

Greening High Impact Sectors

Investing in diverse and local economic models



India Green Economy Barometer 2017



There has been some encouraging evidence of new, sustainable business models that provide decent work and stable careers. If these examples can be taken to scale, the transition to a green economy offers huge opportunity to build business value, create jobs and support more resilient communities.

Sector transformation is about generating value for all stakeholders from the sustainable use of environmental assets. It is also about inclusivity of decision making, opportunity and ownership. The sectors and systems that currently demand the most resources or create the most waste offer the greatest opportunity for innovation. These sectors are - energy, food, housing and transport.

Economic resilience

Volatile commodity prices and unpredictable markets are increasingly undermining long-term economic priorities at the national level. The opportunity to build decentralised and resource-efficient sectors offers the chance to build resilient economies – which are better equipped to cope with external shocks and are responsive to local conditions.

Prosperous societies

People seek resources which are economically viable and technically feasible. They intent for healthy food, safe housing and affordable energy. They want

employment in industries and sectors that provide them with decent work. They seek to witness an improvement in their living standards, health and wellbeing, and the knowledge that they will be able to enjoy a long and healthy retirement. They also want to see an improvement in opportunities for all, but not limited to an increasingly remote minority.

Business opportunity

Business is constantly looking for ways to become more efficient and generate new value. There are substantial competitive gains to be made in more efficient use of resources such as water, energy and materials, creating savings now, as well as developing resilience to the upward trend in commodity and energy prices. Given the scale of transition required across all sectors and services, industries which fail to innovate and fund the efficiencies will be unable to compete. Businesses want confidence about the future, finance to invest in change and growth, access to new markets, and rewards for innovation and risk taking.

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Key Sectors in India – Overview

Sectors and Economy

On the basis of economic activity, the Indian economy can be classified into primary, secondary and tertiary sectors:

- The **primary sector** of an economy includes those activities which lead to the production of goods by exploitation of natural resources. It is also known as 'agriculture and related sector' as most of the natural products are obtained from agriculture, dairy, fishing, forestry etc. It produces natural products like cotton, milk, fruits etc.
- The **secondary sector** of an economy includes those activities which result in transformation of natural products into other forms by manufacturing. This sector is also called the 'industrial sector' as this sector is associated with different kinds of industries. It produces manufactured goods like cloth, sugar, bricks etc.
- The **tertiary sector** of an economy includes those activities that contribute in the

development of the primary & secondary sectors by supporting the production process. It does not produce goods, but generate services like transportation, communication, banking etc. Examples of tertiary sector activities are banking, insurance, finance etc.

Since the early 1990's, India has experienced rapid economic growth which is expected to continue into the foreseeable future. According to the Government of India (GoI) estimates, Real GDP or GDP at constant (2011-12) prices for the year 2016-17 is anticipated to grow at 7.1% in 2016 -17 over the year 2015 -16. The real GDP is projected to reach INR 121.90 lakh crore in 2016 -17 as against INR 113.81 lakh crore recorded in 2015-16 (MoSPI, 2017).

The sectors which mainly contributed to this growth path includes sectors that registered growth rate of over 7% at constant (2011-12) prices. Following are these sectors:

- Public administration, defence and other services (11.3 %)

Table 1: Share of GVA across sectors in 2013-14

Sectors	Gross Value Addition (%) 2013-14 (@ 2011-12 prices)
Primary Sector	17.22%
Agriculture	17.22%
Secondary Sector	31.68%
Construction	8.28%
Mining	3.01%
Electricity, gas, water supply & other utility services	2.31%
Manufacturing	18.08%
Tertiary Sector	51.09%
Trade, repair, hotels & restaurants	12.03%
Transport, storage, communication, broadcasting	6.73%
Financial, real estate & professional services	19.71%
Community, social & personal services	12.62%
TOTAL	100%

Source: Planning Commission, 2015

- Manufacturing (7.9%)
- Trade, hotels, transport, communication and services related to broadcasting (7.8%)
- Electricity, gas, water supply other utility services (7.2%)

The growth rate estimated in other sectors includes agriculture, forestry and fishing (4.9%), mining and quarrying (1.8%), construction (1.7%) and financial, real estate and professional services (5.7%). Figure 1 illustrates how India's GDP has evolved since independence, indicating the manufacturing and services sectors have substantially increased while the formerly dominant agriculture, forestry and fishing sectors are in major decline.

Manufacturing and services sectors have substantially increased while the formerly dominant agriculture, forestry and fishing sectors (primary sectors) are in major decline.

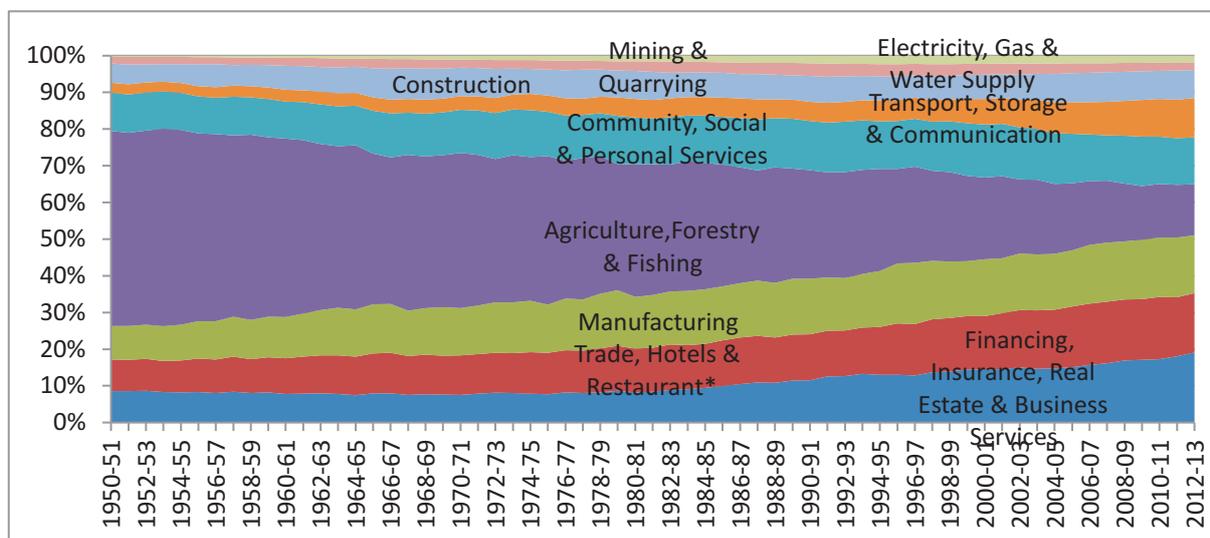
While manufacturing and services have increasingly contributed to GDP, agriculture sector was left behind, but it provided employment to a massive share of India's population. In India, a large proportion of workforce is still dependent on the agricultural sector (48.9% employment share in 2011-12) (ILO, 2016). **However, it is important to note that the growth of the Indian economy had been majorly jobless throughout as the growing sectors mainly secondary and tertiary failed to provide employment to the relatively larger share of workforce as the agricultural sector continued to provide.** Referring back to 1970s, even when GDP grew at 4.7% per annum during 1972-73 to 1983, employment growth was 2.4%. Further, during the 2004-05 to 2009-10 quinquennium, when GDP growth

was as high as 9%, employment grew at an insignificant rate of 0.22%, thus indicating the jobless growth path of the country (ISID, 2012). Thus the concern continued over translating economic growth to better labor market scenarios.

The study by IGEP (2013), using data by SERI (2012), shows that in India the 'agriculture and forestry' sector has remained the sector with the highest direct and indirect material input due to India's large agricultural production. However, the construction sector and the sector group 'wood/metal/chemical products' – hence the main manufacturing sectors – have been catching up significantly in the same period. Both sectors are not only the most dynamic ones in terms of physical growth, but are also the second and third largest in terms of material input. Comparing India's productivity with the productivities in other countries sheds light on the potentials for improvements, given the existing or current technologies.

- The construction sector in Germany is twice as resource efficient as the construction sector in India. The difference can be taken as a rough indication that if India were to construct its infrastructure and houses in a resource-efficient manner similar to the way that Germany does, it could save half the amount of materials used in the sector - 900 million tonnes in 2007, more than 5 billion tonnes in 2050 and more than 125 billion tonnes between 2013-2050.
- Indian manufacturing companies have remarkable potential for achieving resource efficiency. Taking the average 45% material cost share of German manufacturing companies as a very rough benchmark, Indian companies (with

Figure 1: Share of various economic activities in GDP (at Factor Cost) for India



Source: Ministry of Statistics and Programme Implementation, Government of India

71% material cost share) that produce more resource-efficiently could have the potential to save around INR 8,888 billion material costs, which would correspond to around one-third of all costs for materials and energy in India's manufacturing, and to one-quarter of total manufacturing output. (IGEP, 2013)

Sectors and their Carbon Footprint

The net Greenhouse Gas (GHG) emissions from India (that is emissions with LULUCF) in 2007 were 1727.71 million tons of CO₂ equivalent (eq) with per capita emissions at 1.5 tons/capita.

- The energy sector emitted 1100.06 million tons of CO₂ eq due to fossil fuel combustion in electricity generation, transport, commercial/institutional establishments, agriculture/fisheries, and energy intensive industries such as petroleum refining and manufacturing of solid fuels. The CO₂ eq emissions from electricity generation were 65.4% of the total CO₂ eq emitted from the energy sector. Coal constituted about 90% of the total fuel mix used.
- Industrial activities together emitted 412.55 million tons of CO₂ eq of GHG in 2007. Industry sector emissions have been estimated from

Economic Sectors and Resource Efficiency

Figure 2: Material Inputs by Sectors in India, 2007

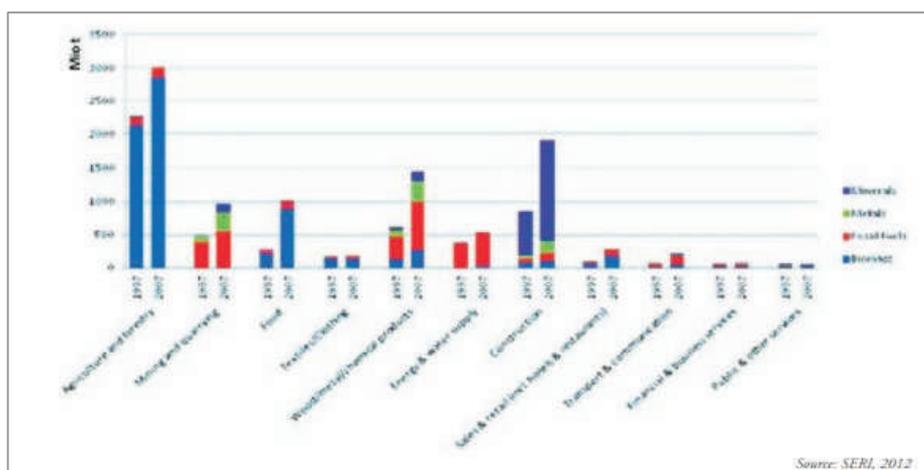
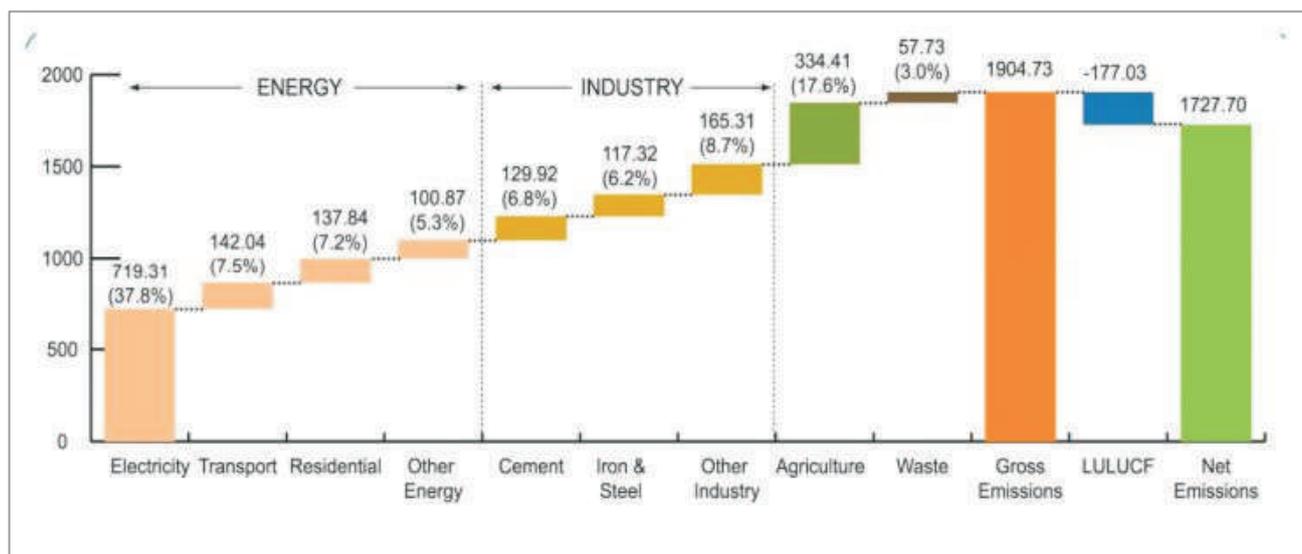


Figure 3: GHG Emissions by Sectors in India, 2007 (CO₂ Equivalent)



Source: (Ministry of Environment, Forest and Climate Change, 2010)

manufacturing of minerals, metals, chemicals, other specific industries, and from non-energy product use. It includes fossil fuel combustion related emissions, as well as the process based emissions. The cement industry emitted 129.92 million tons of CO₂, which is 32% of the total CO₂ eq emissions from the Industry sector.

- The agriculture sector emitted 334.41 million tons of CO₂ eq in 2007. Estimates of GHG emissions from the agriculture sector arise from enteric fermentation in livestock, manure management, rice paddy cultivation, agricultural soils and on-field burning of crop residue.
- The waste sector emissions were 57.73 million tons of CO₂ eq from municipal solid waste management, domestic waste water and industrial waste water management. (Ministry of Environment, Forest and Climate Change, 2010)

Sectors and Employment

While the size of country's population had been increasing, so has the size of its workforce, thereby worsening the situation further as the larger size of

workforce continues to be dependent on agriculture and allied sector for their livelihood. Figure 4 illustrates that even though the share of workforce in industry and service sector is rising over time, the absolute number of workforce continues to be the largest in agriculture and allied sector (having 23.17 crores workforce- in usual status). But, this also indicates that the development of secondary and tertiary sector can help improve the livelihood of masses. In fact it develops a case for ensuring economic growth to have trickle down effects on the labour market conditions. However, mechanisation of big industries making them more capital intensive than labour intensive is one of the reasons why there is saturation of employment opportunities in the organised sector.

The Financial Times (as cited in Bhaduri, 2008) reported that the TATA steel plant in Jamshedpur employed 85,000 workers in 1991 to produce 1 million tonnes of steel. In 2005, the production rose to 5 million tonnes, while employment fell to 44,000. This shows that even though output increased approximately by a factor of five, the employment dropped by a factor of half.

Table 2: Share of employment across sectors

Sectors	Employed Person (%)
Primary Sector	48.9 %
Agriculture	48.9%
Secondary Sector	24.3%
Construction	10.6%
Mining	0.5%
Electricity, gas, water supply & other utility services	0.5%
Manufacturing	12.6%
Tertiary Sector	26.9%
Trade, repair, hotels & restaurants	11%
Transport, storage, communication, broadcasting	4.8%
Financial, real estate & professional services	2.3%
Community, social & personal services	8.7%
TOTAL	100%

Source: Economic Survey, 2015

Gender disparity in employment growth

Further, Table 1 indicates employment growth picked up pace from 2009-10 to 2011-12, but gender gaps continues to exist. The National Sample Survey (NSS) (68th Round) showed that employment grew strongly from 2009 -10 to 2011-12 in comparison to the previous period. Moreover, employment has grown faster for men and in urban areas. In this regard, male employment grew by 1.9 % per annum from 1999 - 2000 to 2011-12, while female employment increased by just 0.3 % on an annual basis.

Rural-Urban disparity in employment growth

Over this period, urban areas accounted for 57.2 % of the growth in employment, though only 31 % of the population live in urban areas as per the 2011 Population Census (ILO, 2016).

Thereby, **labour participation scenario continued to indicate the gender and rural-urban divide, whereby the problem of employment remained sever in rural areas and for female workforce.**

Inter-state migration

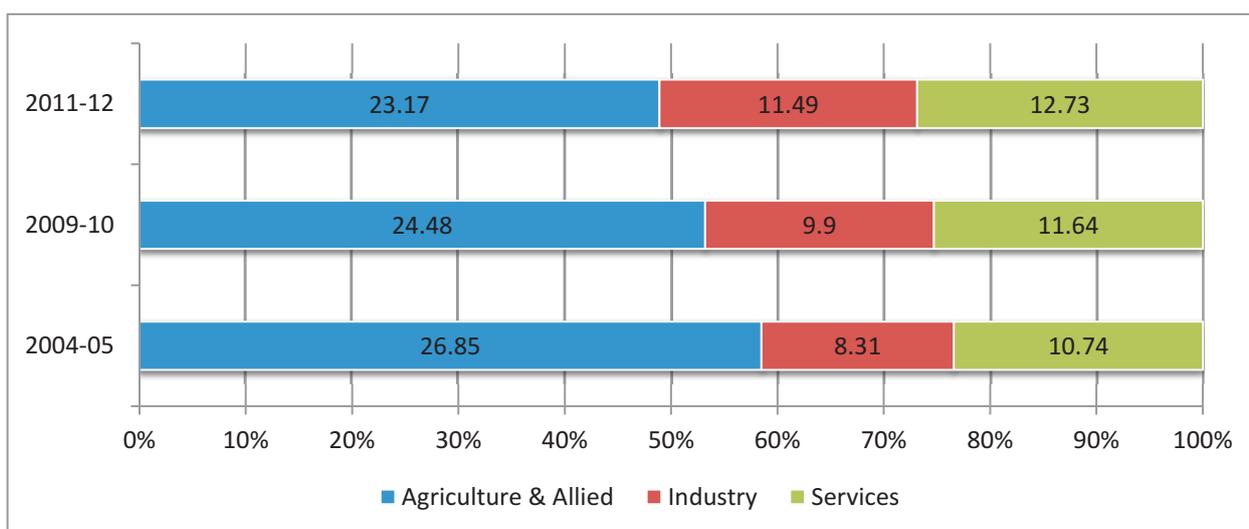
Never the less, the recent economic survey 2016-17 also revealed that labour migration in India is increasing at an accelerating rate. The analysis revealed that inter-state labour mobility averaged 5-6.5 million people between 2001 and 2011, yielding an inter-state migrant population of about 60 million

and an inter-district migration as high as 80 million. The first-ever estimates of internal work-related migration using railways data for the period 2011-2016 indicate an annual average flow of close to 9 million migrant people between the states. Additionally, it also revealed that migration for work and education is accelerating. In the period 2001-2011 the rate of growth of labour migrants nearly doubled relative to the previous decade, rising to 4.5 per cent per annum (PIB, 2017) .

Moreover, Ministry of Labour and Employment (MoLE) conducts an annual employment-unemployment survey and according to the recent, 4th annual survey 2013-14 report, Indian Economy is characterised by the existence of a vast majority of informal or unorganised labour employment. More than 90% of workforce and about 50% of the national product are accounted by the informal economy. Therefore, undoubtedly **majority of the country's workforce is currently ending up working as informal workforce and are then deprived from various benefits of fundamental rights of the workforce.**

All these factors including - poor employment opportunities in rural areas, increasing migration, huge dependence on agriculture and allied activities for livelihood, in parallel with poor GDP contribution of the sector; raises a need for the policy makers to extend their focus on economically viable, technically feasible and sustainable alternative sources of livelihood for the growing population needs of the country.

Figure 4: Workforce employed across major sectors (in usual status in crores)



Source: Press Information Bureau (PIB), Gol

Table 3: Key labour market indicators*Employment growth picked up pace from 2009 -10 to 2011-12, but gender gaps continued to remain*

	2004-05	2009-10	2011-12	2013-14
Employment (million)^{a,b}	457.9	459	472.9	N.A.
Unemployment (million)^b	11.3	9.8	10.8	N.A.
Labour force participation rate (%)^c	63.7	57.1	55.9	55.6
Male	84	80.6	79.8	75.7
Female	42.7	32.6	31.2	31.1
Unemployment rate (%)^c	2.3	2	2.1	3.4
Male	2.1	1.9	2.1	2.9
Female	2.6	2.3	2.3	4.9
Share of employment in manufacturing (%)^c	11.6	11	12.5	10.7
Male	12	11.1	12.2	10.7
Female	11	10.8	13.2	10.6
Share of regular wage and salaried workers (%)^c	14.4	15.7	17.9	15.4
Male	17.3	17.8	19.9	16.5
Female	8.4	10.2	12.8	12.1
Working poverty rate (%)				
<US\$ 1.90 per day	35.3	28.4	17.9	N.A.
>=US\$ 1.90 & < US\$ 3.10 per day	36.5	37.5	35	N.A.
Average real daily wage index (2004-05=100)^d				
Rural	100	111.7	122.8	N.A.
	100	129.4	N.A.	N.A.

Source: India Labour Market Update, 2016, International Labour Organization (ILO)

Note: a) all ages; b) usual status; c) estimates for persons aged 15 years and above; d) average real daily wage index for regular wage employees aged 15-59 years.

Agriculture

The agricultural sector is the backbone of the Indian economy. Over 50% of the working population in India is directly employed by the agricultural sector. (Census, 2011) Agriculture has both positive and negative impacts on the environment. Its positive externalities include providing services like carbon sequestration and rural landscape maintenance. Additionally, as demand for food has grown, agricultural intensification has protected large areas of forest and grasslands from being felled but, without a cost. Both extensive and intensive agricultural practices have resulted in significant negative impacts on the environment including ground water depletion, soil degradation and methane emissions.

India's agricultural sector has tremendous potential to become greener. Green agriculture involves shifting both commercial and subsistence farming towards ecologically sound farming practices, such as efficient use of water, use of organic soil nutrients, optimal tillage, etc. Making this sector green will require physical capital assets, financial investments, research and capacity building in 5 key areas, which include soil fertility management, more efficient and sustainable water use, crop and livestock diversification, biological plant and animal health management, and appropriate farm level mechanisation.

Construction

The construction sector is considered to be one of the major contributors to economic growth, and thereby a measure for development of a country. It employs over 40 million people and over 80% of the country's unskilled labour force (millions of unskilled, semi-skilled and skilled work force) with potential job opportunities. According to the Global Construction 2020 Report, the sector will account for 13.2 per cent of the world's GDP by 2020. (Global Construction Perspectives and Oxford Economics, 2011)

The Indian construction industry grew at a Compound Annual Growth Rate (CAGR) of 9.42 per cent between 2003-04 and 2012-13, and contributed to 8.2 per cent of the Indian GDP. (NSDC, 2012) It employed 41 million people in 2011 and is the second largest employer after agriculture. (Planning Commission, 2013) The growth in the sector is fuelled by the rapid transformation of the country from a predominantly rural to an urban society, which houses 377 million people in urban settlements i.e., 31.16 per cent of the total population. (Census of India, 2011) Small cities and towns are to be the primary locus of this growth, with the number of towns increasing from 2,774 to 7,935 between 2001 and 2011. (Census of India, 2011)

The demand for commercial property will also increase to meet the business needs, via offices, warehouses, factories and other buildings for industry. The growth rates in hospitality and retail

sector are also high, although their total area remains relatively small. (Parikh K., 2011)

Manufacturing

The manufacturing sector accounts for 18.08% of the Gross Value Added (GVA) during 2013–14 at 2011–12 prices. This sector has the potential to elevate much of the Indian population above poverty by shifting the majority of the workforce out of low-wage agriculture. The Indian manufacturing sector is broadly divided into:

Capital Goods & Engineering; Chemicals, Petroleum, Chemicals & Fertilisers; Packaging; Consumer Non-Durables; Electronics, IT Hardware & Peripherals; Gems & Jewellery; Leather & Leather Products; Mining; Steel & Non-Ferrous Metals; Textiles & Apparels; and Water Equipment.

This rising growth of the resource intensive manufacturing sector is enabled and facilitated by an ever-increasing rate of material use, leading to manifold impacts to the environment. National Productivity Council of India has estimated the cost of environmental damage at approximately \$32 billion.

The working group of the National Manufacturing Policy has identified 7 recommendations to ensure environmental sustainability in the manufacturing industry. These include Green Products; Green Buildings; Sustainable Environment Management in MSMEs; Environmental Regulatory Reforms and Market Based Instruments; Organised Waste Management and Recycling Industry; Green and Clean Technology Fund; and Disclosure on Performance.

Transport

It has been universally recognised that improved transport systems are essential for accelerated economic growth. The transport sector accounts for 4.81% of the Gross Value Added (GVA) during 2013–14 at 2011–12 prices. However, this sector also contributes to substantial and growing proportion of air pollution in cities. The primary externality costs in the transport sector arise from the relationship between transport and emissions as the sector is depended on fossil fuels to meet its energy needs. The transport sector is the second largest consumer of energy.

There are two basic approaches for reducing vehicular emissions: (1) reducing emissions per vehicle-km travelled; and (2) reducing the total number of kilometres travelled. These strategies require active government intervention and aggressive measures. Theoretically, emission tax is assumed to be the first and the best solution for reducing vehicular emissions. However, such a tax is difficult to administer and monitor. A more practical strategy would be to use a mix of instruments which includes both public and private principles.

Tracking Stakeholder Initiatives in Greening Sectors

Table 4: Tracking Government Initiatives in Greening the Economy

Sector	Initiatives
Agriculture	<ul style="list-style-type: none"> • According to the budget 2017-18, the government seeks to double farmers' income in the coming 5 years. • Paramparagat Krishi Vikas Yojana (PKVY): This scheme ensures the promotion of organic farming. USD 45.83 million has been allocated for the scheme during the year 2015-16. Adoption of farming will promote the balanced use of chemical fertilisers and enhance the quality of farm produce. • Pradhan Mantri Krishi Sinchai Yojana (PMKSY): This scheme ensures access to means of irrigation to all agricultural farms in the country to produce 'per drop more crop', thus bringing much desired rural prosperity. It aims to increase agricultural production & productivity by increasing availability of water and its efficient use. • Niti Aayog, Contract Farming Law: In February 2017, as an effort to protect the farmers against price volatility, Niti Aayog came up with a law on contract farming, to protect the farmers' interest. The law on contract farming is considered to be important for private players, as it would induce competition, while ensuring better price of horticulture produce to farmers through advance agreement. • India's National Mission for Enhanced Energy Efficiency implements the Perform, Achieve and Trade (PAT) mechanism, covering the country's largest industrial and power generation facilities. PAT covers more than 50 per cent of fossil fuel use and sets a target to reduce energy consumption at participating facilities by 4-5 per cent in 2015, as compared to 2010 levels. • Draft National Renewable Energy Law (2015) – India's Ministry of New and Renewable Energy drafted the National Renewable Energy Act and was opened to public consultation in July 2015. The goal of the Act is to create legislative framework for further deployment of renewable energy in India. The draft of the Law covers issues including security payments, grid access and decentralised energy. • National Solar Mission: The Indian Solar Mission is a large scale solar energy programme that will run from 2010 to 2022. Given the major policy focus of the Indian government to provide wider energy access in rural areas, the project promotes electricity generation from both small and large scale solar plants. • Paris Agreement NDC: India needs to achieve certain targets by 2030 including lowering emissions intensity of GDP by 33%–35% below 2005 levels; increase the share of non-fossil based power generation capacity to 40% of installed electric power capacity (equivalent to 26–30% of generation in 2030); and create an additional carbon sink of 2.5–3 GtCO₂e through additional forest and tree cover.
Renewable Energy	<ul style="list-style-type: none"> • National Tariff Policy (2016): The National Tariff Policy for Electricity was amended by the Union Government on 20 January, 2016. Special focus on renewable energy has been laid. In order to promote the use of renewable energy, solar Renewable Purchase Obligation (RPO) is proposed to be increased to 8 per cent by 2022. • Low-interest funds: Low-interest-bearing funds to be provided from National Clean Energy Fund (NCEF) to Indian Renewable Energy Development Agency Ltd (IREDA) for on-lending to viable renewable energy projects. Funding of USD 746.82 million from NCEF and USD 775.63 million from IEBR has been planned for the year 2016-17 to develop and use renewable energy resources in an eco-friendly and sustainable manner. • Power to the people: Implementation of 2 schemes – Deen Dayal Upadhyay Gram Jyoti Yojana (DDUGJY) and Integrated Power Development Scheme (IPDS) for rural & urban areas. Implementation of a new scheme – Ujwal DISCOM Assurance Yojana (UDAY), which would enable electrification for all villages by reducing losses through programmes that involve public participation.

Construction	<ul style="list-style-type: none"> • The MoEFCC released a draft notification in 2015 that mandates that construction activities happening 500 km around power plants to use only fly ash bricks. So far, 1 state has adopted this policy. • The Energy Conservation Building Code was formulated in 2007. It targets building energy efficiency and is likely to become a mandate in the coming future. It is a mandatory requirement for all buildings with a built up area above 20,000 sq. m. to be appraised by the MoEF's Environmental Appraisal Committees (EACs) and the State Environmental Appraisal Committees (SEACs). • Green Rating for Integrated Habitat Assessment (GRIHA) was adopted as the national rating system for green buildings in India, in 2007.
Transport	<ul style="list-style-type: none"> • Bharat Stage Emission Standards (BSES) VI (comparable to Euro VI norms) were released in 2017 to regulate the output of air pollutants from internal combustion engines and spark-ignition engines equipment, including motor vehicles. • The government is close to launching the Voluntary Vehicle Fleet Modernisation Programme which is aimed at encouraging people to scrap their old vehicles and replace them with modern, more fuel-efficient ones, by offering tax and other benefits. • FAME India Scheme: On April 8th, 2015, the Government of India announced FAME (Faster Adoption and Manufacturing of Electric/Hybrid) Vehicles in India – a scheme under the Ministry of Heavy Industries and Public Enterprises. • National Electric Mobility Mission 2020 was launched in 2017 for promotion of hybrid and electric mobility in India, by the Ministry of Heavy Industries and Public Enterprises. The mission aims to increase the population of xEV to 6-7 million by 2020 and contribute to national fuel security by providing incentives at both supply and demand ends of the industry. Indian automobile company Mahindra and Mahindra, and taxi aggregator Ola, have begun introducing a fleet of electric taxis and charging ports in three Indian cities. • In 2016, the government announced plans for new policy initiatives to encourage private investments in climate friendly and sustainable public transport systems, like Metro Rail, Non-Motorised Transport and other low carbon emitting systems in urban areas. New initiatives under consideration, including Green Urban Transport Scheme, new Metro Rail Policy, revision of Metro Acts, and Standardisation and Indigenisation of Metro systems, are aimed at increasing private sector participation.

Sources: (Agriculture in India: Information About Indian Agriculture & Its Importance, 2017) (Power Sector in India, 2017), (International Energy Agency , 2012), (Grant Thornton , 2016)

Table 5: Tracking Private Initiatives and New Markets in Greening the Economy

Sector	Initiatives
Agriculture	<ul style="list-style-type: none"> • According to the Department of Industrial Policy and Promotion (DIPP), the Indian agricultural services and agricultural machinery sectors has witnessed Foreign Direct Investment (FDI) equity inflow of about USD 2,315.33 million from April 2000 to December 2016. • Prime Minister, Narendra Modi, has encouraged other states to follow the Sikkim Model of organic farming. Unlike other people who mainly opposed the notion of organic farming, Sikkim farmers have shown the way. In Sikkim, 75,000 acres of farmland is devoted to organic farming, where initially farmers had used synthetic fertilisers. • Today, India has about 650,000 organic producers. A parliamentary committee report acknowledged that an increase in the range of organic farming could boost employment by at least 30 per cent. States like Kerala, Karnataka and Gujarat have started implementing this method of farming. • The organic food market in India is growing at 25-30%. However, despite huge government spending, awareness continues to be very low. The market is expected to grow by more than 25% a year and is anticipated to touch USD 1.36 billion by 2020.
Renewable Energy	<ul style="list-style-type: none"> • Around 293 global and domestic companies have committed to generate 266 GW of energy together through solar, wind, mini-hydel and biomass-based projects in India over the next 5–10 years. This initiative would entail an investment of about USD 310–350 billion. Between April 2000 and December 2016, the industry attracted USD 11.4 billion in Foreign Direct Investment (FDI). • Installed capacity in India's renewable energy market jumped by 12.9% in the last year, and the government is encouraging companies to find cleaner energy sources to sustain the breakneck pace of production. • The EY Renewable Energy Market Attractiveness Index ranks India as the third most attractive market overall. • India is set to become the third biggest solar market globally in 2017. Solar capacity in the country is expected to touch 18.7 GW by the end of 2017, which is about 5% of global solar capacity. Indian solar market has grown by approximately 72% in the last three years and is now worth approximately 8-9 GW per annum.
Construction	<ul style="list-style-type: none"> • According to data released by the Department of Industrial Policy and Promotion (DIPP), cement and gypsum products attracted Foreign Direct Investment (FDI) worth USD 3.117 billion between April 2000 and September 2016. • In the brick sector, the use of Fly Ash, Hybrid Hoffman Kilns and Vertical Shaft Brick Kilns (VSBK) considerably increases resource efficiency. Cement production can also be made less resource intensive with the implementation of the vertical roller mill technology, fluidised bed cements fired kiln system, and the use of mineralisers.
Transport	<ul style="list-style-type: none"> • The Indian automobile industry is currently witnessing a new trend in the market that is proving to be the next big thing in urban mobility. The car sharing and/or car rental services segment is showing signs of growth, owing to a rising demand among the on-the-go-millennial population, which is looking for a cheaper alternative to purchasing one's own car. • In India, emerging car pooling/car sharing platforms have proven to be reliable alternatives to both car ownership and car rentals, by offering convenience and flexibility to customers who are seeking such services to make their lives easier.

Source: (Agriculture in India: Information About Indian Agriculture & Its Importance, 2017), (Power Sector in India, 2017), (Cement industry in India, 2017), (Indian Railways, 2017), (Rosencranz, 2016), (TechSci Research, 2015), (Agarwal, 2017), (Development Alternatives, 2014), (Vij, 2016)

Medium, Small and Micro Enterprises – Overview

The MSME sector has been an enormous contributor to the Indian Economy, creating ample of employment opportunities in the rural and backward areas. The sector also stimulates industrialisation and technological advancements in the deprived areas of the country. (MSME Annual Report , 2015-16)

As per the fourth All India Census of MSMEs, the unregistered sector houses far more units than the registered sector, consequently employing four times the number of people. Together the manufacturing and service sector MSMEs have contributed 37.54% to the country’s GDP in the year 2012-13, (MSME Annual Report , 2015-16) There are around 46 million enterprises in India, across various sectors of work, 94% of which are unorganised in nature, owing to lack of adequate support. MSMEs are job creators, they contribute 45% to India’s manufacturing output and employ close to 40% of India’s workforce. (Economic Times, 2013) Growing at 11% per annum, which is higher than the average GDP growth rate, they have potential to increase the growth rate to 15% by 2020. (The new wave Indian MSME, 2015)

MSMEs contribute to over 40% to industrial production and over 45% to India’s exports; they also account for substantial pollution load of India. With a

notable share in manufacturing, they consequently are major contributors to environmental pollution. The high contribution also arises due to their inability to leverage high-end technological equipment and finances to set up common facilities for smooth functioning. The Planning Commission of India, at many times, has recommended the shift to ‘environment managing’ action from the SPCB/CPCB with advisory support for MSME, enhancing their financial ability to keep the natural resources unpolluted. (Report of the Working Group on Effectively Integrating Industrial Growth and Environmental Sustainability, 2012-17)

The annual report (2014-15) of the Ministry of Micro, Small and Medium Enterprises has projected the number of working enterprises and people employed in the MSME sector over the last decade. Whilst the number of enterprises has increased rather rapidly over the last decade, the contribution to employment generation hasn’t been as tremendous considering the number of new units added. These statistics take into account MSMEs in the registered sector only. In the year 2006-07, approximately 2 people were employed in each MSME, and the figure remains nearly same in 2011-12, implying no improvement in their employment providing ability.

Figure 5: Leading Industries in the Indian MSME Sector

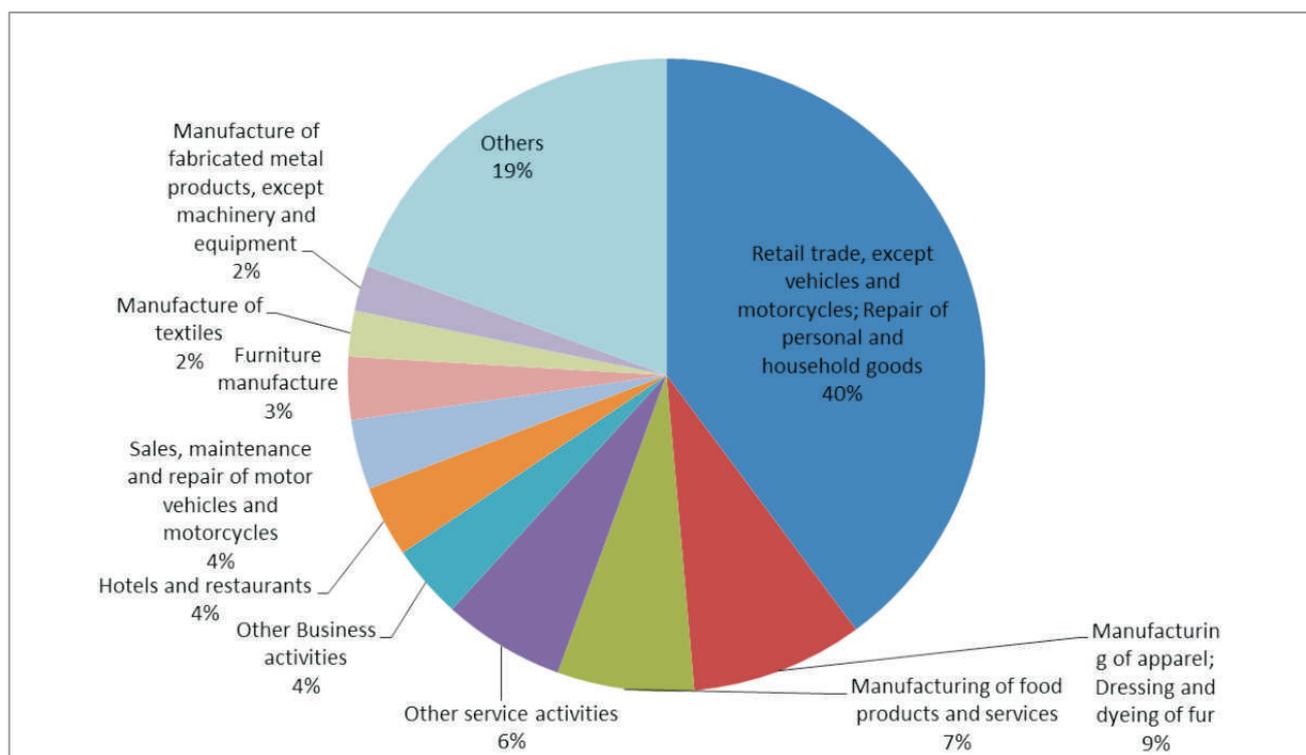
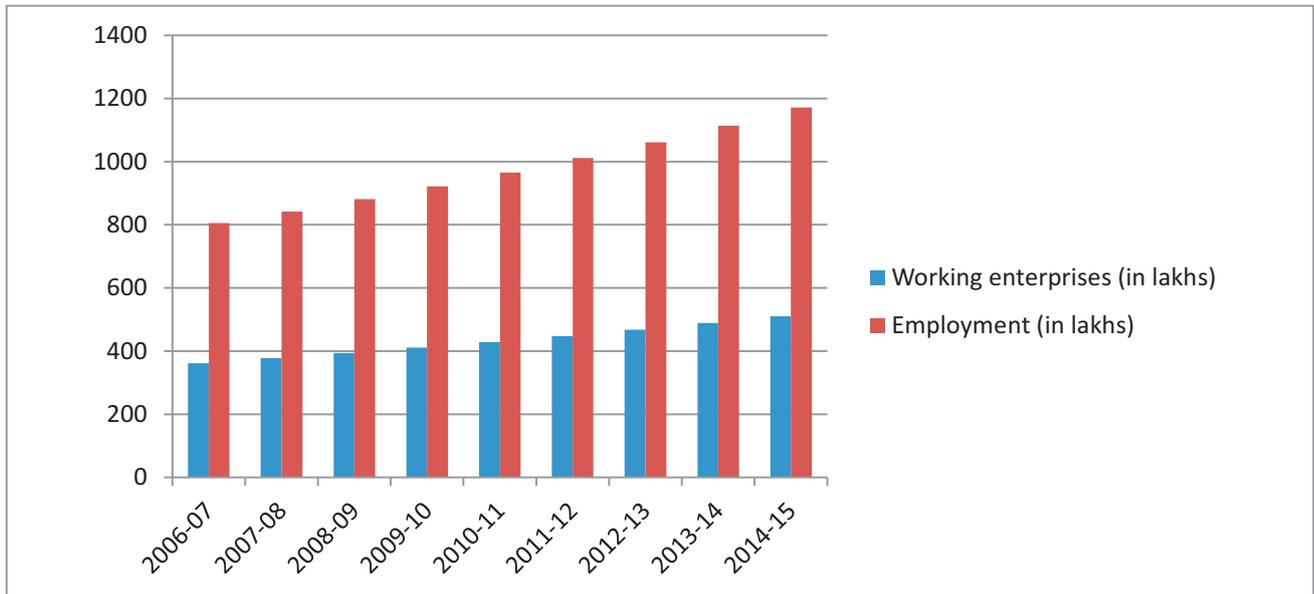


Figure 6: Number of working enterprises and employment generated in MSME sector



Need for Promoting MSMEs in India

While manufacturing sector is continuing to have an incremental share in country's GDP, it has not been such a major long-term driver of job creation in India in the past, but has the potential to provide employment to the massive share of population in the future with right policy interventions.

According to FICCI's estimates, within the manufacturing sector, **Micro, Small and Medium Enterprises (MSME) sector accounts for about 45% of manufacturing output, 95% of the industrial units and 40% of exports. Besides, the sector provides employment to almost 60 million people, mostly in the rural areas of the country, making it the largest source of employment after the agriculture sector.** Development of this sector, thus, holds key to inclusive growth and plays a critical role in India's future. Moreover, the estimated contribution of MSME sector (including service segment) to GDP during 2010-11, 2011-12 & 2012-13 are 36.69%, 37.97% & 37.54% respectively (PIB, 2015). All these parameters contribute towards the potential of the sector to be an alternative source of livelihood for the masses and thereby contributing to the country's GDP.

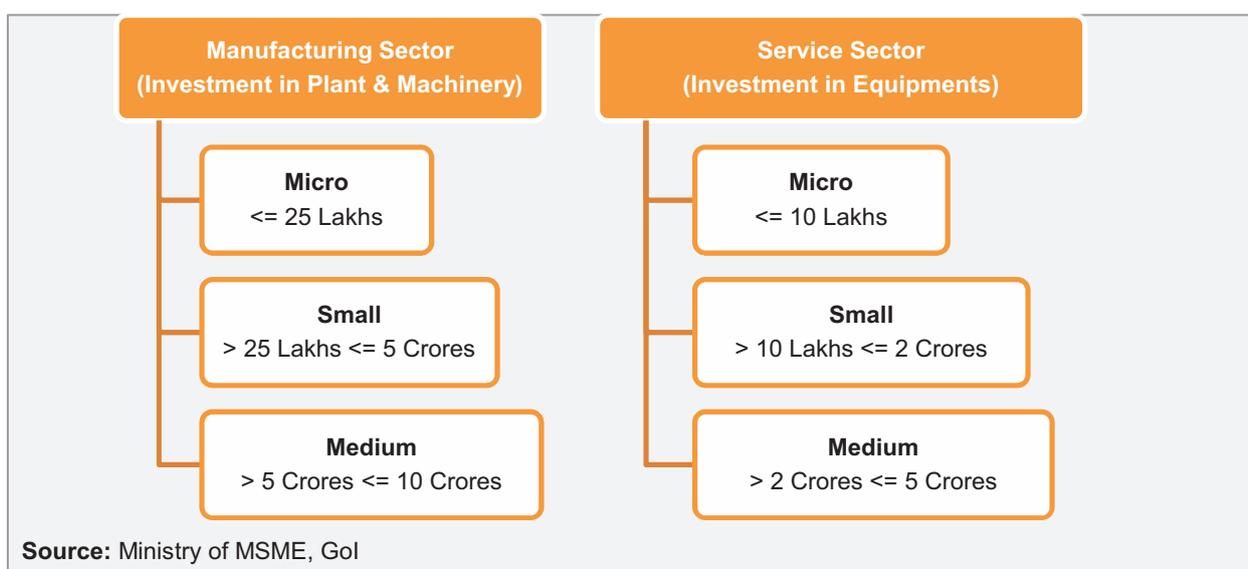
What is MSME?

In accordance with the provision of Micro, Small & Medium Enterprises Development (MSMED) Act, 2006 the Micro, Small and Medium Enterprises (MSME) are classified in two classes:

- **Manufacturing Enterprises-** The enterprises engaged in the manufacture or production of goods pertaining to any industry specified in the first schedule to the industries (Development and regulation) Act, 1951) or employing plant and machinery in the process of value addition to the final product having a distinct name or character or use. The Manufacturing Enterprise is defined in terms of investment in Plant & Machinery.
- **Service Enterprises-** The enterprises engaged in providing or rendering of services and are defined in terms of investment in equipment.

A detailed classification based on the limits of investment are as follows:

Figure7: Composition of MSME



Growth of MSMEs

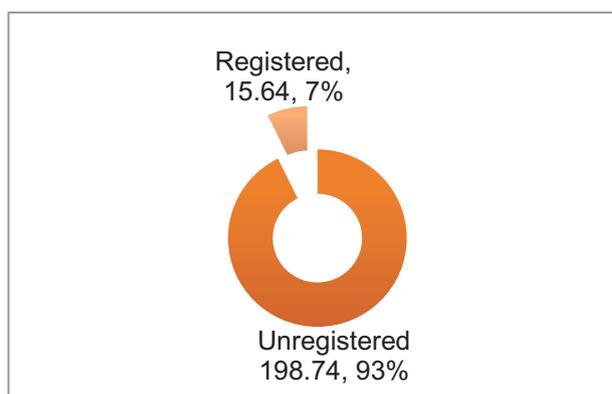
As per the provision of MSME Act, MSMEs have to file Entrepreneurs Memorandum (Part – I) at District industries Centres (DIC) before starting an enterprise. After commencement of the project, the entrepreneur concerned files Entrepreneurs Memorandum (Part – II)/ (EM-II). Since 2015, EM-II has been replaced by Udyog Aadhaar Memorandum (UAM). Figure 3 illustrates the growth of MSMEs recorded in last one decade. However, in India not all MSMEs belong to registered sector.

Characteristics of MSMEs in India

A periodical survey is been conducted since 1977 to understand the nature, growth and performance of MSMEs in India. Recently, in 2011-12 the results of Fourth All India Census of Micro, Small & Medium Enterprises 2006-07 was published. The report revealed that majority of MSMEs belonged to unregistered sector. Figure 4 indicates that only 7% of MSMEs were registered and remaining 93% of the MSMEs were part of unregistered sector.

Figure 9: Distribution of enterprises across unregistered and registered sector

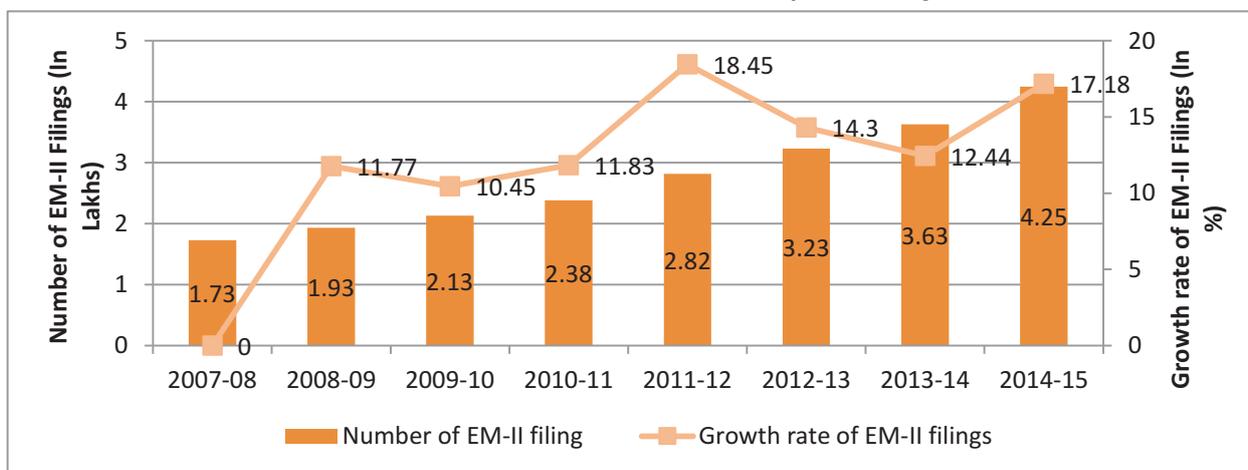
Majority of MSMEs belonged to unregistered sector



Source: Fourth All India Census of Micro, Small & Medium Enterprises 2006-07, Ministry of MSME, GoI

Figure 8: Number of growth rate of EM-II Filings

The number of MSME are continuously increasing



Source: Annual Report 2016-17, Ministry of Micro, Small and Medium Enterprises, GoI

Since majority of enterprises (93%) are operating as unregistered sector therefore majority of the employment (81.5%) was also recorded in unregistered sector. Further, 95% and 99.8% of enterprises were operating as micro enterprises in both registered and unregistered sector respectively (See Table 2). Additionally, in both registered and unregistered sectors, the ownership of enterprises mainly lied with male members, indicating the gender gaps prevailing in the country (See Table 3).

Interestingly, 60% of enterprises in unregistered sector and 45.2% of enterprises in registered sector

are located in rural areas and therefore unregistered sector in the rural areas has the highest number of employment. However, in the case of unregistered sector, even though higher number of enterprises are located in rural areas, there is high fixed invested recorded in urban areas (INR 133522.5 Crores). In fact, urban areas are witnessing high fixed investment both in registered and unregistered sector as compared to rural areas (See Table 4). **The high fixed investment observed in urban areas irrespective of less number of operating enterprises further indicates the urban-rural divide.**

Since there is huge fixed investment flowing in the MSME sector, it is important to understand the flow of this investment across the size of enterprise and the nature of activity. **Manufacturing enterprises in both registered and unregistered sector accounted for the highest share of fixed investment across all micro, small and medium enterprises.** Table 5 indicates that small sector with a share of 49.76% of the total fixed investment of registered MSME sector accounted for the largest share of total fixed investment followed by micro sector (37.75%) and medium sector (12.49%). Manufacturing enterprises (86.94%) accounted for a very high share of fixed investment in registered MSME sector followed by service enterprises (6.73%) and repairing and maintenance enterprises (6.34%).



Table 6: Distribution of enterprise and employment across registered and unregistered sector

	Number of Enterprises (lakhs)			Employment (lakhs)		
	Registered*	Unregistered	Total	Registered*	Unregistered	Total
Micro	14.85 (94.9%)	198.39 (99.8%)	213.24	65.34	405.52	470.86
Small	0.76	0.35	1.11	23.43	3.32	26.75
Medium	0.03	-	0.03	4.32	-	4.32
Total	15.64 (7%)	198.74 (93%)	214.3	93.09	408.84	501.93

Source: Fourth All India Census of Micro, Small & Medium Enterprises 2006-07, Ministry of MSME, GoI

Note: *: Includes only working enterprises

Table 7: Percentage distribution of enterprises by sex of owner across registered and unregistered sector

	Female		Male	
	Registered*	Unregistered ^a	Registered*	Unregistered ^a
Micro	14.19	9.1	85.81	90.43
Small	5.06	3.01	94.94	96.81
Medium	4.21		95.79	

Source: Fourth All India Census of Micro, Small & Medium Enterprises 2006-07, Ministry of MSME, GoI

Note: *: Includes only working enterprises

a: 0.47% enterprises showed missing ownership

Table 8: Distribution of enterprises, employment and fixed investment across area of location

	No. of Working Enterprises (lakh)		Employment (lakh)		Fixed Investment (Crore)	
	Registered*	Unregistered	Registered*	Unregistered	Registered*	Unregistered
Rural	7.07 (45.2%)	119.68 (60.2%)	36.82	234.09	133880	107293.9
Urban	8.57 (54.8%)	79.05 (39.8%)	56.27	174.75	315258	133522.5
Total	15.64	198.74	93.09	408.84	449138	240816.5

Source: Fourth All India Census of Micro, Small & Medium Enterprises 2006-07, Ministry of MSME, Gol
Note: *: Includes only working enterprises

Table 9: Fixed investment across the size of enterprise and the nature of activity in registered sector

	Micro	Small	Medium	Total	% Share
Manufacturing enterprises	148913	189434	52112	390459	86.94
Repairing and maintenance enterprises	11762	15649	1059	28471	6.34
Service enterprises	8863	18419	2926	30208	6.73
Total	169538	223502	56097	449138	100
% Share	37.75	49.76	12.49	100	

Source: Fourth All India Census of Micro, Small & Medium Enterprises 2006-07, Ministry of MSME, Gol

Table 10: Fixed investment across the size of enterprise and the nature of activity in unregistered sector

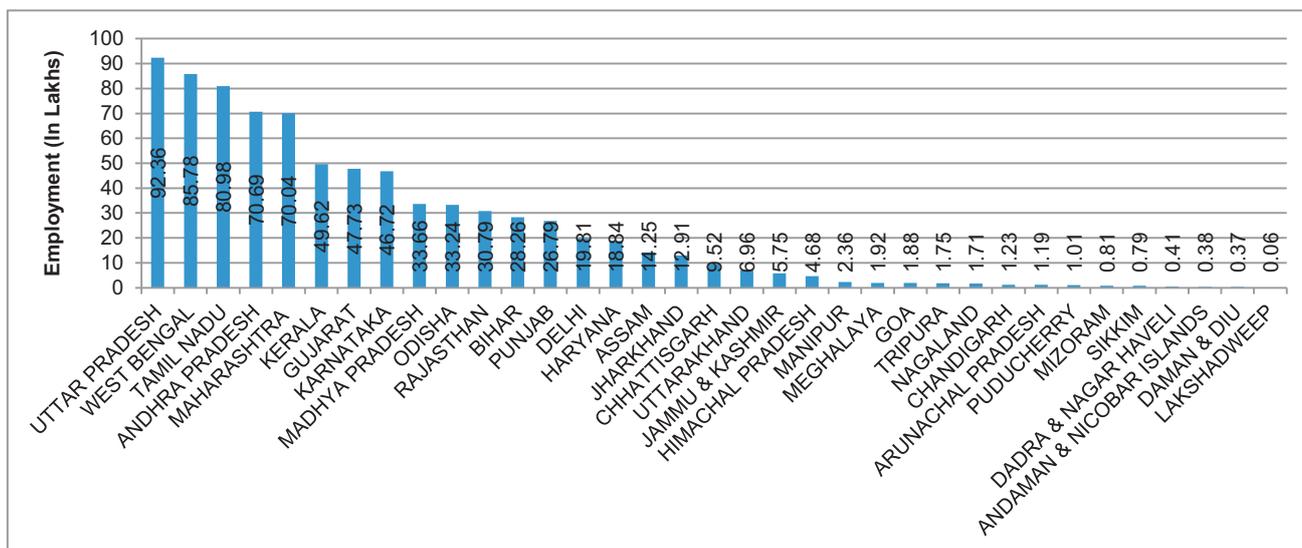
	Micro	Small	Total	% Share
Manufacturing enterprises	120026.24	7479.78	127506.02	52.95
Repairing and maintenance enterprises	14901.34	3031.42	17932.76	7.45
Service enterprises	91247.23	4130.45	95377.69	39.6
Total	226174.81	14641.65	240816.47	100
% Share	93.92	6.08	100	

Source: Fourth All India Census of Micro, Small & Medium Enterprises 2006-07, Ministry of MSME, Gol

In case of unregistered sector, table 6 indicates that micro segment with a share of 93.92% of the total fixed investment of unregistered MSME sector accounted for the largest share of total fixed investment followed by small segment (6.08%). Manufacturing enterprises (52.95%) accounted for a high share of fixed investment in unregistered MSME sector followed by service enterprises (39.60%) and repairing and maintenance enterprises (7.45%).

A state-wise distribution of employment in the MSME sector presented in Figure 5 indicates that few states including Uttar Pradesh, West Bengal and Tamil Nadu are majorly contributing to employment opportunities in the MSME sector.

Figure 9: State-wise distribution of employment in the MSME sector



Government Programmes to Support MSMEs

- **The Strategic Action Plan for MSMEs** (Ministry of MSMEs) proposes that the Ministry would focus on its efforts for giving financial assistance for Entrepreneurship Development Training Programmes (EDPs), Skill Development Training Programmes (SDPs), Entrepreneurship-cum-Skill Development Training Programmes (ESDPs) and Training of Trainers Programmes (ToTs). Centre for Excellence would be set up at national level for standardisation of training curriculum, training of trainers, etc. Financial assistance to States/UTs for their efforts to set up Entrepreneurship Development Institutes would be enhanced with more focus on Naxalite affected areas, hilly areas of Jammu & Kashmir, Himachal Pradesh and Uttarakhand, North Eastern Region and difficult areas e.g. Andaman & Nicobar group of Islands, Lakshadweep group of Islands, etc. MSME Development Institutes would be converted into autonomous organisations to provide handholding and advisory services to the MSME. All training institutions of Ministry of MSME would be brought under a single umbrella, in terms of standardised syllabi, updated course content and market sensitive training. Depending upon the individual strength, the national level institutions would endeavour to develop into separate Centres of Excellence in their chosen areas.
- The Ministry has also recently introduced 10 innovative schemes under the **National Manufacturing Competitiveness Programme (NMCP)**, covering entire gamut of manufacturing in the sector, aiming to develop global competitiveness among Indian MSMEs. These ten schemes are:
 - o Marketing Support/Assistance to MSMEs (Bar Code)
 - o Support for Entrepreneurial and Managerial Development of SMEs through Incubators
 - o Enabling Manufacturing Sector to be competitive through Quality Management Standard & Quality Technology Tools (QMS/QTT)
 - o Building Awareness on Intellectual Property Rights (IPR) for MSMEs
 - o Lean Manufacturing Competitiveness Scheme for MSMEs
 - o Mini Tool Rooms (MTR)
 - o Design Clinic Scheme for design expertise to MSMEs Manufacturing sector (DESIGN)
 - o Marketing Assistance & Technology Upgradation Scheme in MSMEs
 - o Technology and Quality Upgradation Support to MSMEs
 - o Promotion of ICT in MSME Manufacturing Sector (ICT)
- **A Scheme for Promotion of Innovation, Rural Industry and Entrepreneurship (ASPIRE)** with an objective to set up a network of technology centres and incubation centres to accelerate entrepreneurship and also to promote start-ups for innovation and entrepreneurship in rural and agriculture based industry with a fund of INR 210 crores.
- **Scheme of Fund for Regeneration of Traditional Industries (SFURTI)** to organise the traditional industries and artisans into clusters to make them competitive, and provide support for their long term sustainability by way of enhancing the marketability of products, improving the skills of artisans, making provision for common facilities and strengthening the cluster governance systems.
- **Lean Manufacturing Competitiveness Scheme (LMCS)** to enhance the competitiveness of manufacturing MSMEs. The objective of the scheme is to enhance the manufacturing competitiveness of MSMEs through application of various Lean Manufacturing Techniques (e.g. Total Productive Maintenance (TPM), 5S, Visual control, Standard Operation Procedures, Single Minutes Exchange of Dies or Quick Changeover (SMED), Value Stream Mapping, Just in Time, Kanban System, Kaizen, Cellular Layout and Poka Yoke).
- **Credit Guarantee Trust Fund for Micro and CGTMSE Scheme** to strengthen credit delivery system and facilitate flow of credit to the MSE sector. The Credit Guarantee under CGTMSE seeks to reassure the lender that in the event of a MSE unit, which availed collateral free credit facilities, failing to discharge its liabilities to the lender, the CGMSE would make good the loss incurred by the lender up to 85 per cent of the credit facility.
- **Credit Linked Capital Subsidy Scheme (CLCSS)** for Technology Upgradation which aims at facilitating technology upgradation of Micro and Small Enterprises (MSEs) by providing 15% capital subsidy (limited to maximum INR15 lakhs) for purchase of Plant & Machinery. Maximum limit of eligible loan for calculation of subsidy under the scheme is INR100 lakhs. Presently, more than 1500 well established/improved technologies under 51 sub-sectors have been approved under the Scheme.

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The estimates listed for the year 2016-17 are provisional estimates.

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Source: Development Alternatives

“India’s development vision should look at building “townlets” and not cities. Townlets are an agglomeration of villages which make urban level services viable and generate local livelihood opportunities and income generation. Local economic development is critical for a green economy and local enterprises alongwith land consolidation for viable agriculture, are instrumental for change. “

- Ajay Mathur, Director General, TERI

“While many sustainability practices are scalable, the ability to adopt sustainability practices has little to do with scale. Small businesses can leverage sustainability actions profitably and enhance competitiveness. Technology allows businesses and communities to be far more energy efficient now than 20 years ago. Even waste can now be repurposed responsibly to reduce cost, generate revenue and positively impact society.”

- Anirban Ghosh, Chief Sustainability Officer, Mahindra & Mahindra

“There is a huge disconnect between natural resource endowment and the employability of the economy. Our education systems and national priorities focus on secondary and tertiary sector; as against primary sector for jobs. With more automation and artificial intelligence entering the secondary and tertiary sector, agriculture and forestry will be the sectors having highest potential for employment opportunities in the country. Agriculture sector needs massive transformation towards more sustainable and productive practices - providing high quality employment. One change to bring is that instead of a few large corporations controlling food, have millions of small farmer corporations who provide and sell fresh food. Future of agriculture is in small farmers’ business viability and environment sustainability”

- Chandra Bhushan, Centre for Science and Environment

About Development Alternatives Group www.devalt.org

Development Alternatives (DA) is a premier social enterprise with a global presence in the fields of green economic development, social equity and environmental management. It is credited with numerous technology and delivery system innovations that help create sustainable livelihoods in the developing world. DA focuses on empowering communities through strengthening people’s institutions and facilitating their access to basic needs; enabling economic opportunities through skill development for green jobs and enterprise creation; and promoting low carbon pathways for development through natural resource management models and clean technology solutions.

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