

Operations Research Helps Manage Startups Better

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Abstract: Startup India action plan was launched by Government of India in January 2016. This innovative plan endeavors to create an ecosystem in the country to motivate young entrepreneur to turn their business idea into action, thereby enhancing productivity & increasing job opportunities. However, it is equally important that startups must equip themselves with advanced analytical methods helpful in making efficient decisions about planning and implementation of various business activities.

Historically, OR techniques have mostly been applied for large scale companies as they wanted their operations made easy and cut their costs. While the Government of India envisions transforming the country into a start up hub, its much faster growth may not be reached without judicious applications of sophisticated operations research techniques. It is much useful & applicable for firms involved in analytics at different stages of operation. Whether used consciously or unconsciously OR techniques are significantly helpful for smooth and efficient functioning of Startups in our country and world at large.

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I. INTRODUCTION

With a population of 1.21 billion (census survey, 2011), India stands as the 2nd most populated nation and it is quite obvious that unemployment is a critical challenge being faced by the country. As per Labour and Employment Report 2016, of about 511 million work force, just 17% is employed in regular formal employment in the organized sectors. Overall, India's unemployment rate grew from being at 6.8% in 2001 to 9.6% in 2011(census survey, 2011). Rising aspirations and growing youth population make it imperative for India to find solutions to unemployment for channelizing its energy in the right direction. Launching up of the startups is to provide an impetus to the domestic challenges of unemployment and foster growing opportunities for multi-sector productivity.

Start-ups in India have been facing two sets of impediments. The former refers to a range of government department's apathy, corruption and complex approval procedures. The latter relates to the power of big and powerful corporate, to resist or counter start-ups which challenge them. The Start-up India Action Plan lists out a comprehensive set of structural and regulatory reforms designed to build a strong eco-system for nurturing innovation and Startups in the country that will drive sustainable economic growth and generate large scale employment opportunities. These action plans are aimed to accelerate startup movements from digital/technology sector to a wide array of sectors including agriculture, manufacturing, social, healthcare, education, and others.

II. STARTUP INDIA ACTION PLAN

- By definition, startups are now separated out with the earlier term 'business' and it has its own guidelines.
- Startups shall be allowed to self-certify compliance with 9 labour and environment laws. In case of the labour laws, no inspections will be conducted for a period of 3 years.
- Startup India hub will be created as a single contact point for start-up foundations in India, which will help entrepreneurs to exchange knowledge and access financial aid. Government of India will also help startups through their lifecycle with specific focus on important aspects like obtaining finances, feasibility testing, business structuring advisory, and enhancement of marketing skills, technology commercialization and management evaluation.
- Startup Mobile-app will be used for registering Startups with relevant agencies of the government through a single form. The app will also have features like tracking the status of registration, downloading registration certificate, filling compliances, obtaining clearances and approvals among other things.

- A system of fast-track examination of patent applications will be incorporated. A panel of facilitators will also be provided to assist in filling of Intellectual Property Rights application and the cost will be borne by the government.
- Norms for Startups will be relaxed if they apply for Tenders floated by PSU.
- In case of failure if any start-up wants to close its operation the government will provide an easy way out.
- Through fund of funds with a corpus of RS.10, 000 Cr the government will be supporting startups indirectly in their operations.
- Credit guarantee comfort with flow of Venture Debt from the formal banking system will be ensured.
- Startups can enjoy tax exemption facility if they invest their capital gains in the fund of funds.
- There will be exemption from income tax on profits generated by startups for a period of first 3 years.
- Investment made by incubators and angel investors will also be exempted from income tax.
- For showcasing Innovation and providing a collaboration platform one national and another international startup festival will be organized annually.
- Atal Innovation mission will provide a platform for promotion of world-class innovation Hubs, Grand Challenges, Startup business and other self-employment activities, particularly in technology driven area.
- A private-public partnership model is being considered for 35 new incubators and 31 innovation centers at national institutes.
- The government plans to set up seven new research parks, including six in IIT campuses and another in the Indian Institute of Science campus, with an investment of Rs 100 cr. each.
- To foster and facilitate bio-entrepreneurship, 5 Bio-cluster, 50 new Bio-Incubators, 150 technology transfer offices and 20 Bio-Connect offices will be setup in research institutes and universities across India.
- The government will introduce innovation-related programs to promote research and innovation among young students.
- Annual Incubator Grand Challenge will be launched to identify leading Incubators in India.

Looking at the Startup India action plan bullets above, it is amply clear that this plan puts into frame a diverse and wide ranging developmental ecosystem in our country. However, on the ground level it is equally important that startups must equip themselves with advanced analytical methods helpful in making efficient decisions about planning and implementation of various business activities.

III. OPERATIONS RESEARCH APPROACH

Operations research is a mature, well-developed field with a sophisticated array of techniques that are used routinely to solve business problems. It is a set of mathematical techniques which have evolved over the last six decades and that helps improve the process of business decision making. Operations Research offers tools to optimize and find the best solutions to myriad decisions that managers have to take in their day to day operations or while carrying out strategic planning. It is in fact a systematic approach to problem solving, which uses one or more analytical tools in the process of analysis. By using techniques such as mathematical modeling to analyze complex situations, operations research gives executives the power to make more effective decisions and build more productive systems based on:

- More complete data
- Consideration of all available options
- Careful predictions of outcomes and estimates of risk
- The latest decision tools and techniques

Hence, for smooth functioning of their businesses, startups must capitalize on the power and potential of operations research in addressing decision making in areas of operations, supply chain, financial and marketing management. With the advent of operations research software, these tools can be applied by managers even without any knowledge of the mathematical techniques that underlie the solution procedures. While Linear programming models are helpful in input/output analysis of any production period, investment plans for the five or ten years can be obtained through Mixed Integer Programming as well. Operations research can also help startups in choosing an optimal project. This kind of choice would need Integer Programming and Quadratic programming techniques. Simulation, on the other hand, enables to try out approaches and test out ideas for operational upgrading. Additionally, for prioritizing its objectives, Startups may use Analytical Hierarchy Process and can achieve them through various multi-objective programming. Some of the OR techniques which may be helpful for functioning of startups can be identified as:

- Linear optimization
- Nonlinear optimization

- Transportation Technique
- Assignment technique
- Routing technique
- Game theory
- Network Analysis
- Production planning
- Logistics
- Inventory technique
- Queuing theory
- Replacement Theory
- Sequencing Theory
- Simulation Techniques
- Stochastic Techniques
- Adaptive scheduling
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IV. CONCLUSION

Traditionally, application and use of operations research techniques have been common with corporate companies operating at large scale. And, this has helped reduce cost and minimize complexity of computing. For startups and its transformation into being a hub and its faster well-prepared growth, application of operations techniques can add the same values as it does to the companies with large operations. Whether used consciously or unconsciously OR techniques are much helpful for smooth and efficient functioning of Startups in our country and world at large.

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