unaffordability of mobile recharge	Unpreparedness of students and teachers to adopt online mode of learning during the current pandemic	Financial constraints being a government school
Social Support (SS)	Collaboration with local NGO (thinkzone) to use their tech-plus-touch model and activity-based methodology, partnered with SOVA (South Odisha Voluntary Action) through which they onboarded about 10 volunteers who were fluent in Odia, support of industry leaders	Collaboration with Telangana Government in 1,000-plus schools for 350,000 students for social, tribal, and minority welfare. Adopt the Village initiative, for which each teacher adopted two-three villages and make learning easy Hub learning model where students of a higher class guided 5-10 counterparts in lower classes.	Financial support of over 3.5 lakhs from old students, moral support from family, and students.

The data has been collected from the company's website and online sources like news articles and publications. Following are few of the terminologies used in the study which later been converted into a model of Social Initiatives in Education (SIE).

8.1 Environmental Dynamics (ED)

The term Environmental dynamics have been extensively discussed in the literature related to social entrepreneurship as the sources of social entrepreneurial innovation (Weerawardena and Mort, 2006; Weerawardena et al., 2010). It includes factors like socio-economic conditions, socio-political movements addressing global poverty and sustainability issues (Lucci, 2012; UNDP, 2006), and the growth of social entrepreneurship eco-systems, etc. These factors play a major role in encouraging entrepreneurs across the genres,

including entrepreneurs in education (Edupreneurs). In all the three cases, it has been observed that the societal problems among the students in rural areas with respect to access to education paved a way to SIE by edupreneurs.

8.2 Social Support (SS)

It includes those factors which helps in the emergence of entrepreneurs. Since social enterprises or social entrepreneurs aims to serve the society with no aim to earn profit, they require moral, financial, governmental, and local people and NGO's support and trust. This support can be in the form of financial help (Case III) or help to deal with local people in their native language (Case I).

8.3 Social Initiatives In Education (SIE) Actions
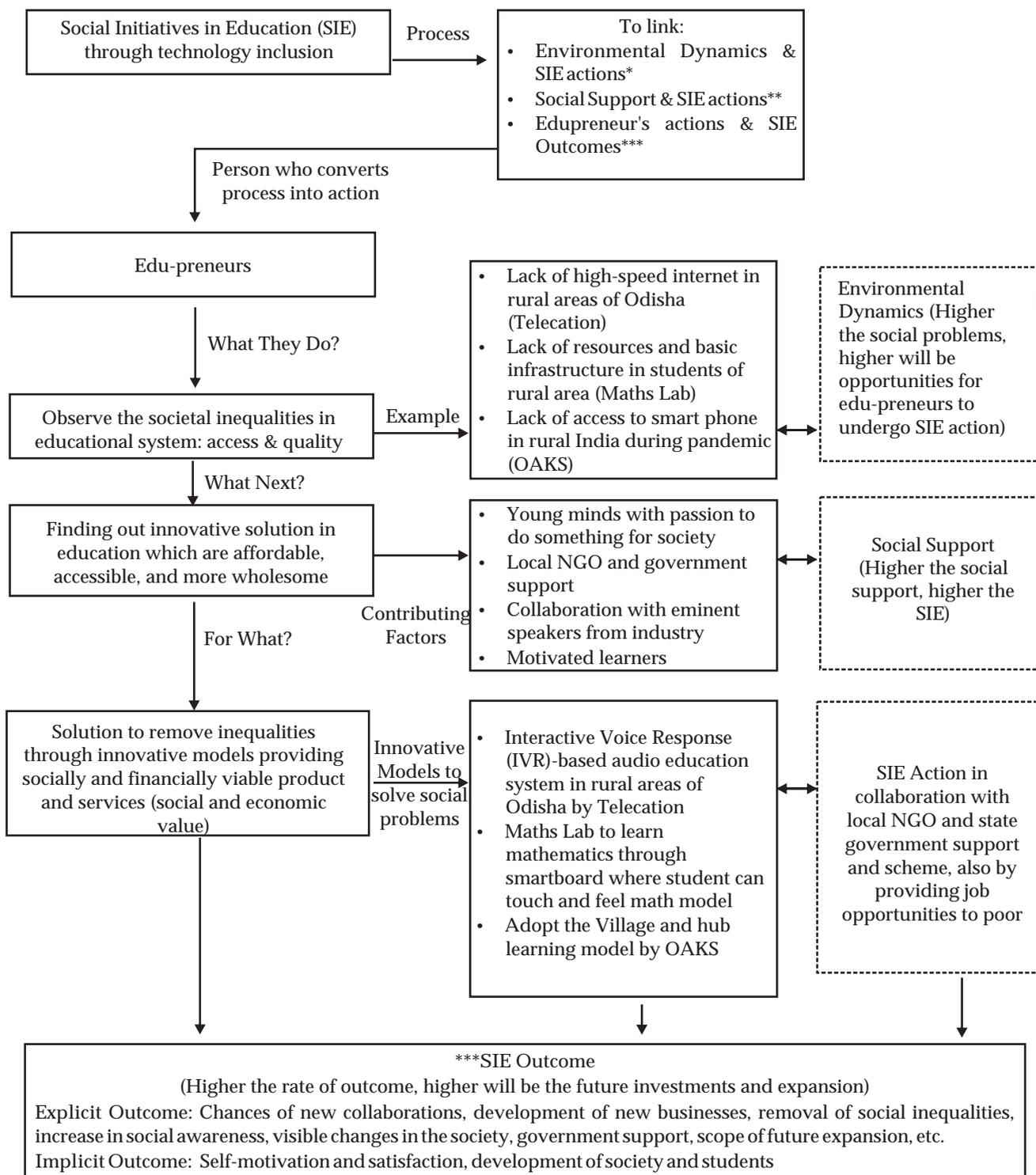
This includes various initiatives taken by edupreneurs to make education available to

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everyone. These initiative aims to be more affordable, accessible, ensure equity, and quality in education. Whether its 'adopt a village' and 'hub learning' (Case II) or developing an affordable and unique lab for students (Case III), it covers the secluded parts of our society with innovative yet affordable solutions.

8.4 Social Initiatives In Education (SIE) Outcomes

It includes the final results generated out of such social initiatives and includes the benefits which a society can derive from such action

Fig 3. Social Initatives in Education

Social Initiatives in Education (SIE) through technology inclusion	**Process** → To link: • Environmental Dynamics & SIE actions* • Social Support & SIE actions** • Edupreneur's actions & SIE Outcomes***

Person who converts process into action

Edu-preneurs

What They Do?

Observe the societal inequalities in educational system: access & quality

Example →
• Lack of high-speed internet in rural areas of Odisha (Telecation)
• Lack of resources and basic infrastructure in students of rural area (Maths Lab)
• Lack of access to smart phone in rural India during pandemic (OAKS)

↔ Environmental Dynamics (Higher the social problems, higher will be opportunities for edu-preneurs to undergo SIE action)

What Next?

Finding out innovative solution in education which are affordable, accessible, and more wholesome

Contributing Factors →
• Young minds with passion to do something for society
• Local NGO and government support
• Collaboration with eminent speakers from industry
• Motivated learners

↔ Social Support (Higher the social support, higher the SIE)

For What?

Solution to remove inequalities through innovative models providing socially and financially viable product and services (social and economic value)

Innovative Models to solve social problems →
• Interactive Voice Response (IVR)-based audio education system in rural areas of Odisha by Telecation
• Maths Lab to learn mathematics through smartboard where student can touch and feel math model
• Adopt the Village and hub learning model by OAKS

↔ SIE Action in collaboration with local NGO and state government support and scheme, also by providing job opportunities to poor

***SIE Outcome
(Higher the rate of outcome, higher will be the future investments and expansion)
Explicit Outcome: Chances of new collaborations, development of new businesses, removal of social inequalities, increase in social awareness, visible changes in the society, government support, scope of future expansion, etc.
Implicit Outcome: Self-motivation and satisfaction, development of society and students

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