

BENEFIT-COST ANALYSIS

EASE OF DOING BUSINESS

Improving Doing Business in
RAJASTHAN

Authors

Nirupama Soundararajan
Senior Fellow
Pahle India Foundation

Shagun Khurana
Senior Research Associate
Pahle India Foundation

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info@copenhagenconsensus.com

www.copenhagenconsensus.com

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Improving Doing Business in Rajasthan

Rajasthan Priorities An India Consensus Prioritization Project

Nirupama Soundararajan

Senior Fellow, Pahle India Foundation

Shagun Khurana

Senior Research Associate, Pahle India Foundation

POLICY ABSTRACT	1
THE PROBLEM	1
INTERVENTION I: LAND RECORDS MANAGEMENT SYSTEM	1
<i>Overview</i>	1
<i>Costs</i>	2
<i>Benefits</i>	2
INTERVENTION II: INCUBATION SUPPORT	2
<i>Overview</i>	2
<i>Costs</i>	3
<i>Benefits</i>	4
SUMMARY BCR TABLE	4
1. INTRODUCTION.....	5
2. OVERVIEW	7
2.1 DOING BUSINESS IN RAJASTHAN	7
2.2 START-UP ECOSYSTEM IN RAJASTHAN	9
<i>Small businesses and incubators</i>	10
3. LAND RECORDS MANAGEMENT SYSTEM IN RAJASTHAN	11
3.1 GOVERNMENT INITIATIVES	13
3.2 PROGRESS OF DILRMP IN RAJASTHAN.....	14
3.3 METHODOLOGY	15
<i>Computation of costs</i>	15
<i>Computation of Benefits</i>	16
3.4 ASSUMPTIONS AND STATISTICS USED	17
3.5 ANALYSIS.....	18
4. INCUBATION SUPPORT IN RAJASTHAN	18
4.1 INCUBATORS DRIVING RESEARCH AND DEVELOPMENT	22
4.2 METHODOLOGY	23
<i>Computation of costs</i>	23
<i>Costs</i>	23
<i>Computation of benefits</i>	24
<i>Benefits</i>	25
4.3 ASSUMPTIONS & STATISTICS USED	25
4.4 ANALYSIS.....	26
5. CONCLUSION	27
6. BIBLIOGRAPHY	29

7. APPENDIX I: LAND RECORDS MANAGEMENT SYSTEM.....	32
8. APPENDIX II – INCUBATION SUPPORT	34

POLICY ABSTRACT

The Problem

Regulatory environment is a key factor in attracting investors. There is variation in the 'doing business' environment provided by different states in India which gives investors ample choice for parking their funds. Rajasthan has immense untapped potential for becoming an industrial hub, with its pool of resources and locational advantage. In the DIPP-Ease of Doing Business rankings for 2017, it stands at 10 among all the states and UTs. However, from our primary research, we find that businesses in Rajasthan continue to witness various administrative and regulatory bottlenecks on a regular basis, particularly in obtaining land for commercial use. NCAER's State Investment Potential study of 2017 finds that the volume of land-related stalled projects are the third highest in Rajasthan and in terms of digitization of land records, the state stands at 15 out of the 21 states included in the study.

Furthermore, start-ups in Rajasthan face fundamental challenges, especially in their nascent stages. Firstly, the road to finding early stage funding is patchy; funding is available only in certain sectors. Indian Tech Startup Funding Report Q3 2017 finds that the FinTech and e-Commerce sectors received 15 per cent and 13 per cent of the total funding respectively, during January-June 2017. It also notes that around 69% of the total funding was allocated to start-ups located in only two cities – Delhi NCR and Bengaluru. Secondly, there is an apparent disconnect between entrepreneurs and research organizations, where bulk of the research spending happens in India. Finally, the state faces a severe lack of entrepreneurs and mentors with experience in commercialization of new ideas and inventions.

There is an urgent need to address these issues. This study seeks to identify specific interventions in these areas and present a cost-benefit analysis for the same.

Intervention 1: Land Records Management System

Overview

The computerization of existing land records is nearly complete in Rajasthan, with computerised copies of RORs available for a nominal fee in 97 per cent of the villages through kiosk centres established in each *taluka*. However, the overall physical progress in Rajasthan in other components of DILRMP has been rather slow. The state government undertook the last survey operations in the year 1976, and all existing cadastral maps under use were

prepared using the traditional techniques. Although 86 per cent of these maps are in good condition; of these only 15 per cent have been digitised. In addition, only about 3.3 per cent of the rural area of the state has been surveyed under DILRMP. The integration of textual and spatial data is still under progress as until now, only 361 out of 47,921 villages have been able to do it. The land records available online are not free of errors as modernization has largely meant that paper records are now stored in computers without updating, with almost no verification of ownership and other data.

Clearly, the implementation design of digitization of land records is flawed. Courts at all levels in Rajasthan are clogged with land-related disputes, which account for 73 per cent of the total civil cases in the state. Land being one of the important factors of production, it is imperative for the state government to revise the implementation of DILRMP and secure property rights, in order to ease future land transactions. Land acquisition will become easy when complete digitization of land records takes place; easy availability and acquisition of land are critical to attract and encourage business in the state. Clear property titles, the ownership of which is guaranteed by the government, can transform the land market in Rajasthan – individuals and companies can buy and sell property with greater confidence, spur the flow of credit, improve inheritance and expand housing stock.

We identify two specific interventions to improve the land records management system in Rajasthan – (a) completion of survey/resurvey activities, and (b) digitisation of cadastral maps.

Costs

- Cost of conducting survey/re-survey activities in rural areas
- Cost of digitizing the cadastral maps
- Operational and maintenance costs

Benefits

- Economic Benefit from secured property rights

Intervention II: Incubation support

Overview

Incubation is a business support process aimed at successful development of start-up companies by providing entrepreneurs with an array of targeted resources and services

required at the initial stage. These include an integrated package of workspace, shared office services, access to specialised equipment along with services like fund raising, legal services, business planning, technical assistance and networking support. Although entrepreneurs may have specialized knowledge about their product or service, they often lack a full array of business skills. Incubation can facilitate removing this knowledge gap, reduce early stage operational costs, and help in establishing local support network for new enterprises. The main goal of an incubator is to produce successful firms that will leave the program financially viable and freestanding. These new firms will then have the potential to create jobs, revitalise neighbourhoods, commercialise new technologies, and strengthen the local and national economies.

Empirical evidence suggests that business incubators when adequately utilised, have attributed to managers and owners acquiring skills that are necessary for survival in a competitive environment, and increasing the survival probability of businesses post-incubation to up to 70 per cent. In 2017, Startup Oasis, an incubation centre based in Jaipur, had 53 start-up ideas under physical incubation and the mortality rate was around 50 per cent. Rajasthan needs more such incubation centres to reduce the mortality rate and decrease the proportion of start-ups per incubator, which is presently 53:1 in the case of Startup Oasis. Establishing more incubation centres will increase the availability of facilities per start-up and is likely to extend better expert guidance, to help translating new ideas into successful firms. This study suggests that establishment of privately owned incubators in Rajasthan is instrumental in providing a favourable environment for start-ups to flourish in the state. Being driven for profits, private incubators are likely to be more efficient than a government sponsored or a university owned incubator.

Costs

- Cost of construction of the incubator
- Cost of lease on land
- Cost of maintenance and operations
- Cost of mentoring and training
- Cost of equity provided by incubator to graduating start-ups
- Investment funding received by incubated start-ups from other investors
- R&D spending by the incubator

Benefits

- Value addition in the valuation of graduating start-ups
- Multiplier effect of increased investment in start-ups on the state GDP
- Multiplier effect of increased R&D spending on the state GDP

Summary BCR table

Intervention	Discount Rate	Total Cost	Total Benefit	BCR	Quality of Evidence
Digitization of cadastral maps; Conducting survey/re-survey activities	3%	1089.88	22267.86	20.43	
	5%	1072.02	12598.30	11.75	
	8%	1057.96	6275.95	5.93	
Intervention	Discount Rate	Total Cost	Total Benefit	BCR	Quality of Evidence
	Scenario I (with 3.5x value addition)				
Establishment of a private incubation centre	3%	72.39	122.12	1.69	
	5%	66.11	111.48	1.69	
	8%	58.14	97.98	1.69	
	Scenario II (with 6x value addition)				
	3%	80.48	150.85	1.87	
	5%	72.88	136.55	1.87	
	8%	63.37	118.66	1.87	

1. INTRODUCTION

The Doing Business Report is a study conducted by the World Bank Group every year since 2003, aimed at measuring the costs of business regulations and their enforcement. In the first edition of this study, the World Bank started with 133 countries and 5 indicators, and has now scaled up to include 190 countries and 11 indicators. The study presents a detailed analysis of the costs, requirements and procedures that a domestic small and medium-size private firm is subject to in different countries, based on which it ranks them. The objective of the research is to encourage economies to bring about efficient and optimal regulation and it offers measurable benchmarks for reform. The latest edition of the study captures quantitative indicators on regulations for starting a business, dealing with obtaining construction permits, getting electricity, registering property, getting credit, protecting minority investors, paying taxes, trading across borders, enforcing contracts, and resolving insolvency. Thus, Ease of Doing Business (EoDB) Index is a measure of regulations directly affecting businesses and does not directly imply general conditions such as a nation's proximity to large markets, quality of infrastructure, inflation, crime and other social factors.

As per the EoDB rankings for 2018, India is placed at 100 out of 190 countries, moving up 30 places from last year's ranking of 130¹. India made paying taxes easier by making payment of EPF mandatory electronically and introducing a set of administrative measures easing compliance with corporate income tax. Another major reform introduced by India is strengthening of access to credit by amending the rules on priority of secured creditors outside reorganization proceedings and by adopting a new Insolvency and Bankruptcy Code that provides a time limit and clear grounds for relief to the automatic stay for secured creditors during reorganization proceedings. This code also aims to make resolving insolvency easier by introducing a reorganization procedure for corporate debtors and facilitate continuation of the debtor's business during insolvency proceedings. These reforms apply for the two largest business cities in India – Mumbai and New Delhi, which the World Bank surveys for the study.

Since the scope of the World Bank's study for India is limited to these two cities, a major limitation of this approach is that it fails to account for the regional diversity in the business

¹<http://www.doingbusiness.org/data/exploreeconomies/india>

climate across different states. With India being a federally structured nation, states have a vital role to play in promoting investor confidence. The ease or difficulty of doing business in a state is a result of the regulatory framework put in place by the state government along with the level of implementation, among other factors. With this in mind, since 2014, DIPP, in collaboration with the World Bank, releases a comprehensive list of reform measures known as the Business Reform Action Plan (BRAP) every year for implementation by all the states and union territories (UTs)². This exercise has been undertaken to enhance the focus of the state governments in order to ease doing business in India and present a more accurate picture of the same to both domestic and foreign investors. The DIPP-EoDB rankings³ for Delhi and Mumbai (Maharashtra) reinforce the aforementioned limitation of the World Bank's study and illustrate the variation in business climate across the country.

The BRAP 2017 included 405 recommendations for reforms on regulatory processes, policies, practices and procedures spread across twelve reform areas. These are labour regulation enablers, contract enforcement, property registration, inspection reform enablers, single window system, land availability and allotment, construction permit and environmental registration enablers, obtaining of utility permits, paying taxes, access to information and transparency enablers and sector-specific reforms spanning the lifecycle of a typical business⁴. To assess the implementation of these reforms by states, DIPP carries out a comprehensive exercise using input-based methodology. This involves obtaining responses from states and UTs on the implementation status of the reform measures suggested in the BRAP. Based on this assessment, DIPP does a comparative study of states and calculates the rankings based on the implementation score of each state⁵.

Although the task is extensive, it fails to account for the user experience. Business feedback is critical to ensure that the reforms that have been implemented are being felt by the private sector⁶. Therefore, DIPP has recently started carrying out a comprehensive business-to-government (B2G) feedback exercise⁷. States and UTs take feedback from businesses on the

²Following the MSME Development Act 2006, state governments have made concerted efforts to attract investments from outside and to promote enterprise. The enterprise is an organisation whose business is "doing business".

³<http://eodb.dipp.gov.in>

⁴<https://www.thehindubusinessline.com/economy/dipp-world-bank-suggest-more-reforms-to-improve-easeofdoing-business-in-states/article9637984.ece>

⁵<http://eodb.dipp.gov.in/>

⁶<https://www.bizsolindia.com/ease-of-doing-business-part-ii/>

⁷<http://eodb.dipp.gov.in/Note%20on%20Feedback%20methodology.pdf>

quality of implementation of the reforms. However, for each state/UT, the ranking continues to be determined taking into account feedback from the state governments, and not the ultimate users. These initiatives of DIPP and the state governments are commendable, but an often-heard criticism is that most reforms are implemented on paper and not in practice.

Analyzing the present climate of doing business in Rajasthan, this paper proposes a set of interventions, supported by a cost benefit analysis. In the first section, the paper provides an overview of the business potential in the state and identifies the areas where further policy interventions can be envisaged. Next, the paper talks about the status of land records maintenance in Rajasthan and the initiatives undertaken by the government for its improvement. In the following section, the paper discusses the proposed interventions in the land records management system and their perceived benefits, and the methodology adopted. The next section talks about the assumptions made and followed by the cost benefit analysis. Next, the paper highlights the importance of a well-functioning start-up ecosystem for Rajasthan and proposes a third intervention in this area. Subsequently, the paper discusses the methodology and the analysis of costs and benefits accruing from the third intervention aimed at improving the start-up space in Rajasthan.

2. OVERVIEW

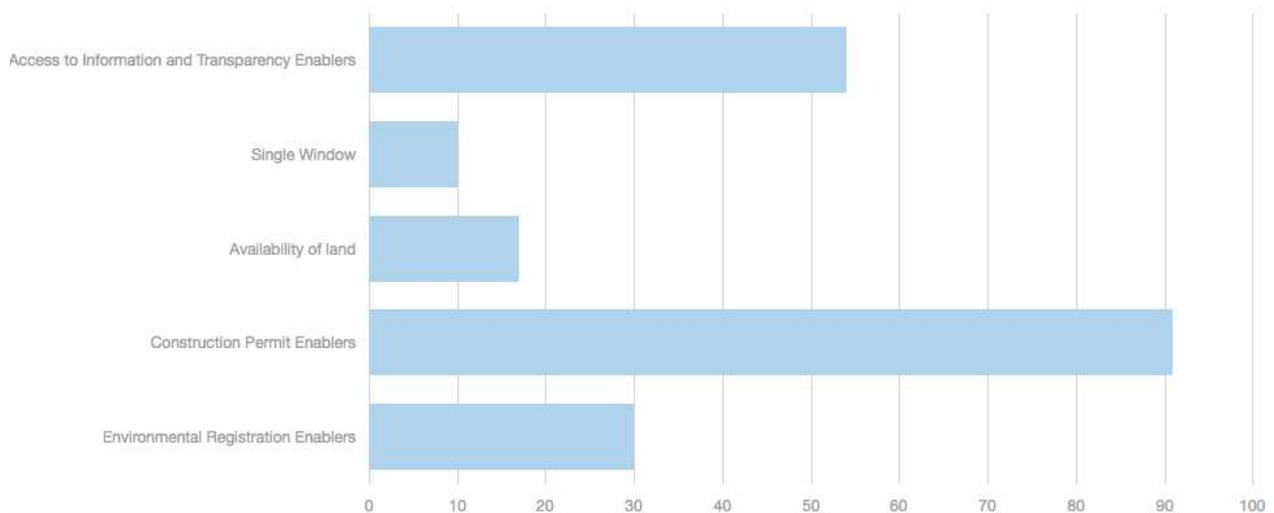
2.1 Doing Business in Rajasthan

In the last few years, Rajasthan has emerged as a preferred destination for business, mainly due to its proximity to the national capital, and an immense pool of resources in areas such as minerals, tourism, handicrafts, renewable energy, etc. Rajasthan's contribution towards India's GDP has been, on an average, 4.8 per cent in the last 11 years. However, it remains predominantly an agrarian state with 55 per cent of the labour force employed in agriculture and allied activities. Given the untapped potential that the state possesses, it is imperative that the government works towards gearing the human resources into the channel of economic progress. The unemployment rate of 14.3 per cent⁸ as in March 2018 is the highest ever that Rajasthan has witnessed over the last two years and thus, emphasizes the need to boost private sector investment in the state.

⁸Centre for Monitoring Indian Economy (CMIE) Monthly time series on Unemployment Rate in India accessed at https://unemploymentinindia.cmie.com/kommon/bin/sr.php?kall=wsttimeseries&index_code=050050000000&dtype=total

In the Global Investment Competitiveness Report 2017 titled “Foreign Investor Perspectives and Policy Implications”, 40 per cent of the survey respondents consider legal and regulatory environment to be a critically important factor in their decision to invest. The government has very little to do with doing business per se, but it has the responsibility to create an ecosystem that will promote the establishment of new businesses by private actors, facilitate their continued sustainability, and eventual exit as and when the purpose is served or the business becomes unviable. Therefore, the role of the government is that of a facilitator of such an environment, more than a regulator. According to the input-based assessment of the series of reforms effected in the BRAP 2017 carried out by DIPP, Rajasthan ranks seventh out of all states and UTs with an implementation score of 99.46 per cent⁹. The state reports successful implementation of 367 of the total 369 applicable reforms¹⁰, specifically in the top reform areas mentioned in the figure. A complete list of the reforms undertaken by Rajasthan is available on the DIPP website¹¹.

Figure 1: The top five reforms implemented by Rajasthan in 2017



Source: DIPP

However, during our primary research¹², we find that the user experience is not necessarily in coherence with this ranking and the reported implementation. Businesses in Rajasthan

⁹<http://eodb.dipp.gov.in/>

¹⁰http://eodb.dipp.gov.in/reportview_2017.aspx?st_id=8&r_id=y

¹¹http://eodb.dipp.gov.in/reportview_2017.aspx?st_id=8&r_id=y

¹²A primary enquiry was undertaken for this study, which includes a roundtable discussion with Rajasthan Chamber of Commerce, industry stakeholders and policy researchers conducted by Tata Trusts on August 9th 2017 in Jaipur, personal

continue to witness various administrative and regulatory issues on a regular basis. National Council of Applied Economic Research (NCAER) calculates the State Investment Potential Index (N-SIPI) for the year 2016, based on six broad pillars – Labour, Infrastructure, Economic Climate, Political Stability, Governance and Survey based responses. Rajasthan fares at ninth rank¹³, and has extremely positive perceptions regarding labour, infrastructure, economic and political climate. However, the second edition of the study released in 2017, includes another important factor-driven pillar – Land. Subsequently, the state’s overall N-SIPI rank fell to 13¹⁴. It also notes that the volume of land-related stalled projects are the third highest in Rajasthan. In terms of digitization of land records, the state stands at 15 out of the 21 states included in the study. Availability of land for industrial use is a problem as the survey responses indicate that a state that had more industrial parks earmarked by the state government, had less difficulties in making land available for industrial use. Furthermore, National Institute of Public Finance and Policy (NIPFP) conducted an impact assessment of the Digital India Land Records Modernization Programme (DILRMP) for Rajasthan that highlights the issues by local administration in the maintenance of land records and with the implementation of the programme. Therefore, availability of land stands out as one of the major issues faced by Rajasthan¹⁵, limiting its potential to develop as a major industrial hub.

2.2 Start-up Ecosystem in Rajasthan

India is currently in the favourable phase of Demographic Dividend wherein, the population in the working age group of 18-59 years has been soaring continuously relative to the number of dependents. For India to turn this abundant labour force into an advantage, it is imperative for the government to devise ways to generate greater employment opportunities. India’s overall unemployment rate was recorded at a five-year high of 5 per cent in FY16, and by 2025, there will be around 80 million net new job seekers¹⁶. Roughly, 10 million enter the country’s labour pool every year, while the employment potential is shrinking. Through schemes like Start-up India and Stand-up India, the government is

interviews with government as well as business stakeholders in Jaipur held between August 9th-10th 2017, and telephonic interviews with incubation centre personnel based out of Rajasthan.

¹³<http://www.ncaer.org/uploads/photo-gallery/files/1459754012NAER-SIPI-Report%202016.pdf>

¹⁴http://www.ncaer.org/publication_details.php?plD=282

¹⁵Rajasthan is the largest state of India by area comprising of 33 districts for all administrative purposes. It is further divided into 314 tehsils with 47,921 villages in total. The total area of the state is 10,761,088 sq.km. number of RORs is 9,783,221, and total cadastral maps is 106,849. These statistics exhibit the sheer expanse of the task of modernization of land records in a state like Rajasthan.

¹⁶<https://blogs.timesofindia.indiatimes.com/toi-edit-%20page/indias-jobs-%20crisis-heres-%20a-plan-%20for-creating-%2050-%20million-quality-%20jobs-in-%20the-next-%20decade/>

stressing on the need for generating “job creators” instead of jobs alone. In India, the Department of Industrial Policy and Promotion (DIPP) defines a start-up as an entity incorporated or registered in India not prior to seven years, with annual turnover not exceeding INR 25 crores in any preceding financial year and fulfils the following conditions. Firstly, that it continuously works towards innovation and commercialization of new products, is driven by technology or intellectual property and, secondly that it is not formed by splitting up, or reconstruction of an already existing business.

Since the last few years, the “start-up culture” is flourishing in India, but has been limited to a select few destinations such as Bangalore, Delhi-NCR and Pune. Rajasthan is grappling with serious challenges like lack of water, lack of irrigation, low agricultural productivity, inadequate rural healthcare, lack of food processing facilities and inefficient food supply chains. A large proportion of educated youth from the state migrate to other destinations in search of better employment opportunities within India and abroad. Many of these issues can be addressed through the development of low cost, indigenous and technology-enabled solutions. Moreover, start-ups and small businesses are avenues for providing employment to the growing labour force and including them in the formal sector. However, Rajasthan still lags behind in providing a conducive ecosystem for its budding entrepreneurs, which seems to be a crucial measure towards making it easy to do business in the state.

Small businesses and incubators

Despite their enormous potential, start-ups in Rajasthan continue to face fundamental challenges, especially in their nascent stages. First, the road to finding early stage funding is patchy; funding is available only in certain sectors. Indian Tech Startup Funding Report Q3 2017 finds that the FinTech and e-Commerce sectors received 15 per cent and 13 per cent of the total funding respectively, during January-June 2017. It also notes that around 69% of the total funding was allocated to start-ups located in only two cities – Delhi NCR and Bengaluru. Second, there is an apparent disconnect between entrepreneurs and research organizations, where bulk of the research spending happens in India. Third, the state faces a severe lack of entrepreneurs and mentors with experience in commercialization of new ideas and inventions.

Ogutu and Kihonge (2016) show that the probability of failure among small businesses can be as high as 75 per cent in the first three years of operations. While the reasons for starting a new business may vary, in many instances entrepreneurs transition from workers to business owners because of their ability to successfully perform a task. As a result, they might not possess the required managerial expertise to handle the business and nor have the resources to hire experts, thus making the business susceptible to failure even before reaching maturation (Wilber, Dixon). The reasons why small businesses might fail can be placed under three heads – economic, financial and experience-related. Economic causes include inadequate sales, insufficient profits, and poor growth prospects; financial causes can be heavy operating expenses, insufficient capital, and inadequate financial support; and experience-related causes include lack of business knowledge, domain experience and managerial experience. Mentors of the start-ups usually are industry experts and have domain experience from having worked in the industry, and are more likely to have specialized knowledge of the tasks at hand. Proper mentoring for start-ups is a near perfect substitute for market research. Moreover, investors consider it important to have the start-up backed by domain-experienced personnel while providing the funding. Therefore, a sound incubation support system is a requirement for Rajasthan, in order to produce more successful and innovative firms.

Based on our primary research and in accordance with existing studies, we propose two areas of intervention for Rajasthan, namely – land records management system and incubation support.

3. LAND RECORDS MANAGEMENT SYSTEM IN RAJASTHAN

Land is inarguably a crucial factor of production, required for setting up a business. The Indian economy has seen a continuous shift in land use from the agricultural to the manufacturing and services sectors. In general, rural land is converted for industrial use through the mutation¹⁷ process. This can be done either when the state government buys the land from locals and sets up industrial areas or Special Economic Zones¹⁸ (SEZs), or when entrepreneurs themselves buy the land from the owners directly, without any government

¹⁷*Mutation* is the change of title ownership from one person to another when the property is sold or transferred. By mutating a property, the new owner gets the property recorded on his name in the *land* revenue department and the government is able to charge property tax from the rightful owner.

¹⁸Under the Special Economic Zones Act, 2005

intervention. Businesses set up in industrial areas and SEZs enjoy a wide range of locational benefits such as good infrastructural facilities, economies of scale, tax exemptions, easy availability of labour, support facilities, etc. As can be expected, the actual cost of land is usually higher in the allocated industrial areas and SEZs, than in the former case. Since the mutation process is still largely offline in Rajasthan, it makes obtaining land through the direct route a cumbersome process for entrepreneurs and drives up the cost. Moreover, national-level data from the Ministry of Statistics and Programme Implementation (MOSPI) suggests that around three out of ten government infrastructure projects are delayed¹⁹, with some projects delayed by over five years and land acquisition is observed as one of the major reasons causing delays.

In India, land policy and administration is a state subject.²⁰ This means any reform pertaining to land transfer / conversion etc. will have to be solely driven by the state government authorities. Land record data can be broadly classified into two categories – spatial and non-spatial data. Spatial data consists of maps of each land plot and non-spatial (textual) data consists of details about ownership, size of plot, rent payable, irrigation status, crop status, etc. The records are maintained at the Revenue Department, the Department of Stamps and Registration and at the Sub-Registrar's Office (SRO) at the district level.

In an Indian state, land ownership is primarily established through a registered sale deed (a record of the property transaction between the buyer and seller), and not by a government guaranteed title. Other documents validating ownership include the record of rights (document with details of the property; RORs), property tax receipts and survey documents. During a property transaction, the onus of checking the past ownership record of a property is on the buyer, not on the government. Therefore, land ownership in India is presumptive in nature, and subject to challenge.²¹

The existing system of maintaining land records is plagued by an array of problems. First, obtaining land records is highly dependent on human intervention (availability of the village accountant or revenue inspectors) which leads to delays if the concerned official is not

¹⁹<https://www.hindustantimes.com/business-news/3-out-of-10-central-infra-projects-are-stalled-govt-data/story-a6NIWkhafuz44el8zwwAaO.html>

²⁰Schedule 7 of the Indian Constitution divides all matters of governance into three lists – Central List, State List and Concurrent List; [http://lawmin.nic.in/olwing/coi/coi-english/Const.Pock%202Pg.Rom8Fsss\(35\).pdf](http://lawmin.nic.in/olwing/coi/coi-english/Const.Pock%202Pg.Rom8Fsss(35).pdf)

²¹"Land Records and Titles in India", PRS Legislative Research, September 2017

present. Second, manual records are subject to manipulation and present opportunities for harassment and rent seeking. Third, recording, storage and retrieval of manual records due to sheer volumes is a major challenge for officials. The poor state of land records affects future land transactions, especially in the presumptive ownership system. The process is cumbersome, and leads to time and cost inefficiencies. Due to these factors, the land records management system is opaque, slow moving and corruption-ridden.

3.1 Government initiatives

The process of modernisation of land records began as early as in 1980s. The central government introduced the Computerisation of Land Records (CLR) programme in 1988-89 with 100 per cent financial assistance on a pilot basis focusing on computerising non-spatial data to remove problems inherent in the manual system of maintenance and updating of land records. Land records are maintained across different departments at the district or village level, each of which works in a stand-alone manner and data across departments is not updated properly. Updating is crucial for systematic maintenance of land records to reflect ground realities in sync with ownership changes, ensure genuine land transactions and implement rural development programmes²². Updating also reduces land/property-related disputes, which make about 66 per cent of all civil cases in India²³. With these objectives in mind, the government initiated a second important scheme, viz., Strengthening of Revenue Administration and Updating of Land Records (SRA&ULR) on a 50:50 cost-sharing basis between the Centre and states. These programmes aimed at providing better services in terms of efficiency, time, transparency and reduction in corruption.

Under the SRA&ULR, the process of transforming the land records management system was mainly technology-driven, comprising of methods such as, modernization of survey and settlement operations, printing of survey maps, reports/documents and for storage, copying and updating of land and crops records using science and technology inputs²⁴. Relying on technology-based tools results in better access to information and transparency, and can play a big role in reducing the time and cost of maintenance of records. Since 1994-95, the Department of Land Resources under the Ministry of Rural Development has been working in collaboration with the National Informatics Centre (NIC), which is responsible for the supply,

²²<http://dolr.nic.in/dolr/sra&ulr.asp>

²³<http://dakshindia.org/access-to-justice-survey-results/index.html>

²⁴<http://dolr.nic.in/dolr/sra&ulr.asp>

installation and maintenance of hardware, software and other peripherals. NIC is also responsible for providing training and technical support to revenue officials to ensure proper implementation.

The Digital India Land Records Modernisation Programme (DILRMP) (previously known as National Land Records Modernisation Programme) is a revamped and comprehensive version of all existing government initiatives. In addition to the previous objectives, it aims to provide an exhaustive database for planning developmental, regulatory and disaster management activities by providing location-specific information, while providing citizen services based on land record data. The ultimate goal of this programme is to replace the existing manual, presumptive land-title system and forge digital, conclusive land titling system.

3.2 Progress of DILRMP in Rajasthan

Dungarpur in Rajasthan was one of the eight districts of India where CLR began as a pilot project of the government in 1988-89. Since then, computerised copies of RORs are available for a nominal fee in 97 per cent²⁵ of the villages through kiosk centres established in each *taluka*. However, the overall physical progress in Rajasthan in other components of DILRMP has been rather slow. According to the DILRMP portal, the process of mutation has been computerised in only 7.9 per cent of the villages. The state government undertook the last survey operations in the year 1976, and all existing cadastral maps under use were prepared using the traditional techniques²⁶. Although approximately 86 per cent of these maps are in good condition, only approximately 15 per cent have been digitised²⁷. In addition, only about 3.3 per cent of the total rural area of the state has been surveyed under DILRMP²⁸. The integration of textual and spatial data is still under progress as until now, only 361 out of 47921 villages have been able to do it²⁹.

Furthermore, as per the DILRMP portal, only a small proportion of the RoRs are available with a digital signature of the designated official (3,632 villages out of 47,918), and almost all of the RoRs are not available in a legally usable form (42,683 villages). The land records available online are not free of errors as modernization has largely meant that paper records are now

²⁵<http://dilrmp.nic.in/faces/rptstatewisephysical/rptComputerizationOfLandRecord.xhtml>

²⁶Traditional methods of surveying land include equipment like 100-foot long metal tapes, transits, electronic distance measurement, theodolites, and total stations.

²⁷<http://dilrmp.nic.in/faces/rptstatewisephysical/rptMapDigitization.xhtml>

²⁸<http://dilrmp.nic.in/faces/rptstatewisephysical/rptSurveyresurveyStatus.xhtml>

²⁹<http://dilrmp.nic.in/faces/rptstatewisephysical/rptMapDigitization.xhtml>

stored in computers without updating, with almost no verification of ownership and other data. The aforementioned study by NIPFP brings to the fore various challenges that have not been addressed in the present design of the DILRMP programme. In conducting survey activities, and updating and digitization of maps, Rajasthan has severely lagged behind. Out of the 527 Sub-Registrar Offices (SROs), 117 have online systems for verifying documents and paying stamp duty. There is very little progress in integrating of mutation, registration and map generation. These studies, the available data and the primary research findings underline the need for a more systematic implementation of DILRMP.

Digitization of land records serves as a remedy for the multiple problems in the land records management system and the perceived benefits are long lasting. Ahuja and Singh (2006) deem the manual system of land records as highly opaque and subject to manipulation by the village officials. Computerization leaves no room for such illicit activities. Moreover, land acquisition will become easy when complete digitization of land records takes place; easy availability and acquisition of land are critical to attract and encourage business in the state. Clear property titles, the ownership of which is guaranteed by the government, can transform the land market in Rajasthan – individuals and companies can buy and sell property with greater confidence, spur the flow of credit, improve inheritance and expand housing stock.

We identify two specific interventions – (a) completion of survey/resurvey activities, and (b) digitisation of cadastral maps.

3.3 Methodology

Computation of costs

Under the DILRMP, the government has been allocating funds for the states since the inception of CLR. Presently, the central government provides 100% financial assistance for digitization of cadastral maps, and shares the burden of expenditure for survey/re-survey activities with the states on a 50:50 basis.

Land surveys are used to establish land maps and boundaries for ownership and locations, are required for other government programmes and for civil law services (property sales)³⁰.

³⁰<http://automatedsurveys.com.au/learn-surveying>

Only around 7.8 per cent³¹ of the total villages in Rajasthan have been surveyed using modern survey techniques under DILRMP. The cost of survey/re-survey is determined from the LBSNAA study of DILRMP in Rajasthan released in 2016 and revised according to the Minutes of Meeting of Core Technical Advisory Group for DILRMP. Cadastral maps show the boundaries of all parcels of land within a specific area, for instance a village. These are maintained by the land administration of the state, and are a matter of public record. The existing cadastral maps of Rajasthan are largely in paper format and not updated since the last survey operations. The proposed interventions imply a simultaneous digitization of maps made during the surveys conducted under DILRMP. For the purpose of computing the cost of digitization of maps, an average of the costs incurred by six states (Kerala, Haryana, Himachal Pradesh, Sikkim, Madhya Pradesh, Orissa and Bihar) has been considered since; they have successfully digitized nearly 97 per cent of the total maps.

In addition to the fixed capital expenditure for conducting surveys and digitizing cadastral maps, there are operational and maintenance costs that will be incurred every period over time. This study assumes annual marginal increase in the existing operational costs of 0.22 per cent of the fixed costs of implementing the interventions.

Computation of Benefits

The economic benefit from secured property rights is calculated by using the results of Knack and Keefer (1995)³². The authors examine the impact of property rights on economic growth using institutional indicators like the risk of expropriation, existence of mechanisms for peaceful resolution of disputes, contract enforcement, corruption in the government, and quality of bureaucracy. These indicators are compiled by International Country Risk Guide (ICRG), which provides private international investment risk services. For this analysis, we assume that digitisation of all land records will help securing property rights in Rajasthan and lead to a movement of 1/50th standard deviation of the ICRG index. This would mean a 0.024 percentage point boost to the growth rate of the economy of Rajasthan.

³¹<http://dilrmp.nic.in/faces/rptstatewisephysical/rptSurveyresurveyStatus.xhtml>

³²"Institutions and Economic Performance: Cross-country tests using Alternative Institutional Measures", *Economics and Politics*, 7(3), 1995

The costs and benefits of conducting survey/resurvey activities and digitisation of cadastral maps are estimated and the benefit to cost ratio of the interventions is calculated using the following formula:

$$\text{BCR} = \frac{\text{PV of total benefits}}{\text{PV of total costs}}$$

where BCR is the benefit-cost ratio and PV stands for present value.

The cost of implementing these interventions are two-part. The fixed cost of conducting surveys and digitizing maps is one-time and the operational and maintenance costs are recurring. The recurring costs and benefits are calculated for a period of 53 years. We assume the standard present value discount rates of 3 per cent, 5 per cent and 8 per cent for this study.

3.4 Assumptions and Statistics used

- The costs and benefits are calculated at 2017 prices.
- The benefit-cost ratio obtained is for both digitisation of maps and survey/resurvey activities implemented simultaneously.
- The total rural area of Rajasthan left to be surveyed under DILRMP is 302,853.77 sq. km.
- The total number of cadastral maps for Rajasthan left to be digitized are 90,709.
- The cost of surveying land is INR 34,000 per sq.km.
- The cost of implementing these interventions are two-part. The fixed cost of conducting surveys and digitizing maps is one-time. The additional operational and maintenance costs are recurring and are taken as a 0.22 per cent proportion of the fixed cost of implementation.
- The duration of the intervention is taken to be 53 years, that is, till 2070 and the costs and benefits are calculated accordingly.
- A comprehensive exercise of land records and maps digitization and updation could make some improvement in the expropriation risk and the rule of law (Knack and Keefer, 1995). This is expected to reflect in the movements on the ICRG scale of 1/50th standard deviation. This will accentuate the growth rate of the economy by 0.024 percentage points every year.

3.5 Analysis

The total cost of digitisation of cadastral maps and conducting survey/re-survey activities in Rajasthan that will accrue for the period of 53 years is estimated to be INR 1150.22 crore at 2017 prices³³. The present value of the cost stream amounts to approximately INR 1089.88 crore at 3 per cent discount rate, INR 1072.02 crore at 5 per cent discount rate and INR 1057.96 crore at 8 per cent discount rate.

The total benefit resulting from the implementation of these two interventions is estimated to be INR 61,385.57 crore per annum at 2017 prices³⁴ accruing until the year 2070. The present value of the benefit stream amounts to approximately INR 22,267.86 crore at 3 per cent discount rate, INR 12,598.30 crore at 5 per cent discount rate and INR 6275.95 crore at 8 per cent discount rate. Table 1 shows the benefit-cost ratio thus calculated (Appendix I).

Table 1: Benefit-Cost ratio for modernisation of Land Records

Present value discount rate	3%	5%	8%
BCR with 0.024 percentage point boost in growth per annum	20.43	11.75	5.93

The above table shows that after the survey activities and map digitization are complete, for every INR 1 spent on modernising land records, the benefits that accrue are INR 20.43 at a low discount rate, INR 11.75 at a medium discount rate and INR 5.93 at a high discount rate.

4. INCUBATION SUPPORT IN RAJASTHAN

Incubation is a business support process aimed at successful development of start-up companies by providing entrepreneurs with an array of targeted resources and services required at the initial stage. These include an integrated package of workspace, shared office services, access to specialised equipment along with services like fund raising, legal services, business planning, technical assistance and networking support. Although entrepreneurs may have specialized knowledge about their product or service, they often lack a full array of business skills. Incubation can facilitate removing this knowledge gap, reduce early stage operational costs, and help in establishing local support network for enterprises. The main

³³Appendix I: Land Records Management System

³⁴Appendix I: Land Records Management System

goal of an incubator is to produce successful firms that will leave the programme financially viable and freestanding. These new firms will then have the potential to create jobs, revitalise neighbourhoods, commercialise new technologies, and strengthen the local and national economies³⁵.

Empirical evidence suggests that business incubators, when adequately utilised, have attributed to managers and owners acquiring skills that are necessary for survival in a competitive environment, increasing the survival probability of businesses post-incubation to 70 per cent³⁶. Across the world, incubation has proved to be one of the most successful tools for mentoring start-ups. Business incubators can be of different types based on their ownership structure, incubation programs, etc. They can be non-profit, that is, either government or university-owned, or for-profit. The for-profit incubators make money from clients either by charging service fees, or getting a share in the revenues, or taking an equity position, or a combination of these. On the basis of incubation programs, incubators can be technology-oriented, empowerment-targeting or of mixed-use. Technology incubators³⁷ are mainly associated with major universities and have a primary objective of commercializing technology and fostering the growth of businesses involved in emerging technology. Empowerment incubators usually support companies whose founders had to overcome economic and/or educational challenges and aim to foster the growth of businesses in areas characterized by high unemployment. The mixed-use incubators³⁸ support a wide variety of clients, catering to the needs of all types of businesses including but not limited to, heavy and light manufacturing, construction firms, wholesale distribution, mail order, and professional services.

Startup Oasis is one such mixed-use incubation centre based in Jaipur, Rajasthan, that aims to develop an ecosystem to inspire and support students, aspiring entrepreneurs and start-ups to solve persistent problems, develop breakthrough innovations and create world-class enterprises. Startup Oasis was set-up in 2013, at a joint initiative of RIICO, Rajasthan's premiere industrial promotion organisation, and the Centre for Innovation, Incubation and

³⁵"Technology Business Incubators: An Indian Perspective & Implementation Guidance Report" by Centre for Internet & Society, India

³⁶

³⁷Such as BITS Pilani, Pilani and Malvika National Institute of Technology, Jaipur in Rajasthan

³⁸Such as Startup Oasis, Jaipur in Rajasthan

Entrepreneurship (CIIE), IIM Ahmedabad, the leading incubation and entrepreneurship centre in India. RIICO and CIIE felt the need to tap into the pool of traditional Rajasthani entrepreneurship and use the joint expertise of RIICO and CIIE to channelise entrepreneurial energies to foster creativity and innovations in order to solve some of the most obstinate problems of the state and the country.

In the pre-incubation stage, the incubator accepts applications from prospective entrepreneurs elaborating with their business ideas; experts at the incubator short list applicants based on different criteria. After the selection process, for the next one month, the experts help the aspiring entrepreneurs to convert their business idea into a minimum viable product (MVP). An MVP is a development technique in which a new product is introduced in the market with basic features, enough to get the attention of the consumers. The objective is to make the product available to consumers in the cheapest possible way while meeting the desired utility standards. The market for such products may or may not exist already. The products are then launched in a small area and are tested for sustainability for the next 7-8 months after the launch.

In the next stage, the incubator conducts a performance evaluation of these pilot stage start-ups based on (a) customer demand for the products, including assessing whether demand has increased since the launch or is likely to increase, and (b) the revenue generated by the product. If the start-up “breaks even”, it passes on to the funding stage, during which the incubator provides support in identifying investors for their first funding. The incubated start-ups are said to have “graduated” from the incubator if they are successful in getting their first round of investment funding or have been self-sustaining on their revenue stream for a minimum of two years. This is how most government-sponsored and university-owned incubators function across different states in India.

In 2017, Startup Oasis³⁹ had 53 start-up ideas under physical incubation and the mortality rate is around 50 per cent⁴⁰. Mortality rate is the proportion of start-ups that do not graduate from an incubator out of the total start-ups incubated. The major reasons behind such a high mortality rate in Rajasthan are the lack of adequate mentoring, business consulting and

³⁹<http://startupoasis.in/>

⁴⁰Based on interviews conducted with the incubator personnel

strategic alliances⁴¹. Rajasthan needs more such incubation centres to reduce the mortality rate and decrease the proportion of start-ups per incubator, which is presently 53:1 in the case of Startup Oasis. On average, the proportion of start-ups per incubator is 35:1⁴² for India while China has one incubator mentoring only two start-ups at a time. Establishing more incubation centres in Rajasthan will increase the availability of facilities per start-up and is likely to extend better expert guidance, to help translating new ideas into successful firms. To improve the proportion of start-ups per incubator, Rajasthan, through its 2015 Start-up Policy, aims to establish 50 incubator/incubator-like organisations to support and incubate 500 innovative start-ups. This implies a target *start-up per incubator* ratio of 10:1. Lower start-ups to incubator ratio is likely to improve the success rate of the incubation programme, as the resources per start-up will increase. This will add a larger number of successful start-ups, thus leading to more job opportunities and creating wealth in the economy.

Notwithstanding the benefits provided by any kind of incubators, this study suggests establishment of privately owned incubators in Rajasthan is instrumental in providing a favourable environment for start-ups to flourish in the state. Being driven for profits, private incubators are likely to be more efficient than a government sponsored or a university owned incubator. The latter work on an incubation fee basis and do not have an efficient screening process in place. Pompa (2013) in their research on the impact of business incubation and training on start-up companies suggest that in order to have a lower failure rate, it is important for the incubators to screen the applicants based on a set of criteria.

This paper proposes a specific model of functioning for a private incubation centre in Rajasthan. The incubator will screen the applicants based on a rigorous screening process, including parameters such as their business ideas, whether the market for their product already exists or can be developed, the valuation of their business, if they have received any funding previously, the ownership structure (in case of more than one founders), etc. This model of incubation assumes that the applicants only include the B2B start-ups. One of the factors that contribute to a higher mortality is a loosely defined screening process. The number of start-ups that can be incubated in a year by this incubator is capped at ten (that is, the desired start-ups per incubator ratio as per Rajasthan's Start-up Policy 2015), and the

⁴¹Resurgent India – Start-up India, Monthly Newsletter Series, Pahle India Foundation

⁴²Resurgent India – Start-up India, Monthly Newsletter Series, Pahle India Foundation

program duration is assumed to be one year. The services provided by the incubator include shared office spaces for the start-up firms, business assistance and networks, marketing, legal and accounting services, etc. Notwithstanding that, a private incubator brings in more efficiency as compared to a government incubator, in order to incentivize the incubation centre further, to invest fully in guiding the tenant start-up firms and helping them survive; we assume that the incubator invests in the start-ups in form of equity, which is a cost to the incubator. This is a standard practice, followed by some of the top incubation centres located in India and abroad, but not in the existing centres in Rajasthan. The existing centres generally charge a monthly or quarterly incubation fees from the tenant firms.

4.1 Incubators driving Research and Development

Innovation plays a key role in driving sustainable economic growth and prosperity. Throughout the world, since the last decade or so, start-ups have been leading in the innovation space more than big corporates. Studies argue that start-ups are small and agile, which gives them more freedom and can be more responsive. A greater willingness to take risks and an inherent flexibility are strengths that help start-ups to innovate. On the other hand, big corporates have a system of departments and hierarchies, established products, product road maps, connected target audience and most importantly, shareholders' interests to contend with. All of this limits innovation to R&D teams and shifting business focus is much harder for big corporates. Furthermore, a new trend is emerging – start-ups are helping larger businesses to create new products outside of the rigid structures that may have previously inhibited this. In the last few years, it has been demonstrated that successful new enterprises can challenge the accepted norms with new concepts and in doing so, transform entire industries through innovation.

Innovation comprises of three essential aspects namely, research, development, and commercialization. The outcome of commercialization is the availability of the innovation to be exploited for profit, which creates both jobs and wealth. Innovation is a process of connected steps, with R&D being its backbone. Measuring and incorporating best practices would ultimately perfect the system. Start-ups essentially lack the money and resources required for R&D and thus, can do limited innovation. Incubation support acts as a conduit, in providing time, money and other resources necessary to launch a new product or service and undertake the activities necessary for a start-up company to become self-sufficient. The

broad objective of an incubator is to find viable companies and nurture them to obtain early stage capital or achieve sustainment and operate as research and development units for start-ups to bring about innovation.

As per The Global Innovation Index (GII)⁴³ rankings of 2017, India features at rank 60 out of 127 countries. One of the major reasons behind this average ranking is the low level of R&D spending. Although the Gross Expenditure on R&D (GERD) has tripled in the last decade, it has ranged roughly between 0.6 to 0.7 per cent as a proportion of GDP⁴⁴. Despite numerous incentives given by the government, private sector expenditure on R&D in India is abysmally low, as compared to global standards. In 2016-17, the private sector R&D expenditure was a mere 0.28%⁴⁵ of the GDP. More than half of the current R&D spending is borne by the public sector, thus compromising on efficiency and adeptness. There is an urgent need to boost R&D spending by the private sector and privately owned incubators can act as a means towards that end.

4.2 Methodology

Computation of costs

Setting up an incubator involves a series of costs. Some of these costs will be incurred only during the inception stage such as the cost of construction of the incubation centre. The rest such as the cost of lease, maintenance costs, cost of training and mentoring will recur over lifetime. This study accounts for these costs assuming that the incubation centre is set up in Jaipur. In addition, the incubator invests in the graduating firms in the form of equity, which is assumed to be 7 per cent⁴⁶ of the valuation of the start-up post incubation. Other costs taken into consideration include the first round of investment received by the graduating start-ups from other investors and the R&D expenditure incurred by the incubator.

Costs

- Cost of construction of the incubator

⁴³Global Innovation Index (GII) ranks the countries by their capacity for, and success in, innovation. It aims to capture the multi-dimensional facets of innovation and provide the tools that can assist in tailoring policies to promote long-term output growth, improved productivity and job growth. GII relies on two sub-indices: Innovation Input sub-index and Innovation Output sub-index. The input components capturing elements of the national economy that enable innovative activities are – institutions, human capital and research, infrastructure, market sophistication, and business sophistication. The output components that measure the outcomes of innovation are – knowledge and technology outputs, and creative outputs.

⁴⁴Economic Survey of India, 2017-18

⁴⁵<https://data.gov.in/>

⁴⁶Based on primary research findings

- Cost of lease on land
- Cost of maintenance and operations
- Cost of mentoring and training
- Cost of equity provided by incubator
- Investment funding received by incubated start-ups from other investors
- Increase in R&D spending by the private sector

Computation of benefits

Setting up more private incubators in Rajasthan would reduce the "start-ups per incubator" ratio, which would mean that the facilities available for each start-up will be higher and the mortality rate can be reduced. Mortality rate is the proportion of start-ups that are both, unable to secure the first round of investor funding and to self-sustain on their revenue stream for at least two years, out of the total number of start-ups that are incubated. Incubators offer step-by-step expert guidance, contacts with the industry and resources targeted at transforming innovative new ideas into feasible business models. This would improve the probability of start-ups to succeed post incubation, implying increased investment in start-ups either by investors or through their own revenue stream. Taking into account, the R&D resources, mentoring services and industry linkages provided by the incubation support, the incubated firms experience a value addition in their product and valuation. Further, higher investment in start-ups and the increased R&D spending will both have a multiplier effect on Rajasthan's economic activity reflected in the boost to State GDP.

Mian (1995) assesses the value-added contributions of business incubators to tenant firms. The correlation coefficients between use and value-added are statistically significant for a set of services provided by incubator as proposed in this analysis. I-DEV International, in conjunction with the Aspen Network of Development Entrepreneurs (ANDE) and Agora Partnerships evaluate the quantifiable value created by impact incubators. For the purpose of study, we use evidence from this research to determine the value added by incubation support. The authors note that early stage firms respond more to the services provided by an incubator. Their analysis finds that the average revenue for the 36 Early Stage Enterprises was \$61,000 upon entry into the incubation program while at the time of completion it was \$434,000, implying a 7.1 times increase in revenues. This is unlikely to be completely attributable to the incubator, since due to screening, most firms that enter incubation are

already more robust than the average start-up and hence, after adjustment we use a value of 6x. However, this seems very optimistic as the valuation of an incubated start-up might also depend on the type of product, market conditions, etc. We present a second scenario with a modest 3.5 times increase in valuation.

As an identical base valuation of each start-ups, we assume that each start-up has a revenue stream of INR 100,000 in a year while applying for incubation. The valuation of a B2B start-up is mostly determined by the founders itself unlike the B2C start-ups, and is usually 10 times⁴⁷ the revenue stream of their start-up. Therefore, the average valuation of start-ups at the beginning of the program is INR 1,000,000.

Benefits

- Value addition in the valuation of graduating start-ups
- Multiplier effect of increased investment in start-ups on the state GDP
- Multiplier effect of increased R&D spending on the state GDP

The benefit to cost ratio of the intervention is calculated using the following formula:

$$BCR = \frac{PV \text{ of total benefits}}{PV \text{ of total costs}}$$

where BCR is the benefit-cost ratio and PV stands for present value.

The present value of costs (excluding the construction cost) and benefits are calculated for a period of 10 years. We assume the standard present value discount rates of 3 per cent, 5 per cent and 8 per cent for the purpose of this study.

4.3 Assumptions & statistics used

The assumptions and statistics used for this analysis are as follows:

- All the costs are estimated for the city of Jaipur at 2017 prices.
- The size of the proposed incubator is 4000 square feet.
- The cost of construction of office space is INR 660 per square foot approximately.
- The operational/maintenance cost for an office space of 4000 sq. ft. is around INR 1.6 lakh per month.

⁴⁷The number has been obtained by interviewing relatively new start-ups who are seeking good incubation support.

- The cost of leasing land for office space is around INR 20 per sq. ft.
- The cost of training and mentoring depends on the expertise and experience of the mentor, and on the specific requirements of the start-ups. It is assumed that in a month, five experts are hired on an ad-hoc basis and are paid on an average INR 30000 per month.
- The duration of the intervention is taken to be 10 years.
- The incubator invests in the start-ups in terms of an equity share of 7 per cent on the post incubation valuation of the start-ups.
- The first investment funding that start-ups receive upon graduating from an incubator is on an average INR 20 lakh.
- The survival rate of start-ups is assumed to be 80 per cent post incubation.
- The investment multiplier to calculate the effect of increased investment on Rajasthan's GDP is assumed at 1.29⁴⁸.
- The average expected spending on R&D activities expected to be borne by a well-functioning incubator is estimated at INR 70 million in a year⁴⁹.
- The R&D spending multiplier for Rajasthan is assumed to be 1.66⁵⁰. This implies that INR 1 spent on R&D activities will lead to a boost of INR 1.66 in the GDP of the state.

4.4 Analysis

On assuming a value addition of 3.5x due to incubation, the total cost of setting up an incubation centre and working space in Jaipur, along with additional funds required for investment and R&D is estimated at INR 9.53 crores per annum at 2017 prices⁵¹. Over a period of 10 years, the present value of the cost will amount to approximately INR 72.39 crores at 3 per cent discount rate, INR 66.11 crores at 5 per cent discount rate and INR 58.14 crores at 8 per cent discount rate. In the second scenario with 6x value addition, the total

⁴⁸Since the probability of success for incubated start-ups is likely to be higher, there will be an increased investment in start-ups overall. This additional investment will have a multiplier effect on the GDP of Rajasthan. A 2013 working paper by RBI estimates the capital outlay multiplier at +1.29 and we have taken it as a proxy for the investment multiplier; <https://chennaiirbi.org.in/Scripts/PublicationsView.aspx?id=15369>

⁴⁹Centre for Monitoring Indian Economy database Prowess captures R&D spending of private firms in India. The expected average spending by the incubator in a year has been arrived from this data; <http://www.nistads.res.in/indiasnt2008/t4industry/t4ind4.htm>

⁵⁰Regional Input-Output Modelling System (RIMS) produces multipliers that are used in economic impact studies to estimate the total impact of a project on a region, for USA. The R&D spending impact multipliers for all the states range from +1.66 (South Dakota) to +2.49 (Texas). We have assumed, with great optimism, that a private incubator in Rajasthan will be able to boost the state's GDP through its annual R&D spending by at least 1.66, which is the lowest multiplier in the case of USA; http://nano.gov/sites/default/files/medicine_-_clinch.pdf

⁵¹Appendix II: Incubation Support

cost comes to INR 9.67 crores per annum at 2017 prices. The present value will mount up to INR 80.48 crores at 3 per cent discount rate, INR 72.88 crores at 5 per cent discount rate and INR 63.37 crores at 8 per cent discount rate.

The total benefit resulting from the incubation support is estimated to be around INR 15.68 crores per annum at 2017 prices⁵² when the value addition is by 3.5 times. The present value of the benefit stream over 10 years amounts to approximately INR 122.12 crores at 3 per cent discount rate, INR 111.48 crores at 5 per cent discount rate and INR 97.98 at 8 per cent discount rate. In the second scenario when the valuation of start-ups increases by 6 times post incubation, the total benefit is estimated to be INR 17.68 crores per annum at 2017 prices. The present value of the benefits stream for a period of 10 years thus calculated, is INR 150.85 crores at 3 per cent discount rate, INR 136.55 crores at 5 per cent discount rate and INR 118.66 crores at 8 per cent discount rate. Table 2 shows the benefit-cost ratio thus calculated (Appendix II).

Table 2: Benefit-Cost ratio of incubation centre

Present value discount rate	3%	5%	8%
Estimated Benefit-Cost ratio (Scenario I)	1.69	1.69	1.69
Estimated Benefit-Cost ratio (Scenario II)	1.87	1.87	1.87

The above table shows that every INR 1 spent on the incubation will result in a benefit of INR 1.69 – 1.87 depending on the value addition resulting due to incubation, irrespective of the discount rate, which is a respectable and attractive amount for private enterprise, but relatively low in social-cost benefit terms.

5. CONCLUSION

The state of Rajasthan has immense potential with abundant natural resources, favourable policy environment, government incentives, and a strategic location. There are plenty of opportunities for investment in sectors such as Cement, IT and ITeS, ceramics, tourism, automotive, renewables and agro-based industries. Over the last 11 years, Rajasthan has contributed a share of 4.8% in the Indian GDP. The state economy is expected to grow at an average growth rate of 7.7% in the next five years. Such rankings are an important

⁵²Appendix II: Incubation Support

determinant of investor perception about the opportunity, attractiveness of the market and the regulatory regime. Rajasthan seems to be on the correct trajectory, albeit, regulatory challenges persist and include a complex land administration system, continued delays in resolving disputes due to an overburdened judicial system and a plethora of required approvals and licenses. For instance, land-related disputes continue to be one of the major reasons behind stalling of investment projects.

Rajasthan government recently legislated⁵³ the Urban Land (Certification of Titles) Bill, 2016, which allows the residents of the urban areas to apply for a guaranteed certificate of ownership against a nominal fee of 0.5 per cent of the land rate, currently on a voluntary basis. Urban area only accounts for 0.54 per cent of the total area of Rajasthan, and the rural areas are still deprived of such reforms, but completion of surveying activities and digitization of maps, is likely to catalyze these reforms in rural areas as well. Modernization of land records has been in the pipeline since the last three decades and the resulting benefits are well known and wide-ranging. The government of Rajasthan needs to streamline the process of registering land, adopt modern methods of maintaining land records and at the same time, update the existing records. Governments are dissuaded not just by the magnitude and cost of mapping millions of properties but also a fear of paralyzing property markets and sparking unrest. However, the long-term impact of modernizing land records outpaces such disincentives.

Further, there is a visible disconnect between the education system and the industry in India. This holds true for Rajasthan as well, and there is an urgent need to bridge this imbalance. Providing a conducive and holistic start-up ecosystem can be a major development in this direction. Incubators provide early stage training, mentoring and business support to new firms, for them to succeed in the market and in turn, create jobs and wealth for the economy.

Private investment is shrinking in India and in order to revive it, the state governments need to offer a fresh perspective towards doing business and fully commit to it. The objective of this cost-benefit study is to strike a policy debate on doing business in Rajasthan in order to deliver a more efficient business environment.

⁵³http://www.business-standard.com/article/economy-policy/rajasthan-becomes-the-first-state-in-india-to-clear-land-title-bill-116040800366_1.html

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7. APPENDIX I: LAND RECORDS MANAGEMENT SYSTEM

Costs sources	
Different costs	Source
Cost of conducting survey/re-survey activities	LBSNAA study, CTAG discussions
Cost of digitizing all the cadastral maps	DILRMP portal, calculations
Operational and maintenance cost	

Benefits sources	
Different benefits	Source
Economic benefit from secure property rights	Knack and Keefer, 1995; SGDP projections from IMF data

Cost-Benefit Analysis				
Costs				Amount (INR; 2017 prices)
	<i>Price</i>	<i>Basis</i>	<i>Area to be surveyed (sq.km.)</i>	
Cost of Survey/Re-survey work	34000	per sq.km.	302853.77	10,297,028,180
			<i>Maps left to be digitized</i>	
Cost of digitizing the cadastral maps	44.77	per map	90709	4,061,042
			<i>Proportion of fixed cost</i>	
Annual operational and maintenance cost			0.22%	22,662,396
Total fixed costs				10,301,089,222
Total costs (till 2070)				11,502,196,225
Benefits				
Total Economic Benefit (0.024% growth in SGDP)				613,855,748,351
Total benefits (till 2070)				613,855,748,351

Present Value Discount Rate	3%	5%	8%
Cost (INR in crores)	1089.88	1072.02	1057.96
Benefit (INR in crores)	22267.86	12598.30	6275.95

BCR (0.024% growth)	20.43	11.75	5.93
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8. APPENDIX II – INCUBATION SUPPORT

Costs sources	
Different costs	Source
Cost of construction (one-off cost)	Multiple internet sources
Cost of lease of land	
Cost of maintenance	Telephonic interviews with existing incubation centres in Rajasthan
Mentoring costs	
Investment funding received by start-ups after graduating from the incubator	
Cost of equity in successful start-ups	Standard proportions
Increased R&D spending by the private sector	

Benefits sources	
Different benefits	Source
Total value created by the incubator for graduated firms in a year	Study by I-DEV International, Aspen Network of Development Entrepreneurs (ANDE), Agora Partnerships
Multiplier effect of increased investment on state's GDP	Calculations
Multiplier effect of R&D spending on state's GDP	

Cost-Benefit Analysis (Scenario I: Value addition by 3.5x)				
Costs				Amount (INR; 2017 prices)
	<i>Price</i>	<i>Basis</i>		
Cost of construction (one-off cost)	660	per sq. ft.		2,640,000
Cost of lease of land	20	per sq. ft.		960,000
Cost of maintenance	160000	per month		1,920,000
	<i>Post incubation valuation of a successful start-up</i>	<i>Proportion of equity in one graduated start-up</i>	<i>Number of graduating start-ups in a year</i>	
Cost of equity in successfully graduated start-ups	3,500,000	0.07	8	1,960,000
Investment funding received by incubated start-ups in a year	2,000,000		8	16,000,000
	<i>Number of experts hired in a month</i>	<i>Average monthly salary paid</i>	<i>Multiplying factor to get annual figure</i>	
Mentoring costs	5	30000	12	1,800,000
R&D Costs				70,000,000
Total cost (without construction cost) (per annum)				92,640,000
Total cost (with construction cost)				95,280,000

Benefits				Amount (INR; 2017 prices)
	<i>Average value an average start-up at the time of program participation</i>	<i>Value added to an average start-up that graduates from the incubator (3.5 - 1)x</i>	<i>Number of graduating start-ups in a year</i>	
Total value created by the incubator for graduated firms in a year	1,000,000	2.5	8	20,000,000
Multiplier effect of increased investment on state's GDP	16,000,000		1.29	20,640,000
	<i>Increased R&D spending by private incubator in a year</i>		<i>R&D spending multiplier</i>	
Multiplier effect of R&D spending on state's GDP	70000000		1.66	116,200,000
Total benefits (per annum)				156,840,000

Present Value Discount Rate	3%	5%	8%
Cost (INR crores)	72.39	66.11	58.14
Benefit (INR crores)	122.12	111.48	97.98

BCR (Scenario I)	1.69	1.69	1.69
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Cost-Benefit Analysis (Scenario II: Value addition by 6x)				
Costs				Amount (INR; 2017 prices)
	<i>Price</i>	<i>Basis</i>		
Cost of construction (one-off cost)	660	per sq. ft.		2,640,000
Cost of lease of land	20	per sq. ft.		960,000
Cost of maintenance	160000	per month		1,920,000
	<i>Post incubation valuation of a successful start-up</i>	<i>Proportion of equity in one graduated start-up</i>	<i>Number of graduating start-ups in a year</i>	
Cost of equity in successfully graduated start-ups	6,000,000	0.07	8	3,360,000
Investment funding received by incubated start-ups in a year	2,000,000		8	16,000,000
	<i>Number of experts hired in a month</i>	<i>Average monthly salary paid</i>	<i>Multiplying factor to get annual figure</i>	
Mentoring costs	5	30000	12	1,800,000
R&D Costs				70,000,000
Total cost (without construction cost) (per annum)				94,040,000
Total cost (with construction cost)				96,680,000

Benefits				Amount (INR; 2017 prices)
	<i>Average value an average start-up at the time of program participation</i>	<i>Value added to an average start-up that graduates from the incubator (3.5 - 1)x</i>	<i>Number of graduating start-ups in a year</i>	
Total value created by the incubator for graduated firms in a year	1,000,000	5	8	40,000,000
Multiplier effect of increased investment on state's GDP	16,000,000		1.29	20,640,000
	<i>Increased R&D spending by private incubator in a year</i>		<i>R&D spending multiplier</i>	
Multiplier effect of R&D spending on state's GDP	70000000		1.66	116,200,000
Total benefits (per annum)				176,840,000

Present Value Discount Rate	3%	5%	8%
Cost (INR crores)	80.48	72.88	63.37
Benefit (INR crores)	150.85	136.55	118.66

BCR (Scenario II)	1.87	1.87	1.87
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Rajasthan is the largest Indian state. It has a diversified economy, with mining, agriculture and tourism. Rajasthan has shown significant progress in improving governance and tackling corruption. However, it continues to face acute social and economic development challenges, and poverty remains widespread. What should local, state and national policymakers, donors, NGOs and businesses focus on first, to improve development and overcome the state's remaining issues? With limited resources and time, it is crucial that priorities are informed by what can be achieved by each rupee spent. To fulfil the state vision of "a healthy, educated, gender sensitive, prosperous and smiling Rajasthan with a well-developed economic infrastructure", Rajasthan needs to focus on the areas where the most can be achieved. It needs to leverage its core competencies to accelerate growth and ensure people achieve higher living standards. Rajasthan Priorities, as part of the larger India Consensus – a partnership between Tata Trusts and the Copenhagen Consensus Center, will work with stakeholders across the state to identify, analyze, and prioritize the best solutions to state challenges. It will commission some of the best economists in India, Rajasthan, and the world to calculate the social, environmental and economic costs and benefits of proposals.



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Copenhagen Consensus Center is a think tank that investigates and publishes the best policies and investment opportunities based on social good (measured in dollars, but also incorporating e.g. welfare, health and environmental protection) for every dollar spent. The Copenhagen Consensus was conceived to address a fundamental, but overlooked topic in international development: In a world with limited budgets and attention spans, we need to find effective ways to do the most good for the most people. The Copenhagen Consensus works with 300+ of the world's top economists including 7 Nobel Laureates to prioritize solutions to the world's biggest problems, on the basis of data and cost-benefit analysis.