



# A Study of Financial inclusion and SDG 9(Industry, Innovation, and Infrastructure)

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## Abstract.

Infrastructure development plays a substantial part in getting Sustainable development goals. Also, Financial inclusion is emerging as a vital factor in promoting sustainable development goals (SDGs), especially in developing economies like India. Globally growing and undeveloped countries requires imperishable infrastructure investments, and modern approaches for its economic growth and to reduce environment mutate. Industry, Innovation, and Infrastructure, depends on three essential topics. First is sustainable economic growth, then to enable transportation and communication infrastructures and by new technological developments and new innovations ultimately the prosperity level of the society as a whole will be increased. There is a lack of studies which are being linked with financial inclusion to the SDGs. The present study is based on a case study approach and discusses the various examples of techniques used in real life in various industries under different domains. On the basis of these examples study also explores the future of financial inclusion as per the sustainable development goal 09. The present study explains the target goals of SDG 9 based on the corporate strategic replicas of twelve corporate houses and studied instances that engage growing upcoming innovations and make worth. We have tried to connect financial inclusion with SDG 9 in this paper.

This paper focusses to find out the nexus between financial inclusion and sustainable development 9 in a universal form. The present idea has not been discussed or explored earlier. The study will benefit the policy makers practitioners, and researchers interested in promoting financial inclusion and sustainable infrastructure development.

**Keywords:** Key words: Financial Inclusion, Sustainable Development Goals, Infrastructure, Industry, Technology

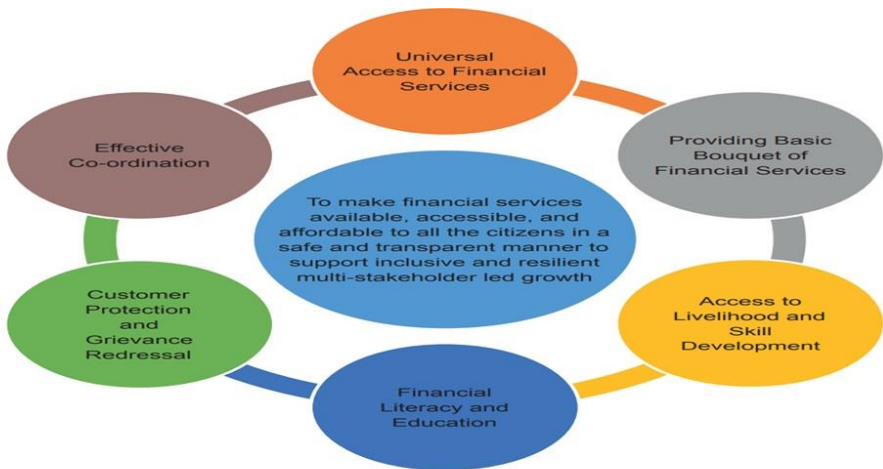
# 1 Introduction

Financial inclusion is a system where individuals and businesses are provided with prolonged financial services and products that fulfil their necessities, encompassing deals, remittance, savings, credit, and security. It provides services such as savings, credits, loans, insurance. The concept of financial inclusion was first started in India in 2005 by the Reserve Bank of India.

The slogan "Innovate for Progress, Build for Tomorrow!" embodies the essence of this goal which focuses on infrastructure, innovation and industry. Goal nine tries to make strong organization, enhance eco -friendly industrialization, plus develop new techniques. Financial development, public welfare and combat weather change are mainly reliant on above factors.

For economic and environmental challenges, the last solution is only technological growth. Encourage eco-friendly industries, and infuse money in scientific research and innovation, are all major types for the ease of justifiable growth. More than 4 billion people still unapproachable to the net, and 90 percent are from the growing countries. To complete this computing gap, it is difficult to check alike access to details and awareness, as well as nurture innovation and entrepreneurship. (United Nations Development Programme)

If someone talk about Globe many developments and improvements have been done in financial system but still a part of population is not aware of modern financial system. The objective of financial inclusion is that each person besides their financial status can afford financial commodities and amenities so that they will able to cope up with their funds and able to manage their risks. Lack of financial inclusion may hinder progress as well as it is also a barrier in achieving sustainable development goals.



**Fig. 1.** Need of Financial Inclusion Source: RBI Report, National Strategy for Financial Inclusion 2019-24.

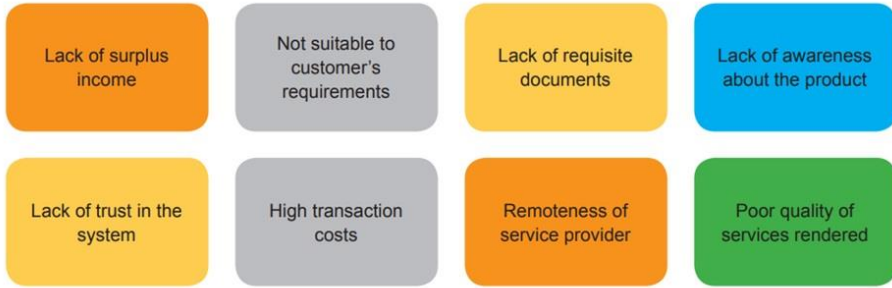
Source: Source: RBI Report, National Strategy for Financial Inclusion 2019-24

The Reserve Bank of India has defined financial inclusion as one single pathway to tackle the various segments like providing universal access of financial inclusion to all the citizens, with basic group of financial services being offered to people, by increasing the access of people to livelihood and skill development, with incentives such as financial literacy, customer protection and grievance redressal and above all providing infrastructure for enhancing overall coordination. From above diagram it is clear that there will be a great need of economic inclusion for sustainable development in India.

International organisations like The United Nations (UN) and The World Bank are playing a major role in putting efforts in achieving sustainable goals. For World Bank one of the major stands of its SDG is that there should be Universal financial access. So, we can say that both Economic inclusion and green development are two important objectives which in future have beneficial consequences for community and the surroundings. Present research on sustainable development and financial inclusion reflects that two of these conceptions have been explored separately with each other, without any attempt made to create a connection or association between them.

Financial inclusion is a main strategy for getting numerous SDGs and executing oath 'leaving no one behind' beneath the UN Agenda 2030 [1]. Encouraging all individuals, enterprises to use formal financial services at a reasonable price is the foundation of financial inclusion. Access to vital and rationally priced economical services in the formal economical sector is guaranteed by financial inclusion [2–4]. Sustainable development is often divided under three basic categories, namely, the economic dimension, environmental dimension and social dimension [5, 6].

By restricting the availability of financial resources and ignoring marginalized communities from completely participating in financial activities, it exacerbates poverty and discrimination while greatly impeding their welfare in terms of society and environment. Moreover, the task in getting financial inclusion, like big stages of impoverishment cum disparity, often become tedious to persons to plan their financial operations, and thus becoming more difficult to fulfil the expectations of sustainable development goals. Presently, the financial systems are far from working upon things like financial inclusion and enhancing the achievement of development goals.



**Fig. 2.** Causes of Financial Exclusion Source: RBI Report, National Strategy for Financial Inclusion 2019-24.

Source: Source: RBI Report, National Strategy for Financial Inclusion 2019-24.

Financial inclusion has been recognizing as an organizer for 7 of the 17 Sustainable Development Goals. Financial access helps daily routine, and supports households and businesses plan for all from eternal objectives to unforeseen future contingencies. As accountholders, people are inevitable to implement significant economical services, example credit and insurance, to develop, expand and corporations, invest money in their health and education, and mitigate risk, all of which can improve their quality of life as a whole.

Across literature there is a shortage of article which talks about the concept of financial inclusion in line with SDG-09. This article by adopting the case study approach, tries to decrease this gap. The article has studied the companies which are working towards financial inclusion with stress on sustainable development goal 09.

The present article is designed as follows. It starts with introduction stating the significance and the need of the research followed by the literature review. The paper is then followed by the discussion on SDG-09 and the used cases of technologies adopted by various organisations in the field. The article is then followed by future scope, limitations and conclusion.

## Goal Target of SDG 9

Inequalities are raising day by day and side by side the economic prosperity is also reducing day by day. People are not able to fulfil their fundamental requisite. almost thirty three percent of total people in the world does not getting wholesome water to drink (“1 in 3 people globally do not have sources for safe drinking water – UNICEF, WHO”); around a billion paper (near about fifteen percent) have to face situation of power cut. As per the predictions made by World Health Organisations, around billions of people are going to be under privileged (World Health Organization 2017). It is an alarming position especially in backward and progressing countries. To withstand the environmental swap and remove the disparities, the sustainable development goal was

accepted[7, 8]. In this list, developed countries have decided to provide growth support to undeveloped countries. These second and third world nations require substantial investments in infrastructural projects, innovative breakthroughs aligned with sustainability, to get environment financial extension and social and also at the grassroots level of society. Here are the 9 target goals of SDG 9[9–11]. By implementation of these targets all over the world will make a growth and ultimately increase in financial inclusion and so many industries, new innovations and startups will be initiated by many entrepreneurs ultimately which give a big start for achieving the SDG 9 targets. Following are the goal targets of SDG 9:

- **Target 1 Develop quality, reliable, sustainable and resilient infrastructure:** This target includes regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all. SDG-9 framework is basically related to weather considerations and universal agreements and is operated by breakthrough developments in scientific knowledge. In 2016, Canada has taken this as a mission go one step further by reducing overcrowding to decrease non-renewable fuel consumption and air pollution so that the same can be accommodated in work places in an ideal manner. Since its adoption and commencement, countries like India, China and Australia have become quite active towards development of robust industries, innovations and infrastructures which promotes sustainability [12].
- **Target 2 Promote inclusive and sustainable industrialization:** By 2030, the targeted approach is to significantly raise the employability of human resources in industrial domains and contribution of industries towards gross domestic product as per the national capacity and achieve a hundred percent increase in least developed countries.
- **Target 3 Increase access to financial services and markets:** The access to financial services such as credit at affordable rates, integration in value chains and integration in markets, to medium small and micro business organisations in less developed countries. For developing countries use of financial services and markets is crucial. Such nations need loans and credit for their future growth and existence.
- **Target 4 Upgrade all Industries and infrastructure:** By 2030, all nations should take assesses to comply with their capability to upgrade infrastructure and modify industries to make them sustainable. This involves boosting resource efficiency and embracing more clean and ecologically sound technology and industrial processes.
- **Target 5 Enhance research and upgrade technological capabilities:** Industrial sectors in all countries, in particular developing countries, by 2030, motivating innovation and substantially escalate the counting of research and development workers per 1 million people and public and private research and development expenditures [12].
- **Target 6 Facilitate sustainable and resilient infrastructure development for developing countries:** Through increased financial, technological and technical assistance to African countries, less developed countries, landlocked developing countries and small island developing States.

- **Target 7 Support domestic technology development:** Through research, and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities.
- **Target 8 Increase access to information and communications technology** and strive to provide global and reasonable access to the Internet in least developed countries by 2020. And now almost all population is using mobile phones for communication. This will make their work easy and saves a lot of time as well.

## 2 Review of Literature

To reduce the gap in sustainable development, a number of models, laws, and guidelines have been generated since the SDG framework was put into effect at the early stages of 2016. The importance of financial inclusion is highlighted in the current research on sustainability.[13, 14] . As demonstrated by recent studies, many nations now consider financial inclusion as their top policy goal.[15] [16]Further [17]supported that Governments emphasise financial inclusion based on extensive research revealing how financial inclusion fosters economic growth.

Innovation contributes to financial inclusion. Expanded financial services permeability makes it possible for companies with scarce finances to obtain the funding required to foster organizational, technological, and economic developments. [18]a Directed causality was assessed by using Granger-causality test with System GMM specification. They utilize Panel ARDL, which notes that there is a positive correlation between financial innovation and financial inclusion that is noticeable over the long and short run[5, 19–21]. Further examined it is vital that government and policymakers to take into consideration the impacts of financial technology and diversity on economic activity along with on each other in order to effectively guide towards the development of those sectors in future generations.

Boosting communication and transportation networks is one instance of how infrastructure development can help increase financial inclusion. Better infrastructure, according to research, lowers transaction costs, broadens the market for financial institutions, and makes financial services more accessible[3, 22]. For promoting financial inclusion under SDG 9 effective policy framework and regulations are necessary. Research studies underscore the significance of regulatory frameworks that are conducive to innovation and the expansion of financial services for underserved communities [16, 23].

Global financial inclusion has increased substantially as a result of technological developments, specifically in the context of mobile banking and digital financial services. Research demonstrates how technological advancements such as mobile money has made it possible for millions of unbanked people to easily and reasonably access financial services[7].

Further studies throw light on micro finance and gender inequality through this study and they conclude that microfinance might mitigate gender inequality (GI) and Gender

inequality is expected to decrease if more women engage in microfinance[24]. Furthermore, [25] states a thorough analysis of M-Pesa in Kenya. A comprehensive analysis of a successful mobile money technology is coupled with cross-country adoption rate data as a component of a mixed research method for clarifying the factors affecting the emergence and proliferation of mobile money services. Correspondingly, the research revealed that a sympathetic, structured atmosphere—slightly deviating from the latent demand for credit availability what tried to drive the increased adoption of mobile money innovations. As result, the Kenyan instance shows that without a regulatory environment that minimises market volatility, the key goal of financial inclusion can't be accomplished. For innovation-led sustainability, an ideal regulatory environment and capable governance within the financial inclusion framework are critical.

### 3 Research Methodology

#### Business Organizations and their Used Cases

**Table 1.** The operational model adopted in twelve companies and some start-ups.

S.No.	Company Information	Benefit Statement (what)	Sustainability (How)	Value Appropriation
1.	Active Energy, Berlin Germany	They construct green mechanism by upgrading supply and voltage levels.	It turn buildings into active protectors of the environment. They provides high energy savings by safely regulating and lowering the voltage level.	Using artificial intelligence, the AE Cloud is the core component of Active Energy solution to identify energy saving opportunities. By innovative hardware and software, they provide valuable insights and achieve major savings.
2.	AT Partners, Tokyo, Japan	It is a venture capital firm. To support operating	They give such atmosphere in which the lot	They concentrate on breakthrough

		companies' open innovation strategies, this company offers new investment schemes and data platforms.	of firms in execution are able to select startups based on their individual methodologies.	innovations such as AI, Internet of Things, and sensors, cloud, health care, fintech, robotics and energy sectors etc.
3.	BluWave-ai, Ottawa, Canada	It applies the concept of integrating distributed renewable energy with advancements in edge computing, cloud-based supercomputing, and artificial intelligence.	With the aid of cutting-edge online optimization and its use, its goal is to accelerate the shift away from a centralized, carbon-based energy model and toward a future in which pure energy can be produced and efficiently consumed by anyone.	The optimization techniques adopted by the organisation are useful to get a balanced approach in reducing the carbon footprint and associated costs by a significant level.
4.	Highbar Technocrat Ltd. Navi Mumbai, India	It is an data expertise resolutions supplier who is an expert in industry operating in infrastructural projects.	It focuses on increasing the efficiency of the infrastructure sector by providing digitally-integrated solutions.	The organisation work towards transformation of clients businesses, data leveraging and change management. The approach is useful in enrichment of business of clients with robust strategies towards growth.
5.	Eneryield, Gothenburg, Sweden	It provides machine learning based solutions to depict incipient faults and failures in assets of electric power systems, e.g. in	In addition to enhancing energy efficiency, it provides a solution for power quality breakdowns in	It identifies main information in respect of the level of health of the elements.



		underground, underwater and overhead power lines and transformers.	power grids and allows for better decision-making.	
6.	Gecko Robotics, Pittsburgh, USA	It apply data-driven approach, and use software and robots to evaluate, analyse and test industrial infrastructure.	They are developing advanced software, robotics, and other technologies that play a vital role in creating a smart, safe, and resilient future for all.	They are equipped with world's most advanced ultrasonic inspection robots for getting the present status of complex infrastructure. Their proven automated solutions collect data at an unprecedented scale, increase efficiencies.
7.	Positive Energy, Singapore	For small- to medium-sized renewable energy projects, they set up a blockchain-based platform to deal in financial tech products.	They provide an asset financing, trading, and e-platform which has converted the way people invests in green options.	Their mission is to reexamine the energy funding phases which can speed up the renewable asset's deployment.
8.	Solidia Technologies, New Jersey, USA	Solidia is a technology and cement company that focusses in creating upgradeable opportunities for the construction sector.	They supply patented eco friendly options for building raw material by use of recycled materials and actively decline in Carbon dioxide emissions and minimize water consumption while recycling it.	By adopting their technology, business can meet sustainable goals when it comes to sustainable business practices.

9.	SR Kay Consulting Group, Pune, India	They fund seed and blue print ideas that are innovative.	They contribute in new inventions, big possible chance and organizations in light on forthcoming concepts target.	They ensure venture thrives on the dual benefits of cost-effectiveness and advanced technological capability.
10.	ECONcrete Tech Ltd., Tel Aviv, Israel	Econcrete's patented technology enhances biodiversity in marine construction by providing nature-inclusive solutions.	The organisation offers bio-enhancement real resolutions that are augmented with used supplies and residues.	Their goal is to leverage science to make a future where marine ecosystems and infrastructure work symbiotically for the advantage of the environment.
11.	Iberdrola, Bilbao, Spain	As the leading producer of wind power worldwide, Iberdrola has emerged as a leader in the clean energy sector thanks to its unwavering commitment. The company is dedicated to expedite such investments in renewable energies, digitalisation and electric mobility as a way to economic and employment recovery.	In order to improve the company's competitiveness, sustainability, and efficiency, Iberdrola sees innovation as a main strategic area within their portfolio.	The organisation has earned hundred percent belief of society and is working closely with public at large.

12.	Saphium , Germany	Using microorganisms, they create bioplastics that are organic, non-toxic, and biodegradable.	Carbon dioxide and hydrogen are their building blocks. They utilise electricity from renewable energy sources to produce hydrogen after extracting carbon dioxide from the air.	The value used in the process is calculated by reduction of waste of plastic and carbon di oxide from the atmosphere. By this method a unit of plastic production reduced double the value of carbon di oxide from environment.
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Source:<https://www.valuer.ai/blog/identifying-new-business-models-and-technologies-within-sdg9>

Active Energy, Berlin Germany create green mechanism and upgrade supply and voltage levels and also change buildings so that they are environment friendly. For executing this, they use artificial intelligence and identified such sources so that energy can be saved. AT Partners, Tokyo, Japan provides new and innovative schemes in which money can be invested and also encourage for set up of new Startups. For achieving this they promote AI, fintech, robotics and energy sectors. BluWave-ai, Ottawa, Canada contributed toward a future in which pure energy can be produced and efficiently consumed by everybody. They used such optimization techniques like edge computing, cloud-based supercomputing, and artificial intelligence. Highbar Technocrat Ltd. Navi Mumbai, India delas with infrastructural projects in which they used digitally integrated solutions. Eneryield, Gothenburg, Sweden finds out the faults and failures in underground, underwater and also suggests how power breakdown can be reduced. Gecko Robotics, Pittsburgh, USA totally use robots and software so that the infrastructure can be improved and it will create a safe future for all. Positive Energy, Singapore deals in renewable energy products and ultimate goal is to promote for green environment by implementing financial tech products. Solidia Technologies, New Jersy, USA is working in generating upgradeable chances in construction field by using ecofriendly materials and contributing to the environment. SR Kay Consulting Group, Pune, India provides funding to new innovative ideas and also promotes reduction in cost and technological development. Econcrete Tech Ltd., Tel Aviv, Israel is contributing to the environment by providing nature inclusive solutions in the field of marine construction. Iberdrola, Bilbao, Spain is contributing to the society in a very broad way by investing in renewable energies, electric mobility as a way to economic and employment recovery. Saphium, Germany is creating bioplastics which are environment friendly, non -toxic and biodegradable and helping in reducing the carbon dioxide from the environment.

It can be concluded from above that all are contributing to the environment in different ways without harming to the environment. Apart from that they are using latest technologies in the industries by fulfilling the sustainable development goals.

## 4 Conclusion and Discussion

When merchandising and individuals themselves embrace this attitude, it will contribute to the creation of an impartial community and the ability to adapt to the ongoing changes brought about by national, regional, and global concerns. In order to create a more sustainable society, the UN's Sustainable Development Goals (SDGs) raise important issues like respect for public institutions, care for a nation's citizens, ethical principles, and inclusivity of all cultures and ethnic groups. Furthermore, financial inclusion is not the only factor that directly supports sustainable development; other indirect channels may also have an impact. Consequently, when a government endeavours to accomplish a particular Sustainable Development Goal (SDG), it ought to consider other variables that could impact the SDG, like infrastructure development, financial literacy, and institutional quality. Thus, whether in developing or developing nations, financial inclusion needs to be given top priority when coordinating efforts to achieve the SDGs. In our study we have tried to connect financial inclusion with SDG 9 by explaining target goals of SDG 9 and also explain the case studies of 12 companies in which we explained how they are making a proper co-ordination in connect with sustainable development goal 9 (industry, innovation and infrastructure). More efforts should be made to examine the ways in which digital finance platforms and renewable energy technologies can facilitates the development of infrastructure and financial inclusion. Analyse case studies where cutting-edge technologies have been effectively incorporated into underdeveloped nations' infrastructure projects. It should be find out how to boost the number of corporate, governmental, and non-governmental organizations included in the case study approach. Determine effective tactics, lessons discovered, and scalable models that are replicable in various settings.

## 5 Future Study

In future it will be explored how well national and international laws, rules, and institutional frameworks support the development of sustainable infrastructure and financial inclusion and select the optimal practices and suggested policies for enhancing sector - based coordination Start examining how stakeholder and community engagement sway infrastructure projects that kept sustainability and financial inclusion first. Analyse how participatory planning techniques affect project outcomes and the resilience of the community. Measure the effects on the environment, the results long periods of time social equity, and the resilience the economy over to determine how they contribute to sustainable development. Investigate sector-specific opportunities and challenges in integrating financial inclusion with infrastructure development by focusing exclusively on specific industries, such as energy, transportation, or telecommunications. Assess

how SDG 9 relates to other SDGs (such as SDG 8 on decent work and economic growth and SDG 7 on affordable and clean energy). By approaching these future research directions, studies will be done on how financial inclusion can be used to promote sustainable infrastructure development and SDG 9 advancement globally. Opportunities to create new knowledge, influence policy, and move ahead inclusive and sustainable development practices prevail in every direction.

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