Centre for Digital Transformation

INDIAN INSTITUTE of MANAGEMENT AHMEDABAD

विद्याविनियोगाद्विकास:

DIGITAL TECHNOLOGIES AND INCLUSION

The SAID Model

for policy making and program development

Prof. Pankaj Setia

The IIMA Chair Professor
Professor, Information Systems and Strategy
Chairperson, Centre for Digital Transformation
Indian Institute of Management, Ahmedabad (IIMA)

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Mr. Aditya Bhasin (Chief Technology and Information Officer, Bank of America),
Prof. Bharat Bhasker (Director, Indian Institute of Management Ahmedabad),
Ms. Madhuri Deshpande (SVP, Global Business Services Executive, Bank of America),
Prof. Debjit Roy (The IIMA Chair Professor and Professor of Operations and Decision Sciences),
Prof. Ramayya Krishnan (Dean, Heinz College of Information Systems and Public Policy, Carnegie Mellon University),
Prof. Ritu Agarwal (William Polk Carey Distinguished Professor, Co-Director, Center for Digital Health and Artificial Intelligence (CDHAI), Carey Business School, John Hopkins University),
Ms. Debjani Ghosh (President of NASSCOM),
Mr. Rajesh Gopinathan (ex-CEO & MD, Tata Consultancy Services),
Mr. Nandan Nilekani (Co-founder & Non-Executive Chairman, Infosys),
Mr. Aditya Puri (Senior Advisor, The Carlyle Group),
Prof. Vallabh Sambamurthy (Albert O. Nicholas Dean of the Wisconsin School of Business of the University of Wisconsin–Madison)

Foreword

The Government of India recognises the importance of creating an enabling, inclusive, fair, non-discriminatory, and just society for all. Ensuring inclusion is not just a matter of social justice but also a necessity for attaining sustainable development for all. The Digital India programme has given a thrust to digital technology interventions in the country, by envisioning to transform India into a digitally empowered society and a knowledge-based economy, by ensuring digital access, digital inclusion, digital empowerment and bridging the digital divide.

With the objectives of a Viksit Bharat by 2047, the government has committed itself to improving the financial and digital infrastructure in the country, to cut across the myriad challenges, to ensure access and affordability of all services to all sections of society.

India is emerging as a significant player in the digital economy, surpassing many countries in several key metrics, such as internet subscribers and digital payments. Both the public and private sectors are working swiftly to expand high-speed internet access nationwide and offer the necessary technology and services to connect Indian households to the digital world.

India has developed a world-class digital public infrastructure (DPI) to bolster its efforts in achieving the Sustainable Development Goals. India Stack, the collective name of a set of commonly used DPIs in India; consists of—unique identity (Aadhaar), complimentary payments systems (Unified Payments Interface, Aadhaar Payments Bridge, Aadhaar Enabled Payment Service), and data exchange (DigiLocker). They have enabled online, paperless, cashless, and privacy-enabled digital access to a variety of services.

Digital systems that are human-centric, development-oriented and sustainable have the potential to support the transformation, foster innovation, close gaps, reduce leakages, improve delivery mechanisms and catalyse inclusive growth. From health to finance, digital transformation is reshaping public and private services with greater efficiency and effectiveness. The networks of digital systems are allowing life-changing digital solutions like e-health, online education, e-commerce, digital cash transfers, to benefit every corner of every community.

I am happy that the Centre for Digital Transformation, IIMA, is leveraging its expertise in research and development to provide thought leadership for digital transformation. This report by Prof. Pankaj Setia, adds to the discourse of universal digital access and in leading the country towards Viksit Bharat.

Dr. Saurabh Garg (IAS)
Secretary
Department of Social Justice and Empowerment
Government of India

Preface

With prevalence of digital technology access to different social strata globally, there is a growing need to bridge the digital divide to create an inclusive human society. This report proposes a SAID model (Selection, Assessment, Identification, and Digital Capability Development) as a framework to promote inclusive social development through digital inclusion. The fundamental premise of the model is that overcoming the "inclusion problem" is pivotal for social progress and that the digital technologies offer solutions for these challenges.

The SAID model operates through a systematic four-step approach. Initially, relevant developmental goals are selected, frequently aligning with the Sustainable Development Goals (SDGs). Next, an assessment identifies inclusion barriers hindering progress toward these goals. The third phase entails identifying pertinent digital capabilities to mitigate these inclusion barriers. Finally, the model focuses on developing five digital capabilities viz. health, knowledge, enterprise, finance, and social to address the inclusion problem.

The report elaborates on the potential for digital health capabilities enhancement using telemedicine and computer vision, to bridge geographic and access-related disparities in healthcare delivery. Similarly, it highlights the role of digital knowledge capabilities, such as e-learning platforms and initiatives like DIKSHA, in promoting access to education and skill development. The report further underlines the importance of digital interventions for promoting financial inclusion. Initiatives like the Sustainable Livelihood Initiative and the pandemic-era mortgage restructuring by Infosys are discussed as examples of digital tools driving financial literacy and access. The need to address societal biases, such as gender and colourism, which hinder inclusive social development are highlighted. The MyAmbar app's focus on women's safety and Burger King's proud whopper campaign advocating for LGBTQ+ inclusion are examples of how digital awareness initiatives contribute to addressing these biases.

I submit that the SAID model, the targeted development of digital capabilities, and digital awareness campaigns represent a powerful combination to address inclusion problems and advance social development objectives.

I would like to thank CDT council members Mr. Nandan Nilekani (Co-founder & Non-Executive Chairman, Infosys), Ms. Debjani Ghosh (President of NASSCOM), and Mr. Aditya Puri (Senior Advisor, The Carlyle Group) for facilitating the case studies from Infosys, NASSCOM Foundation, and HDFC Bank.

Prof. Pankaj Setia
Project Director
The Institute Chair Professor,
Professor, Information Systems and Strategy
Chairperson, Centre for Digital Transformation
Indian Institute of Management Ahmedabad (IIMA)

POLICY BRIEF / EXECUTIVE SUMMARY

The report outlines a SAID (Selection, Assessment, Identification, and Digital Capability Development) model that outlines the process for leveraging digital technologies for social development.

The model consists of four steps:

1. Selection of specific social development goals.
2. Assessment of the inclusion problem that restricts or hinders social development after the specific social development goals are selected.
3. Identification of the digital capabilities that may be built to address the inclusion problem.
4. Development of these digital capabilities.

Based on the projects done at India's leading software and technology companies and the inputs of thought leaders, this report highlights several inclusion problems and five different types of digital capabilities that help address them:

- **a. Digital Health Capabilities**
- **b. Digital Knowledge Capabilities**
- **c. Digital Enterprise Capabilities**
- **d. Digital Financial Capabilities**
- **e. Digital Social Capabilities**

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INTRODUCTION

Social development is a key priority for policymakers worldwide, and after extensive international efforts, there is now a growing consensus on the goals for social development. However, how to achieve these goals remains a challenge.

Meeting these goals is crucial as the ability to meet the deadline (2030) will create a new humanity, a new world—a better world. As many policymakers and organizational leaders are working hard and developing programs, we underline that a solution may depend on a focused approach that leverages digital technologies as a part of the solution. This requires identifying a clear approach to leveraging digital technologies—a model that may guide the development of programs and strategies to leverage digital technologies. Such a model is essential as it can help achieve the following:

1. ***Economies of scale and scope***
2. ***Avoidance of misalignment in governance***
3. ***Reduction of redundancies in technologies and efforts***

Indeed, there is a lot happening in both the private and public sectors to enhance individual well-being through digital technologies. The challenge for us is to extract key learnings from these developments to create strategic and decision-making models for leveraging digital technologies to achieve social development.

This report presents the SAID (Selection, Assessment, Identification, and Digital Capability Development) model, which outlines how policymakers may leverage the power of digital technologies to develop programs for social development. The SAID model highlights the fundamental principles policymakers may rely on to formulate digital strategies for achieving social development goals.

Social development is the underlines evolution and improvement in the living conditions of individuals in society, as well as the enhancing their relationships, and better interactions across groups and instituitions these individuals maintain with each other and with other groups and institutions that make up the social fabric of a nation. Social inclusion, oOn the other hand, social inclusion refers to the underlines participation of extent that individuals, families, and communities are able to fully participate in society and their control of their own destinies, considering various factors related to spanning their access to economic resources, employment, health, education, housing, recreation, health, education, culture, and civic engagement (Warschauer, 2004).

THE SAID MODEL

The proposed model is built on two assumptions:

Assumption 1:

The first assumption emphasizes that sustainability and speed of social development depend on our ability to underline a dynamic that restricts social development. That is, identifying an underlying unifying and conceptual factor that would help a broader development is crucial at the national and international levels to meet developmental goals.

The SAID model outlines the inclusion problem as the underlying factor that limits social development. However, identifying the problem is challenging, as the exclusion of people and groups may be historically rooted because of the social dynamics associated with race, caste, and other factors. The inclusion problem underlines the lack of social development and is the first assumption in the SAID model.

Assumption 2:

Digital technologies can be used to develop capabilities that overcome the inclusion problem. Various digital technologies are helping individuals access knowledge and resources associated with their development and well-being, thus facilitating their inclusion. Therefore, the SAID model's second assumption is that digital technologies can help develop capabilities that overcome the inclusion problem.

STEP 1: *Selection ("S") in the SAID model*

The first step in creating a digital program for social development is to select the developmental goals that should be pursued.

Since the adoption of the United Nations Declaration on Sustainable Development by all 193 member countries in 2015, Sustainable Development Goals (SDGs) have become a key focus of international public policy.

From the perspective of inclusive development, successful implementation of the SDGs would entail not only a reduction in poverty and marginalization but also an increase in ecological sustainability and a narrowing of the gap between the powerful and the less powerful.

Various SDG goals have been identified with a focus on people. Specifically, each program has to select the goals it needs to target.

STEP 2: *Assessment ("A") of the SAID model*

The second step is related to the inclusion problem that (when solved) enhances social development outcomes. Specifically, it is about the assessment of the inclusion problem. What is the inclusion problem that hinders development, and how does it do so?Often the systems for development may exist, but individuals may not have access to them for various reasons. For example, access to finance may be restricted because of the costs of banking.

There are few global initiatives aimed at ensuring and advancing digital equity. In USA, the National Digital Inclusion Alliance (NDIA) supports community programs and equips policymakers. Specifically, NDIA enhances coalition building for digital equity by enabling grassroots community greater access to research and technical knowledge (Sieck et al., 2021). The second step in the SAID model involves assessing the inclusion problem that hinders social development.

STEP 3: *Identification ("I") in the SAID model*

The third step involves identifying the digital capabilities that are best suited to address the inclusion problem identified in step 2.

On the basis of various projects that develop digital technologies, it is evident that inclusion can be enhanced by developing digital products and services, as these are more widely available beyond a core group. As digital capabilities grow, exclusion is no longer a viable option— socially, morally, or financially—and traditional factors that lead to the lack of inclusion are overcome quite easily.

Telemedicine is a classic example of how digital capabilities can include a larger population that has no access to physical healthcare facilities, expert doctors, or specialized hospitals in their vicinity.

STEP 4: *Digital ("D") capability development in the SAID model*

Developing digital capabilities is the fourth and final step of the SAID model. This requires leveraging digital technologies to enhance one or more of the five types of capabilities:

a. Digital health capabilities that help us stay fit
b. Digital knowledge capabilities that enhance our learning
c. Digital enterprise capabilities that increase our consumption choices
d. Digital financial capabilities that improve our monetary transactions
e. Digital social capabilities that strengthen our relations with society

Next, we highlight how the development of these five digital capabilities addresses a certain inclusion problem, enhancing social development.

DIGITAL HEALTH CAPABILITIES

Digital health capabilities represent the ability to access and use healthcare and wellness services developed through digital technology. These capabilities are becoming increasingly vital for extending healthcare services to people, a progress that has been accelerated by the COVID-19 pandemic. The World Health Organization has a "Global Strategy on Digital Health 2020-2025". The strategy underlines greater empowerment of patients through digital healthcare services, to enhance outcomes health for all.

Notable advancements in digital technologies that enable health capabilities include, among others:

- ***Telehealth platforms***
- ***Artificial intelligence (AI) and Machine Learning (ML)***
- ***Development of trustworthy AI for healthcare***
- ***Better connected care links between healthcare service providers and patients***

Good health is associated with better productivity and less absenteeism, two key determinants of a nation's socioeconomic development. This recognition is driven by various initiatives of the Indian government, including those championed by the National Digital Health Mission (NDHM).

India is the world's fifth-largest economy with a goal of achieving a USD 5 trillion economy (Agrawal et al., 2021). However, in the Healthcare Access and Quality (HAQ) index, it is ranked 145th out of 195 countries(Fullman et al., 2018). In an effort to provide affordable healthcare to all citizens, the Indian government officially launched the NDHM in September 2021(Adams, 2021). India's tryst with digitalization in healthcare through Health Information Systems (HIS) and telemedicine dates back a couple of decades ago when ISRO conducted a case study on telemedicine(Sheetal Ranganathan, 2020).

In 2009, the Centre for Development of Telematics (C-DAC) launched the e-Sanjeevani project. In addition to the HIS, India has focused on digital therapeutics and digital diagnostics. The NDHM aims to create an open digital health ecosystem that will serve as a shared digital infrastructure for both public and private organizations to offer innovative and novel healthcare solutions.

As of May 15, 2022, over 21.9 million health IDs (also known as ABHA, Ayushman Bharat Health Account) have been created, and 53,341 health facilities have been registered under the scheme (Priyanka Sharma, 2022). The objective of this scheme is to combine societal inclusion with the success of the National Payment Corporation of India (NPCI) in the healthcare sector. Digital 3.0 in healthcare will address basic challenges in India's healthcare system.

We next highlight some key inclusion problems and how digital capabilities are addressing them.

We next highlight some key inclusion problems and how digital capabilities are addressing them.

Inclusion as a Problem of Access to Medical Specialists

Many segments of the population are unable to access expert medical specialists because of a lack of awareness or resources, or locational disadvantage, which hinders their inclusion in the healthcare sector. For example, people living in remote rural areas face challenges in accessing medical specialists from urban centers. However, digital technologies can be useful in extending expert medical assistance across regional boundaries and reaching out to those who were previously unserved by physical healthcare units. For instance, digital health capabilities engendered through telemedicine are efficient ways of delivering healthcare services to a wider population.

Telemedicine in India

- Telemedicine refers to the practice of diagnosing and treating patients remotely through telecommunications technology, making high-quality care accessible to individuals in low- income areas. In fact, the earliest published record of telemedicine dates back to the early twentieth century when ECG (electrocardiogram) readings were transmitted over telephone lines.

- Telemedicine has the potential to alleviate the strain on healthcare systems. To this end, the Health Ministry of India established the National Telemedicine Taskforce in 2005, leading to the development of various programs and bodies such as the Indian Council of Medical Research - ICMR AAROGYASRI, National eHealth Authority (NeHA), and Village Resource Centers (VRCs).

- Telemedicine can also benefit family physicians by offering them convenient access to specialists and enabling them to closely monitor their patients. Various forms of telemedicine services, such as self-monitoring, real-time and remote, and store-and-forward, are used. These provide various services that educate, help deliver or manage healthcare, screen diseases, and mange during disasters (Jhunjhunwala, 2019).

- In India, gynecology, general practice, and dermatology are the most frequently accessed specialties through teleconsultations, accounting for 51% of all such consultations. However, other specialties, such as ENT, mental health, pediatrics, gastrointestinal, and ophthalmology, have seen a significant increase in teleconsultation inquiries in recent years (Chellaiyan et al., 2019).

Phone consultations	Video consultations	Digital tools for self-help	Online self-assessment tools
86% (Up from 48% before pandemic)	83% (Up from 33% before pandemic)	92% (organizations)	89% (organizations)

Source: David Bates et al. (2021)

Inclusion as a Problem of Access to Medical Procedures

In addition to medical specialists, various medical procedures of varying levels of sophistication are often concentrated in certain regions. This makes it difficult for people living outside these regions to access many of these medical procedures, which hampers the early detection or prevention of many ailments. However, some medical procedures, such as eye checkups, can be performed using digital capabilities such as image computing. These facilities can reach wider masses without the need for physical centers or the presence of medical professionals.

Example of Eye-PAC

Image computing platforms can be a powerful tool for improving accessibility to eye care and including a population without access to trained ophthalmologists. The onset of blindness due to lifestyle-related diseases such as glaucoma and diabetic retinopathy is preventable, yet over 50 million people in India are at risk of developing such sight-threatening eye diseases Early detection through regular eye checkups is essential to prevent or manage these conditions.

However, there is an acute shortfall of trained ophthalmologists in India, with an expert per- capita ratio of approximately 1:100,000. That is, large population and limited availability of experts leads to a large gap and requirement for large-scale screening. Unfortunately, screening is typically only available in urban areas where ophthalmologists and sophisticated lab equipment are accessible, leaving a substantial portion of the population excluded from preventive and diagnostic screening that could help prevent serious complications later on. Eye-PAC is a digital computing technology platform designed and developed by the Healthcare Technology Innovation Centre (HTIC) of IIT Madras and integrated with the 3nethra eye screening camera developed by Forus Health through technology translation (The Hindu, 2011).

Specialization in Terms of Healthcare

Eye-PAC uses image pre-processing, blood vessel segmentation, and red lesion detection, followed by image analytics, to extract clinically relevant information from eye images to predict the onset of the following vision-threatening diseases:

Diabetic retinopathy	**Hypertensive retinopathy**	**Glaucoma**	**Age-related macular degeneration.**

3nethra is a user-friendly device that requires minimal training and is capable of detecting eye diseases. Eye-PAC, which currently operates on 1,300 devices across 22 countries, has screened 2 million patients (The Hindu, 2016).

Inclusion as a Problem of Discovery

The problem of inclusion of a wider population in the healthcare system also arises from the problem of discovering who needs access to care. Providing care may be challenging because of geographical distance or constant mobility. Owing to geographical distance, several people remain excluded from physical health services. Meanwhile, constant migration makes it difficult for health officials to integrate migrants into society and the healthcare system. Digital capabilities such as data analytics can help address these challenges.

Example of Infosys: Working With an African Nation Government to Enhance Healthcare Inclusion

Access to essential healthcare services was unavailable for a major chunk of the population living over 5 km away from a health facility in an African nation. Infosys helped the government develop a solution, with the primary goal of strategically locating new health posts. The aim was to ensure that by 2023, 95% of the population would be residing within 5 to 6 kilometers of a health facility. Infosys collaborated to develop an analytics model that produced dynamic maps featuring optimal locations for the new health posts across the nation. The model used a combination of previously untapped analytics from mobile network operator (MNO) data and other data sets to understand population growth, density, and migration in the country and project the optimal placement of new health facilities in line with national priorities.

The team used anonymized MNO data from an MNO partner, including call data records and geo-tagged locations of cell towers. They also used high-resolution population density data for 2015, compiled by WorldPop and calculated using satellite imagery trained on the nation's previous census data. Additionally, they employed location and catchment area calculations of existing health facilities, provided by the Ministry of Health from a detailed UNICEF survey of every operating health facility in the nation, as well as monthly facilities-level disease burden data also supplied by the Ministry of Health. The team used data analytics to:

- **Validate the information against available census data and analyze population density, movement, and patterns**
- **Assess month-on-month, and across times of day, population movement that helps unravel commuting patterns**
- **Study and account for population movement across weekdays and weekends while providing health services**
- **Assess seasonal migration linked with agricultural activities**
- **Identify a consistent set of unique users in 2016 and 2017**
- **Using the UNICEF-defined catchment areas, to identify the availability of health facilities relative to the population**
- **Use the WorldPop data to determine spatial clusters of uncovered population, adjusting for population growth and migration**
- **Identify distances beyond which a patient may not travel to the health post**

Inclusion as a Problem of Access to Healthy Lifestyle Habits

A healthy lifestyle is a precursor to an overall higher standard of health and well-being. Unfortunately, factors such as low literacy, lack of resources, and limited awareness prevent many individuals from adopting healthy lifestyle habits. However, digital health capabilities such as wearable technology help encourage and provide access to healthier lifestyles and better integrate people into the healthcare system.

Example of Infosys: Digital Transformation at a Large North American Life and Annuities Insurance Carrier to Help Drive More Health/Fitness Inclusion

Between June 2020 and February 2021, a large North American life and annuities insurance carrier launched a product to integrate wellness and wearable technology into life insurance, aimed at providing premium benefits to individuals who adopt healthier habits. The company followed the standard regulatory processes to suggest premiums to customers. Through a partnership with a wellness-focused company, this insurance carrier became the first in the industry to integrate wellness and wearable technology into life insurance, rewarding customers for taking steps toward healthier habits.

The Infosys digital platform helped the client launch their product. The platform was highly adaptive and seamlessly integrated with such innovative offerings from insurance carriers. The solution further improved the timeline required by the company for future launches and repricing initiatives. The solution encourages healthy living, and the platform enables the implementation of product rules. Policyholders receive discounts once their health scores improve because of healthy living. The platform offers a seamless view of product/policy performance for both the carrier and the customer, enabling the launch of digitized products and customer wellness initiatives.

Inclusion as a Problem of Access to Digital Devices and Services

For improving digital health capabilities, “digital inclusion” refers to the activities required to ensure equitable access to information and communication technologies (ICT). Many people are excluded from benefitting from digital health capabilities because of a lack of access to digital devices and services, such as smartphones and reliable internet. Better access to digital devices and services helps spread awareness about prevention, treatment, and healthy lifestyles. Therefore, removing these material barriers could foster better health among the population. As per a TRAI report (IBEF), monthly mobile traffic and the number of wireless subscribers show an upward trend. Schemes such as the Prime Minister Wi-Fi Access Network Interface (PM-WANI) could further accelerate this trend. Hence, mHealth could be a promising option for Indians in the future.

Example: Low Smartphone Usage in Rural India Hindering Vaccination Through CoWin

- Assam has the lowest percentage of smartphone users among all states in India, with only 21% active smartphone users. Poor vaccination due to digital inaccessibility led to the loss of employment for about 1 million construction workers in the state (The Wire, 2021)
- 70% of Indians still live in rural India, where digital illiteracy and a poor vaccination distribution strategy have resulted in an asymmetry of immunized populations in urban and rural areas. In Jharkhand, Punjab, Tamil Nadu, and West Bengal, the ratio of fully vaccinated urban population to eligible population is still lower (SBI, 2022)

DIGITAL KNOWLEDGE CAPABILITIES

Digital knowledge capabilities refer to people's abilities to acquire digital knowledge and skills. Various online learning and skill development platforms, among others, are helping develop such capabilities. Digital skills are becoming increasingly important to ensure development in today's knowledge-intensive world. The United Nations Industrial Development Organization's (UNIDO) Learning and Knowledge Development Facility (LKDF) Forum 2021 emphasized the importance of digital skills for an inclusive future (UNIDO, 2021).

The pandemic has accelerated the digitalization of learning and connecting with classrooms. However, it has also revealed a severe knowledge divide that reinforces social and economic disparities. When digital learning capabilities are more widely accessible, it promotes the inclusion of all kinds of learners, irrespective of their social, economic, or cultural background. The impact on social development is apparent.

Impact of Digital Knowledge Capabilities on Inclusion and Social Development

Traditional knowledge systems often suffer from issues such as unequal access to opportunities, high costs, concentration in certain major cities and towns, and a lack of expert tutors. This causes a skill divide between those with access to quality learning resources and those without.

Digital technologies allow people to learn, upskill themselves, and overcome the exclusion rendered by traditional knowledge systems. With easy access to high-quality resources, expert tutors, and affordable digital learning options, many people are enhancing their knowledge and skills through various digital educational platforms. As per a survey by Coursera, the online primary and secondary supplemental education markets grew to INR 21.18 billion and INR 34.17 billion in 2019 and 2020, respectively. In comparison, the online reskilling and certification markets grew to INR 21.74 billion and INR 23.87 billion in 2019 and 2020, respectively. The potential for greater social inclusion through digital knowledge capabilities has prompted the government to take several initiatives to impart digital skills and increase access to digital technologies. The following are some of these initiatives:

The National Skill Qualification Framework (NSQF)	**National Digital Literacy Mission (NDLM) (NASSCOM Foundation)**	**Ministry of Education (MoE) and Skills Development**
National School Education Platform, NCERT, and Ministry of Education	**DIKSHA is a national portal for school education launched by the government in September 2017. It provides students, teachers, and parents with curriculum-based and engaging learning materials. The portal is multi lingual and has been adopted by 35 states/union territories.**	

Inclusion as a Problem of Content Curation

Access to knowledge content/educational content is vital for achieving outcomes such as better social development through digital technologies and digital knowledge capabilities. Digital technologies have enabled groups otherwise excluded from such opportunities to access educational content and engage in continuous learning.

- In both public and private schools, for educational delivery, WhatsApp was the primary mode (75%), and was followed by phone calls between teachers and students (38%) (UNICEF, 2021)
- Coursera conducted a survey that finds that digital learning made 58% of career builders in India better equipped

The case of the Digital Skills Academy by IIT Madras and NASSCOM underlines the role of building digital knowledge capabilities.

Case Study: Digital Skills Academy by IIT Madras and NASSCOM

In 2017, NASSCOM and BCG conducted a comprehensive study to identify the trending job roles and skills in the emerging technology area. The study found that the IT-ITeS industry was facing massive disruption as emerging technologies were supposed to change the future of work. FutureSkills, an industry-driven learning ecosystem enabled by NASSCOM, predicted that nearly half of IT employees would require reskilling in the next four to five years. The platform includes a curation engine that scours the web for high-quality learning content and funnels it to the learning community in an easy-to-consume format. The curation engine also allows subject matter experts from industry and academia to contribute by curating the content and helping identify learning pathways for the learners.

IIT Madras has partnered with NASSCOM IT-ITeS to launch various training programs, such as FutureSkills program. Leading faculty members from IIT Madras and other IITs and NITs have created these programs with a blend of hands-on and theoretical knowledge to make the trainees productive from the get-go. The “Career Back 2 Women” initiative—where data science and big data analytics, AI/ML, cyber security, and programming skills are offered as specializations for reskilling/upskilling courses—places special emphasis on women who wish to return to the IT profession. This initiative is driving the inclusion of an important workforce into the IT-ITeS industry.

Inclusion as a Problem of Teaching Relevant (Marketable) Skills

The skill divide that exists today is largely due to a lack of adequate digital skills among people. In today's world, digital skills are essential in all aspects of life, more so in people's professional lives. Hence, it is important to impart relevant and marketable skills to enable people to keep up with the developments of today's digital world and benefit from them.

Example of Infosys: Education Initiative with a UK Borough Council to Enhance Digital Capabilities

Background

- Digital inclusion became a crucial strategy for the UK government. This was especially relevant during that led to high unemployment levels.
- Infosys worked with the UK Borough Council, as it had committed to creating 1,000 digital jobs in the UK to catalyze post-pandemic growth
- Infosys had an intent to expand the program across Europe, as it may help democratize access to reskilling and upskilling opportunities

Mission

In 2020, the skill gap among individuals, especially among the economically poor, was severe. Estimates suggested that “9 out of 10 jobs will require digital skills for which half of the UK population was not digitally skilled.” Because of the pandemic, the number of unemployment claimants aged 18 to 49 tripled. In 2020, one in five adults in the borough lacked what would be considered essential digital skills. The council's mission is to help low-paid workers by connecting them with economic and employment opportunities, after giving them access to adult education and skill development.

Scope

- The Infosys Education Initiative collaborates with a UK borough council to drive inclusion in the knowledge space
- Specifically, Infosys introduced a digital learning platform for providing access to digital training. This platform helps users track their progress and search for different courses.
- The platform has been developed to support the reskilling and upskilling of the UK workforce. It is a cloud- and mobile-based solution that has been designed to be accessible anytime, anywhere, and on any device, ensuring equitable access for all residents.
- Digital training is available to beginners, intermediate learners, and expert learners, with periodic tests and certification
- From modules on sending effective emails to cybersecurity and coding, the courses are designed to help users build their digital skill sets and boost their appeal to employers. The platform helps create a learning path for the learner depending on their current level and interests.
- Launched in 2021, this platform offers over 220 courses on technologies, emerging job roles, and professional and behavioral skills. The goal is to create real, measurable transparent growth in the community.

Impact

As of 2022, the platform offers mentorship and technical support to entrepreneurs, helping them innovate and build . An Infosys subsidiary company is helping the council develop a structured program tailored to support entrepreneurs and small and medium enterprises (SMEs). Since its launch in 2021, the platform has witnessed the registration and participation of over 6000 people who have embarked on their digital reskilling journey. It continues to attract people from all strata of society and enhance knowledge inclusion.

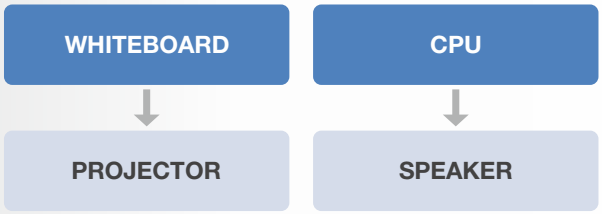
Inclusion as a Problem of Garnering Individual Attention

Often, teaching and delivery methods can be archaic, making learners disconnected from the classroom and teaching experience. The modernization of classrooms through the use of technology is a way to make learners interested and make access to knowledge more equitable.

Example of HDFC Bank: Smart Classrooms in Government Schools

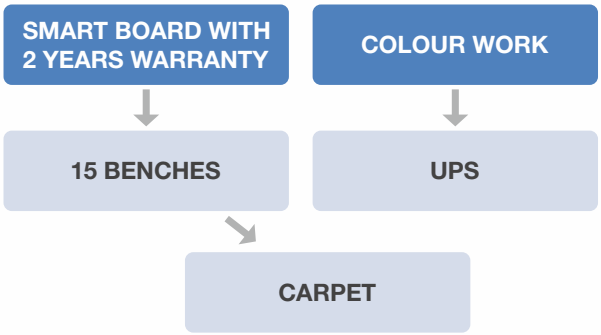
HDFC Bank has committed to creating 2,500 smart classes by 2025 using technology. The bank has already established over 1,280 smart classes, which have helped provide better education. The project adopts two models to make the class a "Digital Class."

Model 1
Two smart classrooms in each school, with each classroom having a whiteboard, projector, CPU, and speaker



Software & Sustainability Aspects
- 3-year technical warranty
- Troubleshoot visits in case of any urgent technological issues/repairing
- Pre-installation of e-content in all smart classrooms Post-installation training to the available teachers and principal

Model 2
One smart classroom in each school with a smart board, benches, a UPS, and a carpet



Software & Sustainability Aspects
- 2-day workshop on teacher training at the initial stage for smart classrooms
- Monthly monitoring and supervision by the vendors' supervisor for 6 months

Sample Digital Classroom Photos

DIGITAL ENTERPRISE CAPABILITIES

Digital enterprise capabilities refer to the ability of people to start ventures or expand their existing enterprises with the support of technology. Digital technologies have the potential to enhance the enterprising abilities of communities in various ways:

- Technology provides people with the opportunity to source materials for their enterprise from different sources.
- Business owners can serve customers across regional boundaries.
- They can keep their business operations running 24/7. For example, e-commerce enables people to make purchases anytime and anywhere.
- Moreover, business owners can use more sophisticated technologies such as advanced analytics and automation to achieve greater business gains.

Technology has significantly changed the way businesses operate and customers engage with them, as evidenced by the rise of internet-based companies and online shoppers worldwide.

Based on a report by Chow (2022) in Web Hosting Secret Revealed (WHSR) in 2022 titled “Online shopping, e-commerce, and internet statistics (2022) you should know,” the trends of online shoppers are shown in Table C.1.

Table C.1: Online Shoppers' Trends in 2021

Digital buyer penetration	Online shopping	Web users visit anonline store	Mobile e- commerce purchase	Credit cards	Digital wallets
28%	USD 1.2 trillion	60%	82%	29%	25%

- As of Q1 2019, India had 560 million active internet users.
- As of 2022, the distribution of internet users in the world by region was as follows: Asia 50.1%, Europe 16.4%, Africa 11.2%, Latin America/Caribbean 10.1%, North America 7.5%, Middle East 4.0%, and Oceana/Australia 0.7%.
- The global internet subscription penetration reached 69.3 % in Q4 2018.
- Amazon was the leading online retailer, with a net revenue of USD 232.88 billion in 2018. The company set a record for profits in Q1 2019, reporting a net income of USD 3.6 billion for the quarter, or USD 7.09 per share, crushing analyst expectations for earnings of USD 4.72 per share.
- Southeast Asia's internet economy reached USD 100 billion in 2019.
- In 2019, e-commerce accounted for over 13% of all retail revenue.
- There were 829,000,000 internet users as of March 2019, with 58.4% penetration, as per CNNIC.
- As of Q4 2018, PayPal had 267 million active registered accounts.
- People in India spent an average of 7 hours and 47 minutes per day using the internet on any device.
- There were 560,000,000 internet users in March 2019, with 40.9% penetration, as per IAMAI.
- As of 2022, WordPress accounted for 27% of all websites worldwide, but only about 40% of WordPress sites were up to date (WHSR, 2022).
- The top five most visited websites globally were as follows: (1) Google.com, (2) Youtube.com, (3) Facebook.com, (4) Baidu.com, and (5) Wikipedia.org.
- Indonesia and Vietnam had the fastest-growing internet economies in Southeast Asia, with annual growth rates exceeding 40% in 2019.
- In 2019, the number of those who accessed the internet exclusively on a mobile device grew by 10.6%, reaching 55.1 million users.
- According to Alexa, the top five most visited websites in 2019 were (1) Amazon.com, (2) Netflix.com, (3) Ebay.com, (4) Amazon.co.uk, and (5) Etsy.com.
- The latest reported figures suggest that almost 1 million people came online for the first time on average each day over the past year.

Inclusion as a Regional/Geospatial Problem

With technology, enterprises no longer have to rely on the brick-and-mortar business model. They can now reach a wider customer base, while customers benefit from greater product variety and convenience.

- India had 140 million e-retail shoppers in 2020, making it the world's third-largest online shopper market, trailing behind only China and the United States (Bain & Company, 2021)

- From 2021 to 2026, the Indian e-retail market is predicted to grow at a rate of 25%–30% annually, reaching USD 120–140 billion by FY26, surpassing the growth rate of modern trade. This expansion will be fueled by small-town India, which is expected to contribute to four out of every five new shoppers. Reverse migration from metro areas spurred growth in smaller communities during the pandemic. Women and elderly buyers, in addition to small communities, are continuing to grow the e-retail base.

During uncertain times such as the COVID-19-induced lockdowns, traditional business structures struggled to service customers, while digital enterprises proved to be a blessing in such trying circumstances. Adopting digital technologies into their operations was the only solution for existing businesses to remain operational.

- COVID-19 gave India's e-retail penetration a huge boost, propelling it by a year and a half to over 4.6% in FY21. This rise was much more pronounced in metro areas, with one in every three people shopping online at least once in the top eight metro areas last year. One in every two residents in Bengaluru shopped online at least once last year. Global e-retail marketplaces predict that the increase is expected to continue, with levels higher than before the COVID-19 pandemic but lower than peak levels.

- During the lockdowns, e-retailers played a crucial role in ensuring that millions of Indian households had access to essential food and sanitary items. Both consumers and sellers relied on e-retailers to survive. Consumers in over 95% of India's pin codes were able to stay home and prevent sickness from spreading. At the same time, e-retailers helped India's small sellers and brands (particularly insurgents) overcome go-to-market constraints and reach consumers amidst the massive upheaval.

However, often, enterprises remain concentrated in some areas because of market structures, raw material and labor force availability, customer base, and other factors. Even the type of enterprises is differentiated between regions, with rural areas and smaller towns mostly seeing small and cottage enterprises. Digital technologies have the potential to blur these regional boundaries and provide entrepreneurs with avenues to start a business without experiencing locational disadvantages.

Case Study of HDFC Bank: Rural Transformation Technology Center (RTTC)—A Satellite Imagery and Geospatial Intelligence-Powered Operations Monitoring and Control Center (OMCC)

The RTTC by the Deshpande Foundation is equipped with customized software that uses AI and ML and extracts geospatial intelligence to inform, guide, and monitor farm pond operations. The control center features display equipment, communication equipment such as a mini call center (telephone exchange, IVRS, etc.), and computing resources that display operational data, dashboard screens, charts and graphs, and telemetry data from various sources (weather, government data sources, IoT sensors, mobile apps, drones, and more).

In its first year of operation, the RTTC—located at Hubli, Karnataka—envisages helping construct farm ponds, facilitating farmer advisory services, and working with farmer producer organizations (FPOs) to improve the sale of produce and augment farmer incomes in the first phase. In the second phase, the center will help manage micro-entrepreneurship, skill development, and other services. It is expected that this center can be used for different projects and offer sector-agnostic functionality. Notably, it will be a readily accessible resource and help center for field champions who are closest to the beneficiaries. HDFC Bank is supporting the establishment of the RTTC, enabling the construction of 1000 farm ponds in North Karnataka over 15 months.

Inclusion as a Problem of Logistics, Infrastructure, and Cost

Logistics and infrastructure are essential pillars in enabling enterprise abilities. However, their complexity and dynamic nature hinder enterprise inclusion. Digital technologies can make logistical processes more efficient by automating and optimizing several manual processes. This reduces human error and delays, making the enterprise better suited for expansion and dynamic situations, such as the pandemic, which caused severe disruptions in supply chains.

High costs are other roadblocks to enterprise inclusion. However, digital technologies have the potential to automate many repetitive manual processes, thereby saving costs that can be diverted toward more sophisticated decision-making processes. In India, especially, the ability of individuals to expand or create new enterprises is often limited by several logistical challenges.

Case Example of Infosys: Partnering with a Logistics Company to Drive Enterprise Inclusion for SMB Logistic Companies

Background
In 2021, the demand for e-commerce exploded during the pandemic, exacerbating supply chain constraints in the trucking industry, which was already facing an acute driver shortage. However, the logistics company in focus was able to manage this surge in demand as it was already ahead of its competitors in its digital transformation journey, helping it maintain its relevance to its customers and partners. The existing business model, which was more relationship-based, was challenged by start-ups that were leveraging digital platforms similar to the Uber model. Therefore, the logistics company needed to embrace digital intervention to stay relevant.

Initiative
- The organization launched its first version of the digital freight marketplace in November 2017, in just six months, with only five customers and ten carriers.
- The business model resonated with small owner-operators with up to four trucks as they got direct access to the loads on the company's load boards, with better rates and reduced deadhead miles.
- The “continuous moves” feature monitors the movements of the trucks and provides recommendations for the next move, making it easier for the drivers to find loads.
- The sophisticated algorithms find the trucks instead of the drivers having to search for loads as per their preference and equipment types.

Outcome
- By the start of 2022, the platform had evolved into an ecosystem that supported 45,000 customers, 48,000 carriers, and over 625,000 drivers.
- Without the marketplace, owner-operators are typically required to share about 11% of the fees for each load with a dispatcher.
- In addition, the platform also helps them find cheaper fuel, alerts them to traffic and weather conditions, suggests rest areas and parking lots, and offers voice-enabled interactions, all with the safety of the drivers in mind.
- The platform has become a great promoter of entrepreneurship by making business easier, more viable, and safer for owner-operators.

Inclusion as a Problem of Lack of Managerial Expertise

Managerial expertise is imperative for the success of any enterprise. However, the lack of availability of expert managers or the high cost of expert managerial talent can put some enterprises at a competitive disadvantage. Fortunately, digital technology offers innovative solutions to this problem.

Digital technologies have enormous potential to optimize managerial operations and use advanced analytics to operate business networks more efficiently, reduce operating costs, and make better consumer-centric decisions. Digital technologies improve an enterprise's ability to make swift, more accurate, and complex analytical decisions.

Example of the NASSCOM Foundation: The Managr App—Optimizing Organizational Operations Through Technological Solutions

Mrs. Jazbi Khan works at the OCA Foundation, a non-profit organization, alongside her husband, Dr. Kamran Khan, a prominent surgical oncologist and the founder and managing trustee of the organization. She manages the team and guides them in executing projects within the organization. As a non-profit organization in the healthcare sector, the OCA Foundation faces time and resource constraints. Since its inception, the foundation has constantly been striving to seek ways to reduce human dependency and improve systems and processes using technology to improve its efficiency.

Under its Tech for Good initiative, the NASSCOM Foundation associates with NGOs and social sector organizations to use technology for social good. In another initiative with the Vodafone India Foundation, the NASSCOM Foundation launched “The Managr” app to digitize the project management cycle. Mrs. Jazbi and her husband discovered this user- friendly platform, which was an innovative tool aimed at holistically improving patients' experiences and streamlining the day-to-day operations of organizations. They became the key spokespersons of the application, promoting it to non-profit organizations within their network.

Aims and objectives
With a mission to create “physical” and “financial” access for early treatment and detection of cancer by bridging resource, skill, and science gaps, the couple sought a one-stop solution for efficient management of various operations. With an overwhelming amount of paperwork and complex patient histories, it was difficult to extract and collate data efficiently, which consumed an enormous amount of time that could have been better used in patient care. The Managr app worked as a one-stop data repository, enabling the organization to analyze and use the data in a more structured and systematic manner. With all the patient data available on one platform, doctors could assess patients more quickly, resulting in improved healthcare outcomes.

Features of the app
- Real-time monitoring of current and expected funds
- Data analytics to help with report generation
- Customized dashboards to support decision-making
- Geo-tracking and validation
- Live tracking of all project activities
- Notifications for tracking tasks for users
- Mitigate risks and design plans
- Escalation matrix

While powerful technologies bring about state-of-the-art treatments today, there is a huge scope for technological tools that could manage healthcare systems at the grassroots level. The vast amounts of data and day-to-day tasks necessitate a simple yet powerful tool, such as The Managr, which offers simple-to-use solutions that could go a long way in providing better healthcare to vulnerable communities.

A shift in the functioning of the organization
The Managr app brought about a considerable shift in the organization's functioning, including the following:
- The organization's fund management improved as the app made tracking, allocation, and budgeting easier and more convenient.
- Live tracking features improved work synchronization.
- Timely reminders and follow-ups improved attendance at multiple healthcare operations.
- Efficient data collection made tracking patient history easier and more accessible.
- Diagnostic procedures were expedited because of the quicker report-generation feature of the app.

Impact
The Managr app worked brilliantly in the hospital setting, resulting in better decision-making and optimal resource management. In today's world, efficient healthcare systems are essential, and technological solutions such as The Managr can help organizations such as the OCA Foundation in providing quality cancer treatments to the most vulnerable.

Inclusion as a Problem of Information Visibility and Access

The majority of the Indian population still resides in rural areas, making it essential to focus on the development of rural communities for the overall progress of the nation. Most people in rural areas are employed in agriculture and allied activities. However, the informal nature of such professions makes formal services such as institutional credit or specialized vocational training inaccessible to many people and enterprises. The use of technology can make such services more accessible, and it can improve the efficiency of the existing rural structures of governance or business operations.

Case Study of HDFC Bank: Milk-to-Money—Digital Processes to Support Women Entrepreneurs Be Better Engaged in the Dairy Industry

HDFC Bank has the vision of taking banking services to the rural hinterland, for rural people to grow and make the most of their hard-earned money. According to the Agriculture Census, 85% of the total land is held by marginal and small farmers who have limited access to formal institutional credit.

The dairy sector has been identified as having the greatest potential for establishing a digitalized end-to-end payment solution that can limit the role of go-betweens and hard cash in the system. Women in Gujarat are typically responsible for most dairy-related activities, primarily in the production stage of the chain, while men typically handle marketing and processing. The cooperative movement, such as AMUL, has created numerous female entrepreneurs, empowering them to be equal financial contributors to their families. This has also led to an improvement in the status of women and the male–female ratio.

In 16,000 dairy societies in Gujarat, payment to farmers was made in cash by the society secretary, with little transparency. The total annual revenue was approximately 20,000 crores (200 billion). However, handling large volumes of cash posed safety and theft concerns, and most farmers lacked saving habits.

Problem redefinition

- To meet the regulatory priority sector lending norms of 8% to small and marginal farmers and the weaker section (women).
- To increase transparency and reduce social malpractices and irregularities in the lending process.
- To reduce the cash volume.
- To induce saving habits and build the credit history of farmers.

The rural and agricultural sectors are a key growth driver of the Indian economy, contributing to 37% of the GDP, with the agriculture sector's share being 18%. The dairy segment in Gujarat was selected for the project on the basis of criteria such as market size, steady income flow, and organized value chain.

The bank's team explored various supply chain models and zeroed in on the dairy value chain. The business correspondent model had issues such as less transparency, huge cash handling, and dates of payment as per the secretary's wish. Discussions were held with society secretaries and farmers, and knowledge transfer happened from the milk society, which stated the farmers' basic requirements.

A comprehensive solution was required to cater to the requirements of dairy farmers for making payments to them once they supplied milk to the society. Drawing from the business correspondent analogy, a unique ID at the society level was to be created and mapped to the corresponding HDFC Bank account number. The payment process needed to be digitalized to improve the turnaround time (TAT) and customer delight.

In the case of the business correspondent model, the data was within the organization's network. However, one unique requirement for this project was to transfer the data file from the society's system/computer to the bank's server. On the basis of data transfer, the amount would be debited from the society account and credited to the individual farmer's account. The payment amount was calculated according to the fat content and weight of milk supplied by individual farmers. Digitalization of the payment process reduced malpractices and misappropriation of cash.

Identification of a solution
- Classic brainstorming and focused group discussions were conducted with dairy and technology experts, vendors, and resources familiar with the geographical conditions
- On the basis of the insights gathered, the following solutions were identified for evaluation:
  a. Deployment of micro-ATMs to society secretaries
  b. An e-Net solution for payment
  c. ATMs
- The idea of micro-ATMs to society secretaries was dropped for connectivity issues and resistance from dairy secretaries toward new technology
- The e-Net solution faced resistance from society secretaries as they were uncomfortable with excel/file uploads
  The option of customized low-cost ATMs operable in rural conditions was explored further

Parameters of the project
- A machine that works in a dusty, hot, and humid environment without air conditioning and consumes less power
- Electronic transfer of data between the society and the banking network
- Secure and foolproof platform
- Digitalized payment from the society account
- Easy access to ATMs at nearby locations

The Multi-Function Terminal (MFT) model
- After careful consideration of capabilities such as dispenser, security, working environment, power consumption, and service support, an appropriate model, the Multi-Function Terminal (MFT), and vendors were selected
- An innovative software solution was developed to encrypt the payment file and push data to the bank server via MFT. The solution was then piloted at five dairy societies in Gujarat with the following actions:
  a. Training sessions on software usage for society secretaries
  b. Education programs on MFT usage for society members
  c. Financial literacy camps for villagers
  d. Hand-holding for initial months
- Positive feedback on “innovative” solutions was received from societies and members. The MFT model became a central piece of technology in an integrated village ecosystem that benefitted all stakeholders: the village society, farmers, and HDFC Bank
- The model was deemed scalable, sustainable, and replicable. This initiative was termed “Milk-to-Money”

The vision of “Milk-to-Money”
- To provide farmers with an opportunity to move away from dependence on cash in a way that carries no risk or problems and allow them to build a valuable credit history not achievable with cash payments
- To introduce rural communities to an organized banking system in their village and encourage them to participate in a cashless system
- To help women farmers gain economic independence, empowering and enabling them to participate more actively in domestic and regional matters and decision-making
- Today, “Milk-to-Money” services are provided in over 1,500 villages in Gujarat and Rajasthan. The most positive outcome is that almost all farmers enrolled in the scheme have at least doubled their incomes over the years and have healthy balances in their savings accounts

Benefits of the project
The “Milk-to-Money” project has benefitted not only the members of the milk cooperative society but also the entire village community and surrounding villages. These people never had access to any banking services or any means to save their hard-earned money. Today, they enjoy the following benefits:
- Cashless payment system for members of the village milk cooperative society
- Improved savings habits and healthy balances in savings accounts as payments are available at their doorstep as and when required
- Farmers' credit history is being built
- Cashless utility bill payment and recharges in the village: Electricity, direct-to-home (DTH), and mobiles
- Easy availability of cattle loans and all other types of loans
- Increased milk production because of the arrival of new cattle
- Government subsidies for women, Direct Benefit Transfer (DBT), etc., directly into their bank accounts

Tangible results

The project has achieved significant tangible results, including the following:

- It serves over 1,500 villages and approximately 300,000 rural families
- Over 5 million zero-balance accounts have been opened
- Unsecured cattle loans totaling 681 crores (6.81 billion) have been disbursed
- Over 2,000 crores (20 billion) of cash is processed annually

Intangible results

In addition to the tangible results, the "Milk-to-Money" project has also achieved several intangible results:

- Milk payments are made transparently and on time, directly into the farmer's account
- Financial inclusion of farmers
- Inculcation of saving habits and building a credit history
- Empowerment of women engaged in dairy farming
- Cashless utility bill payments and recharges
- Carbon footprint reduction

Impact

- The success of "Milk-to-Money" has brought the HDFC Bank closer to understanding the needs and wants of rural communities and has prompted it to develop and offer specific banking and loan products to benefit farmers
- The bank is now ready to extend these benefits of "Milk-to-Money" to more villages and farmers within the Gujarat Cooperative Milk Marketing Federation (GCMMF) community. All 3.6 million farmers in GCMMF can benefit and double their incomes, achieve healthy saving balances, and become digitally proficient across all aspects of their lives
- The project started in Gujarat and Rajasthan and has now expanded to 11 states, including Maharashtra, Uttar Pradesh, Punjab, Haryana, Madhya Pradesh, Odisha, Tamil Nadu, Karnataka, and Andhra Pradesh

DIGITAL FINANCIAL CAPABILITIES

Through digital financial capabilities, digital technologies have the potential to overcome several challenges that impede more comprehensive financial inclusion. Digital financial capabilities refer to using owned assets to make financial payments, executing personal bank payments digitally, and transacting and tracking payments with a digital trail. These capabilities can overcome financial exclusion resulting from physical barriers, lack of awareness or knowledge, or high costs. Indicators of financial inclusion may include the percentage of rural Indian households owning bank accounts, the percentage of women in rural India holding bank accounts, and so on. India's JAM trinity is an example of a large-scale digital-enabled capability that has increased financial inclusion (see the table below):

J	Pradhan Mantri Jan Dhan Yojana	Banking infrastructure in 650,000 villages	425.9 million bank accounts created	1.30 million banking outlets (villages)
A	Aadhar	Unique identity	1.29 billion Aadhar Ids generated	1.24 million BC agents (villages)
M	Mobile	Mobile connectivity	1.17 billion mobile phone users	0.32 million BC agents (Urban locations)

Source: Digital India

Inclusion as a Problem in Performing Complex Transactions

Digital financial capabilities have the potential to integrate a large section of formerly excluded and underserved customers into the financial sector by solving the problem of complex transactions. Digital financial services require little or no physical interaction, and the onus of successful use of the services is on the customer. Thus, issues such as the complexity of processes can hinder financial inclusion.

Case Study of HDFC Bank: Digital Financial Capabilities for Self-service

The Kisan Gold Card scheme is an excellent example of overcoming inclusion problems as it reaches the hinterlands to finance farmers. HDFC Bank has developed crucial digital financial capabilities and identified various areas of improvement in rural geographies that could be game-changers for farmers, such as the electronic processing of Letters of Acknowledgment of Debts (eLAD), electronic KYC (eKYC), electronic-customer signature (eSIGN), and digital vintage base loans for customers.

During the pandemic, the bank realized that connecting with rural customers was challenging, and personal meetings or visits were restricted. Document processing for eLAD, eKYC, loan document signing, and vintage loans was challenging and often required multiple visits to the customers' locations. HDFC Bank staff had to visit customers' homes or farms to complete the documentation, which were typically located about 30–40 km from the base location of the relationship manager (bank employee location). However, customers were often unavailable at either their farms or homes.

These activities were time-consuming and affected the customer experience and TAT for loan processing. It was also difficult to ensure that farmers' loan account documents were compliant because of the challenges in completing the documentation.

HDFC Bank has ensured that the digital process is designed to involve all stakeholders including the following:
1. The product department, which understands the customers' needs according to the sales force feedback, customizes loan application forms, and undertakes other associated activities.
2. The credit process team, which supports understanding the document requirements and automates the approval or sanction process.
3. The policy department, which helps assess the risk associated with the product and automates the necessary steps.
4. The legal department, which helps minimize the documentation and ensures that the loan agreement content and communication to customers are appropriate.
5. The operations department, which helps implement the execution process for these listed projects.

Implementing these projects was challenging because of the rural geography, and the bank adopted various communication channels to reach its employees and customers. The bank created advisory videos, mailers, and SMS communications to encourage their customers for adoption. Moreover, the bank conducted training sessions for its employees to better understand and enhance the customer experience with eLAD, eSIGN, eKYC, and vintage base loans before they were launched for higher penetration and adoption. Each process had been designed to ensure that the bank had an authentic connection with customers and received a real-time flow of data.

(eLAD)	As per Section 18 of the Limitation Act 1963, loan documents are valid for three years from the date of execution, and a LAD must be signed before the due date. Failure to sign the LAD before the due date renders the document void and unenforceable in a court of law.
eSIGN	The bank has envisioned a vendor solution that enables loans and other documents to be sent electronically, wherever the customer's signatures are required. The bank's system will trigger an SMS link that will authenticate the customer via an Aadhaar-based OTP process. The process is validated with electronic signatures by the borrower and co-borrower.
Vintage loans	For an existing bank borrower, a vintage-based digital product has been developed wherein the sales team can quickly process leads into disbursements with minimal documentation, which will be auto-pushed to the system for auto-sanctions upon disbursement.

HDFC Bank has the capability to create charges online with the help of state government portals in six states as of April 2022. The bank has a process and technology backend that can be replicated for many other states once the government enables the online facility for charge creation. The online charge creation process helps in quicker delivery and reaching out to a larger number of villages and farmers.

Challenges and resolutions

- HDFC Bank recognizes that the adoption of digital capabilities will face challenges in rural areas
- The bank has encountered numerous challenges such as poor mobile network connectivity, inadequate basic infrastructure in villages, low levels of digital literacy level, and issues with mobile number linkages to Aadhaar
- Currently, Aadhaar-linked platforms such as eLAD, eSIGN, and eKYC are experiencing network issues in rural areas. In addition, most of the rural population's records are not up to date with UIDAI[1], such as mobile numbers because of frequent porting of new mobile numbers, and mobile number integration is required for the successful adoption of any digital product

Outreach and benefits

- HDFC Bank has gone the extra mile to reach out to rural customers via video, SMS, phone calls, etc., to make the customers' loans compliant
- The bank has ensured the implementation of these digital capabilities to make itself future- ready for rural infrastructure such as network/bandwidth and GPS, and keeping up-to-date UIDAI records (Aadhaar literacy level) in the rural areas has given the bank an added advantage for quick adoption
- Such initiatives have also improved the customer experience with paperless transactions, reducing the number of touch points between customers and bank employees
- Despite the obstacles, the bank has achieved close to 5–10% adoption of these digital products. However, in terms of vintage-based loans, the bank was able to fulfill the needs of over 3,600 farmers between November 1 and January 31, 2022, resulting in overall disbursements of INR 80 crores (800 million) through a digital disbursement platform
- Recognizing the immense potential in rural areas, HDFC Bank has invested in making its infrastructure future-ready in these regions. Therefore, the bank has delivered these digital products to the rural population

The government has developed various schemes and facilities to benefit the rural population, and these schemes can be delivered by linking them to the Aadhaar database. Awareness campaigns are working hard to make the rural population Aadhaar compliant so that the scheme benefits are passed on to the beneficiaries. Given the current government's focus on rural development and digital product literacy, HDFC Bank believes that the use of these digital capabilities will skyrocket in the coming months.

HDFC Bank has leveraged its digital capabilities to reach out to over 500,000 farmers in more than 100,000 villages across the country and is geared to increase its footprint to over 200,000 villages.

Case Study of Infosys: Digital Capabilities at a Leading European Bank to Drive Inclusion During the COVID-19 Pandemic

Problem identification

- In the early stages of the pandemic in March 2020, Infosys delivered a functionality that allowed a leading European bank to streamline customer mortgage restructuring.
- Earlier, the processes in the bank were manual, requiring human interventions to help close mortgage restructuring.
- The bank required automated moratoriums and 6-month restructure options for interest-only mortgages, which were unavailable in its existing systems.
- Both front-end screens and back-end changes were required to deliver the end-to-end solution.
- Mortgage account restructuring processes had to be updated to allow tracking of the updates and auditing and management information (MI) options.

[1] UIDAI stands for Unique Identification Authority of India, which is a government agency responsible for managing the Aadhaar program. Aadhaar is a 12-digit unique identification number issued to residents of India on the basis of their biometric and demographic data.

Restructuring
- Screen options to allow the automation of mortgage restructuring options
- A new screen was added for branch and mortgage direct users to allow them to add these restructures for customers, eliminating the need for emails, phone calls, or scanned options
- Updates to amend the repayment structure process for interest-only and moratorium
- Various mortgage documentation changes to address COVID-19 concerns
- MI updates for reporting COVID restructures to the data warehouse
- The automation of mortgages for the COVID-19 account short-term restructures benefitted 12,000 customers

Inclusion as a Problem of Financial Awareness

A lack of awareness about digital financial services is a significant bottleneck to achieving financial inclusion. It creates a divide where people without proper awareness are unable to reap the benefits of digital financial services such as access to easy credit or savings options.

Case Study of HDFC Bank: Financial Inclusion Through the Sustainable Livelihood Initiative

Since its inception, HDFC Bank has reached out to over 1.3 crore (13 million) households, with a little over 45 lakh (4.5 million) active borrowers as of February 2022. The bank is among the top 5 in the banking industry for enabling financial inclusion.

Sustainable Livelihood Initiative (SLI)
Since its inception, the Sustainable Livelihood Initiative (SLI) has participated in financial literacy programs. The approach of the customer sourcing model is to impart financial literacy to group customers at the time of sourcing and disbursal.

Benefits
- SLI has helped create financial awareness among people at the bottom of the economic pyramid, promoting inclusive banking
- SLI in a month onboards approximately 2.1 to 2.4 lakh (0.21 to 0.24 million) members in group loans, further contributing to inclusive banking
- HDFC Bank has disbursed 15,129 applications under the PM Svanidhi scheme as of March 28, 2022, and is actively working toward disbursing the sanctioned applications to complete the documentation
- The scheme has been implemented under the DFS guidelines, but there have been challenges in vendor identification, vendor empanelment with urban local bodies, and monitoring customers for timely repayment

Inclusion as a Gender-Bias-Related Problem

A stark disparity exists between men and women in terms of access and use of financial services. While programs such as Pradhan Mantri Jan-Dhan Yojana (PMJDY) have significantly increased the number of women bank account holders, financial inclusion in terms of usage of financial services remains challenging. A lack of education and awareness, societal structures, employment in the informal sector, etc., are some reasons behind this disparity.

Case Study of HDFC Bank: HDFC's SLI Initiative Aimed at Serving Women at the Bottom of the Pyramid

One of the aims of HDFC Bank's SLI is to serve women at the bottom of the pyramid, both in the banked and unbanked segments of the population.

Because of this initiative, the bank has witnessed a rise in the number of rural women seeking banking services, such as group loans and account openings. Through SLI, women have been able to avail credit for themselves and use it for improving their occupations such as tailoring, designing artificial jewelry, setting up grocery shops, livestock rearing, and handicrafts.

Moreover, the initiative promotes women's financial inclusion by offering occupational training, credit counseling, and financial literacy training.

Inclusion as a Capacity Problem

The capacities of existing financial institutions to serve customers are often limited by physical constraints, such as the availability of branches and the costs of human agents.

The Role of Fintech in Financial Inclusion

Fintech companies have the potential to accelerate the process of financial inclusion by leveraging the existing financial ecosystem and technology to reach a broader customer base and make banking and financial services more straightforward and more cost-effective for people.

Case Study of Infosys: Transformation at an Indian Fintech for More Societal Inclusion

This is the story of an Indian fintech revolution that began as a mobile wallet and then evolved into a payments bank and an e-commerce marketplace. According to World bank, at least 233 million Indians have never visited a bank, and only 74,000 (of the 600,000 total villages) have access to a bank. The mobile penetration rates have exceeded 80%, but only 53% of adults have a bank account. The government aims to increase this figure to 90% by 2034 by bringing half a billion Indians into the mainstream economy and accelerating the pace of financial inclusion in the country. We discuss the case of a fintech company.

Aims and objectives

- Financial inclusion may not just be about having a bank account. It entails creating an ecosystem that enables and encourages people to use financial instruments regularly.
- Riding on the digitalization wave in the country and leveraging the Finacle core banking solution from Infosys, the fintech company opened 42 million savings accounts, many of them for customers who previously lacked access to financial services.

Outcomes of fintech

- With the payments bank license and an e-commerce marketplace, the fintech company has successfully engaged the tech-savvy millennial population by seamlessly weaving banking into their everyday activities, such as shopping, bill payments, movie or event ticket purchases, and investments.
- The company's flagship savings product is a testament to its in-depth understanding of customers' needs and challenges in adopting existing banking products. The company has tailored the product proposition according to this understanding and developed features to remove those barriers. For instance, small merchants enjoy free QR transactions, while larger “organized” merchants pay a 1.0–1.5% fee.
- Digital transactions on the company's banking ecosystem are free in perpetuity. Customers can save, make, and receive payments and build a transaction history that enables them to apply for credit.

Impact of fintech

- The digital strategies of the fintech company have been empowered by Finacle's modern core banking platform, which is a robust, scalable, and flexible platform. Open APIs have paved the way for the company's collaboration with industry players in the banking and non-banking sectors.
- Within just 18 months, the company created 42 million savings accounts, many of them for customers who previously lacked access to financial services. These customers can now save, make, and receive payments and build a transaction history that enables them to apply for credit.
- The average transaction value has quadrupled because of the wallet plus savings account offering. A highly engaged customer base has been generated. Card activation after 30 days is significantly higher than the industry average. Small merchants going digital for the first time now have transaction histories and are eligible for loans from other financial institutions. These merchants account for nearly 30% of overall open banking transactions in India through the fintech company's Unified Payments Interface (UPI) offerings.
- The company has created an ecosystem that enables and encourages people to use financial instruments in their everyday lives. It has seamlessly integrated banking into customers' primary journeys, be it shopping, paying bills, buying movie or event tickets, making investments, and a lot more.
- The company has achieved greater integration with e-commerce. Several retailers said they experienced 20–30% growth in transactions from their partnership with the company. The system accounts for 50% of the transactions from small towns and villages, thereby significantly helping the government's vision of greater financial inclusion.

DIGITAL SOCIAL CAPABILITIES

Digital social capabilities refer to the abilities of people from different strata, communities, genders, etc., to participate in society with the help of digital technology. This includes using digital capabilities for inclusion in social systems, debates, and decision-making. People may be excluded from the larger society because of stigmatizing attitudes or beliefs, certain societal systems, and so on. This exclusion may be based on gender, disability, social status, sexual orientation, etc. Digital capabilities are helping overcome such exclusion and problems that we highlight below.

Inclusion as a Problem of Lack of Support Mechanisms in Times of Distress

Times of distress often have a more significant impact on the excluded. Hence, social inclusion is also a problem of exclusion from support mechanisms during times of distress. These support mechanisms can be in the form of physical support, such as during natural calamities, or psychological support.

The excluded people find it difficult to seek support from the traditional systems of societal interactions and support mechanisms. Digital technologies, in this regard, can be beneficial to include more people, regardless of their differences, in support networks.

Example of the NASSCOM Foundation: My Ambar App—A Holistic Digital Tool to Empower Women

The National Commission for Women (NCW), India, registered a 94% increase in cases of women being assaulted in their homes during the lockdown.

Zeba Khan, a 24-year-old Delhi girl passionate about achieving gender equality, has been an active spokesperson against gender-based violence. She believes technology can play a crucial part in combating violence at the grassroots level.

Under the "Tech for Good" program, the NASSCOM Foundation collaborates with many NGOs and social sector organizations to bring change to the last mile through technical capacity building.

In partnership with the CSR arm of Vodafone Idea Limited, the NASSCOM Foundation is actively working on developing and promoting the My Ambar platform. The platform helps women understand and stand against violence.

The My Ambar app offers help and education for women on gender-based violence.

It also helps create a safe place for survivors and high-risk victims, enabling them to log their complaints and seek help, without bias or judgment. This app has facilitated women such as Zeba and many more to combat violence at different levels.

Women such as Zeba, who are actively engaged in helping women, have limited, traditional textbook tools, which cannot provide fingertip succor to them. This restricts them from understanding the situation practically and offers no tools to assess risks or get immediate help.

Zeba attended the My Ambar webinar and drew inspiration from the possibilities of empowering youth and women. She actively started promoting the My Ambar platform to ensure the safety and security of women. As a Teach for India Fellow, she educated her students about the platform and encouraged them to spread the word about it, resulting in a more informed and empowered ecosystem.

This tool empowered her contact group immensely, giving them a fingertip technological tool in the form of the My Ambar app, which enabled their families and communities with prompt assessment, round-the-clock availability, and actionable help. The app is now helping grassroots communities to prevent gender-based violence and take necessary actions against it. The NASSCOM Foundation used the content from Safety Trust to design and develop the app. Working with UN Women, Nasscom Foundation intends to enhance app's access towomen across India, for downloading and using the app.

The app is bilingual and helps cater to audiences in English and Hindi. The audio gives a more realistic approach to the topics of mental health and gender-based violence. The results of bringing together a technological solution such as the My Ambar app and proactive people such as Zeba are highly encouraging. This helps create better awareness in the remote parts of India and provides actionable tools for getting help in the time of need.

Features of the app
- A ready-to-use directory with helpline numbers across India
- Comprehensive information about various aspects of gender-based violence, available in an easy-to-understand form
- Self-risk assessment for users, helping them understand their physical and emotional state, recommending further courses of action
- A step-by-step guide for assisting women, enabling them to act in the event of violence
- Upfront SOS helpline button

Impact of the app
The awareness of sex education, mental health, and gender-based violence in our society is limited. Even when women are sensitized, they do not have access to quality mechanisms for quick guidance and support. However, simple and powerful tools such as My Ambar leverage technology for women's safety and empowerment.

Through Zeba's efforts, over 150 girls have downloaded the My Ambar app, greatly helping them, their friends, and their community. Their positive experiences create a word-of-mouth effect, and more and more women are taking advantage of the app. The results of bringing together a technological solution such as the My Ambar app and proactive people such as Zeba are extremely encouraging.

Inclusion as a Problem of Sexuality Biases and Colorism

Discriminatory systems and beliefs prevent people on the wide spectrum of sexuality and skin pigment from inclusion in the larger society's political, social, and economic life. Beliefs that view diversity in sexual orientation and gender identity as somehow damaging to society and label LGBTQ (lesbian, gay, bisexual, transgender, and queer) individuals as disordered or criminal are major obstacles to achieving inclusive growth. Similarly, colorism, rooted in outdated stereotypes, is a major basis of differentiation in society and, thus, a strong cause of social exclusion. With technology, there is an opportunity to address and rectify the ways in which individuals are disadvantaged on the basis of their identity or appearance.

Example of Burger King and Its Limited-Edition Whopper

Burger King added a limited-edition whopper burger to its menu in 2014. It happened to be the same original whopper but with a rainbow-colored wrapper with the caption, “We are all the same inside.”

The company captured people's reactions to the wrapper's unveiling on video and posted it online. The video received 7 million views across all social platforms. The YouTube video alone received more than 5.3 million views to date. The Proud Whopper ad reached 20% of the US population (Burger King data).Burger King's delivery of this important message on social inclusion resonated with its target audience of 18- to 24-year olds.

Case Study of Infosys: Digital Transformation at Infosys to Enhance Social Inclusion

Aims and objectives
- Infosys believes diversity fosters creativity and innovation and that inclusion creates a more empathetic workforce. Following ESG (environmental, social, and governance) goals, the company has focused on gender diversity and the inclusion of various strata of talent.
- Economically disadvantaged groups, people with disabilities, and LGBTQ individuals all needed to be addressed and included to participate and contribute as a part of Infosys. Even today, the company's hiring programs focus on bringing in talent from diverse social areas, including freshers, laterals, economically weaker sections (EWS), LGBTQ individuals, Public Works Department (PWD), and more. However, achieving representation from a diverse talent pool is a challenge.

Identification of the problem
A major factor that exacerbates the lack of diversity in hiring is the absence of opportunities for enablement, particularly during pandemics. To address this, Infosys created a hiring process that facilitated the hiring of individuals from diverse groups, ensuring that students and candidates from the aforementioned categories had an opportunity to participate in the company's hiring process. However, the most important component was missing: enablement.

Resolution of the problem
- Including diverse groups in the mainstream processes is a huge challenge, and the only robust and scalable solution is to leverage technology.
- Platforms such as Springboard and TQ changed the way connections happened and ensured the project was successful.

Outcomes of the initiative
- Digital learning platforms have aided in providing training on various relevant topics for Infosys hiring, including communication, algorithm-based problem-solving skills, and logical ability.
- These technological platforms have also aided in tracking students and candidates and ensuring that the skilling and the reskilling journey begins as early as possible.
- The goal is to provide customized learning opportunities to those who need them anytime, anywhere, and in any language.
- The effort has already garnered over 500 profiles from NGOs and housekeeping/security staff at Infosys. The registered students have also enrolled in the enablement programs.
- While over 15 profiles have already been handpicked and placed with Infosys, the aim is to quickly hit the target of placing over 100 people in the system in future recruitment drives.

Inclusion as a Problem of Community-Based Discrimination

Social exclusion is often the effect of a process of discrimination based on cultural, social, or racial identity. Sometimes, such exclusion can occur against somebody because of their subscription to a particular community or group. Stigmatizing and discriminatory beliefs against certain communities and castes prevent people from living a dignified life and are negative consequences of such an exclusionary process.

This exclusionary process can also bar people from benefiting from several welfare programs aimed at overall socioeconomic development.

Example of the Digital India Scheme

Digital India is an initiative by the Government of India. It also provides high-speed internet access to rural areas. The scheme aims to ensure that government services are accessible electronically to all citizens, irrespective of their location or community orientation. “Digital infrastructure as a utility to every person” is one of the primary themes of the scheme. The scheme allows for the electronic distribution of the benefits of several welfare schemes, such as PMJDY and Mahatma Gandhi National Rural Employment Act (MNREGA), to beneficiaries. Thus, such an electronic process eliminates any social bias or prejudice that officials may have.

The following are some of the objectives of the scheme:
- Develop a stable and secure digital infrastructure
- Deliver government services digitally
- Achieve universal digital literacy

As part of the scheme, BharatNet focuses on bringing high-speed broadband connectivity to rural India. It works in collaboration with the Bharat Broadband Network Limited (BBNL), and provides connectivity to nearly 2,50,000 gram panchayats. Through BharatNet, the government aims to extend various teleservices, such as telemedicine, tele education, e-health, and e-entertainment, to people across different demographics. The project is expected to generate local employment opportunities and drive socioeconomic growth in rural areas.

Conclusion

Many development goals may be achieved if the problem of (lack of) inclusion is resolved. This report offers conceptual foundations, building on the various digital projects conducted, using the SAID model. Policymakers, program managers, business professionals, and entrepreneurs may use the model to lead the next level of growth for the nation and the world.

References are available upon request.

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INDIAN INSTITUTE *of* MANAGEMENT AHMEDABAD

भारतीय प्रबंध संस्थान अहमदाबाद

Centre for Digital Transformation
Indian Institute of Management Ahmedabad
Vastrapur, Ahmedabad - 380015, Gujarat, India
Email: digitaltransformation@iima.ac.in