

Minimum Viable Product (MVP) for Product startup: An Indian perspective.

A.S.Rao

indiainvents@gmail.com

<http://www.indiainvents.blogspot.com/>

Countries which innovate and build products lead and rule this global economy. The search for an Indian identity in global market place continues with heightened nationalistic fervor. India missed first industrial revolution, large machines do not represent India. Second wave with public sector leading the way built a wide industrial base though only few public sector units survived liberalization. Acquired Technology pushed private sector ahead on learning curve but with MNCs preferring fully owned units, joint ventures faded away. Indian talent from NIIT to IITs got global recognition with Y2K and Indian software firms emerged as large employers in Europe and USA. But the question why there is no Google or Apple coming from India confounds media and public. Will the fourth push, startup surge, result in a product developed in India made for the world? This paper looks at the lean startup model and critical role of Minimum Viable Product (MVP). Is this fast track with MVP feasible for product startups based in India? An attempt is made to analyze gaps in eco-system and suggest agenda for researchers.

The startup fever, first noticed in Silicon valley has now spread all over the globe. Three young entrepreneurs, Bjoern Herrmann, Max Marmer, and Ertan Dogrultan, had set out to take a comprehensive, data-driven analysis into what makes startups successful. The team has compiled data on more than 50,000 startups around the world through Startup Compass and more than 50 in-depth, qualitative interviews conducted with entrepreneurs and investors. The comparative analysis, produced in collaboration with affiliates from UC Berkeley, Stanford and Telefónica Digital, covers a host of topics, including how the landscape of startup ecosystems has begun to extend beyond Silicon Valley to become somewhat of a global phenomenon. The report compiled a global ranking of startup ecosystems based on a fifty variable, eight component index, which includes *Startup Output, Funding, Company Performance, Talent, Support Infrastructure, Entrepreneurial Mindset, Trendsetting Tendencies and Ecosystem Differentiation*.

The top 20 startup ecosystems are in Silicon Valley, Tel Aviv, Los Angeles, Seattle, New York City, Boston, London, Toronto, Vancouver, Chicago, Paris, Sydney, Sao Paulo, Moscow, Berlin, Waterloo (Canada), Singapore, Melbourne, Bangalore and Santiago.

The startup ecosystem report (2012) argues that countries are shifting from service-based economies to become increasingly driven by a new generation of fast-moving software and technology organizations. Overall, the Startup

Ecosystem Index paints a glowingly positive picture of the state of entrepreneurship around the world. While Silicon Valley is far and away the strongest ecosystem, just 5 or 10 years ago most of the other ecosystems on this list either barely existed or didn't exist at all. Bangalore makes it to the list of 20 and the report highlights the difference in the ecosystem between Bangalore and Silicon Valley.

Factor	Bangalore	Silicon Valley
Age	37	34.12
Gender(F/M)	6%/94%	10%/90%
Education (Dropout/ PG+PhD)	1:4.5	1:2.5
Serial Entrepreneur	24%	56%
Percentage of non-technical founding teams	15%	16%
Working hours per day	10.86	9.95
Percentage of founders who lived in Silicon valley	8%	100%
Motivation (Product Vs Impact)	2:1	1:1
Customers (B2B Vs B2C)	1.4:1	2:1
Market (New Vs Niche)	2.4:1	4:1

Founders of Bangalore startups have higher education, cater for niche market with focus on product features. Across India, E-commerce based on cloned business ideas, built on generic technology are popular with young technocrats. Analysts contend they face tough competition from better endowed players like Germany's Rocket Internet and new generation from Marwari/ business community.

India too is brimming with startup activity and their lifecycle is portrayed as different from others like economic life cycles, technology life cycles.

Lifecycle

Economic development is characterized by cycles. The shortest cycles, named after Kitchin, embrace a period of 3 to 4 years. The medium term (Kuglar) cycle takes 7 to 9 years; it has considerable impact on business life and its four phases (*revival, recovery, stagnation and crisis*) can be followed with a fair amount of accuracy through economic history. The concept of the long cycles has become associated with the name of Russian economist Kondratiev, who analyzed the development of long-term trends in selected indicators. In 1925 he published his findings; that there exists about half-century long cycles.

The technology life cycle developed by Ford and Ryan proved to be a useful conceptual tool in technology management. TLC traces technology from the stages of the first idea, to its development and commercial exploitation. It is a useful concept that brings out the evolutionary character of technology. The evolution is influenced by the determinants of technology change. Technology

Life Cycle has four distinct stages *fermentation, growth, maturity and decline*. Product Life cycle also follows similar S curve. The firm will be developing technology in small evolutionary steps to meet the market requirements. The initial stage is fluid with many firms working on the same technology and each designer assuming that his design will be the ultimate winner. The technology risk is enormous and market potential unclear. Customers set a price on the technology by setting the price of the end product. Customers compare products in the market place and compare the technologies.

Startup Genome identified six stages of development- *Discovery, Validation, Efficiency, Scale, Profit Maximization and Renewal* in startup life cycle. In discovery stage the Startups are focused on validating whether they are solving a meaningful problem and whether anybody would hypothetically be interested in their solution. Next startups work to get early validation that people are interested in their product through the exchange of money or attention. Startups then refine their business model and improve the efficiency of their customer acquisition process. Startups should be able to efficiently acquire customers in order to avoid scaling with a leaky bucket. With confidence, startups step on the gas pedal and try to drive growth very aggressively.

Technology and product development are critical stages in life cycle of any enterprise. However, there is difference in the tools deployed by established firms and start-ups.

New Product Development in product life cycle

New product development is expensive, takes time, costs a ton and no one wants to end up with a product that does not fly. Still majority of products fail, while there is no failure-proof *mantra*, several measures are taken to reduce development time & cost, improve user adoption and fail early. Fuzzy front end of new product development refers to the uncertainties inherent in chartering through unknown waters. Front end activities include *Idea generation, assessment of market, technology, competition, product definition, project justification and action plan*. There is more uncertainty at this stage. Uncertainty is defined as lack of information on goals, alternatives and consequences. Environmental uncertainty related to market changes, emerging technological developments and evolving competitive situation is defined as '*front-end-fuzziness*'. Unresolved technical certainties and inadequate customer needs assessments are responsible for the failure of many new product development projects.

The front-end activities include pre-phase zero (*idea generation*), phase zero (*assessment of market, technology and competition*) and phase one (*product definition, project justification and action plan*) of phase review or *stage-gate*

system. Strategic orientation, product development methodology, customer involvement are considered important. The strategic orientation can be *customer orientation*, *technological orientation* or *competitive orientation*. *Customer orientation* is the firm's sufficient understanding of its target buyers in order to be able to create superior value for them continuously. *Competitor orientation* can be defined as the ability and the will to identify, analyze and respond to competitor's actions. *Technological orientation* are strongly R&D-oriented, are proactive in acquiring new technologies, and use sophisticated technologies in the development of new products.

On methodology, NPD literatures roughly classify two categories: *phased product development* (PPD) and *integrated product development* (IPD). Historically, PPD approach derives its concepts from the phased program planning (PPP) used by NASA to develop missiles and other large-scale development programs. Today's industry users have modified NASA's PPP approach, such as "*Phased Development Process*", "*Structured Development Process*", "*Stage-gate*", or "*Phased Review Process*". The IPD approach establishes its development path using concurrent and overlapping development practices that accent early planning and decision making. *Concurrent Engineering is a systematic approach to the integrated, concurrent design of products and their related processes, including manufacture and support. This approach is intended to cause the developers, from the outset, to consider all elements of the product life cycle from concept through disposal including quality, cost, schedule and user requirements.*(Institute for Defense Analysis (IDA))

Customers' sophistication and knowledge are increasing. As expectations rise, customers' attention to detail and ability to articulate gaps between expectations and experiences increases. Therefore, customers are viewed as important potential co-designer and co-producer, since they can make an effective contribution to production activities. As customers are the final stakeholder and arbiter of product, involving customers in product design and production can reduce uncertainty from customers. QFD (*Quality Function Deployment*), originally developed in Japan, is a conceptual organizational framework for enhancing communication and coordination between engineering, marketing and manufacturing personnel. It is based on the premise that Innovations do not fail in the end - they take the road to disaster in the beginning due to incomplete understanding of user's requirement. The organizing framework for QFD is the concept known as the *house of quality* (HOQ), a matrix that maps customer requirements against product attributes. The starting point is to identify customer requirements and tabulated in *Voice of Customer*, then matched with technical characteristics of the product.

Minimum Viability Product (MVP) in startup cycle

For startups the focal point is development of "Minimum Viable Product" (MVP), a product that includes just enough features to allow useful feedback from early adopters. The term was coined by Frank Robinson and popularized by Eric

Ries for web applications. This makes it easier for the company to speed to market with subsequent customer-driven versions of the product. And it mitigates the likelihood of a company wasting time on features that nobody wants.

A minimum viable product has just those core features that allow the product to be deployed, and no more. The product is typically deployed to a subset of possible customers, such as early adopters that are thought to be more forgiving, more likely to give feedback, and able to grasp a product vision from an early prototype or marketing information. It is a strategy targeted at avoiding building products that customers do not want, that seeks to maximize the information learned about the customer per dollar spent. "*The minimum viable product is that version of a new product which allows a team to collect the maximum amount of validated learning about customers with the least effort.*" An MVP is not a minimal product,^[3] it is a strategy and process directed toward making and selling a product to customers. It is an iterative process of *idea generation, prototyping, presentation, data collection, analysis and learning*. The process is iterated until a desirable product-market fit is obtained, or until the product is deemed to be non-viable and the game is to minimize total time spent on iteration. The MVP starts with a product vision, which is maintained throughout the product life cycle, although it is adapted based on the explicit and implicit (indirect measures) feedback from potential future customers of the product

"Lean startups don't try to scale up the business until they have product market fit [PMF], a magical event—more easily recognized in retrospect than in the moment—when they finally have a solution that matches the problem,"(Steve Blank)

The Dropbox team initially announced a bare-bones version of its service on the website Hacker News. The company collected reams of immediate feedback from site readers, and continued to incorporate feedback into several successive product launches—each of which added only a couple of new features. While the feature additions were gradual, they were rapid, as was company growth: Dropbox increased its user base from 100,000 to 4 million in the course of 15 months.

MVP is increasingly adopted by software start-ups. The basic building blocks for digital services and products, the technologies of startup production, have become so evolved, cheap, ubiquitous that they can be easily combined and recombined. Some of these building blocks are snippets of code that can be copied free from the internet along with easy-to-learn programming frameworks (*Ruby on Rails*), services for finding developers (*eLance*), sharing code (*GitHub*) and testing usability (*UserTesting.com*). Yet others are application programming interfaces (*APIS*) digital plugs that are multiplying rapidly. They allow one service to use another, for example Voice calls (*Twilio*), maps (*google*) and payments

(*payPal*). The most important are platforms- services that can host startup offering like *Amazon cloud* computing, distribute them (*Apple Appl store*) and market them (*FaceBook, Twitter*). And then there is Internet, the mother of all platforms, fast, universal and wireless.

For hardware building blocks include all of the above plus 3D printers, sensors, micro controllers which bridge the analogue and digital worlds. The platform for most connected devices is Smartphone. Some examples of hardware startups:

Contour developed action video, with a first version that combined a CMOS security lens, battery pack, and AV cable to create an accessory lens that plugged into existing video camera. Sold for \$250 they quickly built a \$400K business doing one thing: Turning camcorder into an action camera.

Nest raised significant amount of capital, still they were diligent about introducing version one, iterating quickly on the software, and introducing version two within 12 months. They could have added a lot of new features, but they didn't. Instead version two did exactly what version one did, just better.

Fit bit started with a single pedometer that wasn't wireless and didn't have subscription revenue. The iPhone began as the iPod with up/down/left/right buttons. Skull candy started with black headphones that didn't have color until the supplier accidentally shipped the company a set of red headphones. The Kindle was first an e-reader that every editor blasted because it didn't have a color screen, couldn't browse the internet, and wasn't a tablet.

No matter the device, it takes a lot of work to bring the whole system (engineering, design, testing, packaging, supply chain, certifications, documentation, logistics, etc.) together into a product ready for mass consumer adoption. Starting basic and adding one feature at a time is incredibly important. Checklist for hardware startups:

- Do not over promise and under deliver. Instead of selling a single feature, they sell everything their product will eventually do. They're afraid they won't be loved by customers or investors so they show a series of features they can't possibly deliver on. The result is long delays, crappy product, or both.
- Do not attempt to mass distribute MVP. The first version is never amazing. Trying to mass distribute a product with average reviews and known quality issues is a fast path to irrelevancy.
- Slow with version two invites disaster. An MVP is supposed to be replaced quickly with a refined second version. Instead when startups spend so much time on everything else (customer support, distribution, brand awareness, raising capital, etc) they can't iterate fast enough on their product.

Indian Perspective

Many startups are taking birth in Bangalore and other innovation clusters with focus on products. iSPIRIT is a think tank working towards making India a hub for new generation software products. There are gaps that need to be bridged and issues that need to be resolved. Important among them are, *narrow IP base, low budget for iteration and absence of early adopters.*

Narrow IP base

Theory has long suggested that formal IP rights are critical in protecting the lead-time or first mover advantage that fast innovators possess. Graham(2010) studied patenting behavior of early stage technology companies and noted the following.

- The venture backed firms hold 19 patents and applications on average with significant differences in sectors. It was 35 for Biotechnology, 25 for Medical devices, 6 for Software and 27 for Hardware.
- Product innovators are twice as likely, than 'Process Innovators' to report that patenting is important in capturing competitive advantage.
- Important reason for technology startups to file patents deal with defensive and strategic motives, namely to prevent infringement law suits and to improve negotiating position in cross-licensing deals.
- Patents serve as quality signals for startup investors.
- Licensing in is also widely practiced for knowledge gain and to prevent infringement. As many as 72% of Biotech firms licensed in patents compared to 13% of software startups.

Polkwagner stressed on the importance of patent portfolio stating that true value of a patent lies not in their individual worth but in their aggregation into a collection of related patents- a patent portfolio. The scale feature of portfolios spring from the observation that a well conceived patent portfolio is in many ways a form of super patent.

Steve Jobs has taken great pains to assure consumers as well as investors in Apple, Inc. that for every iPhone function, there's a patent for that too. According to Jobs, the patent portfolio for the iPhone is over 200 patents strong. However, that doesn't include the patents that Apple licenses from other companies in order to bolster the iPhone's capabilities without detracting time and energy from Apple's own research achievements. E-Ink technology behind Amazon's Kindle has 148 patents and 96 applications protecting 3 component technology areas

Low budget for iteration

The government funds a large part of R&D in India, so does MNC R&D enters. The government funding is mostly restricted to first phase ending with a function proving prototype. This could be called MVP and taken to market with fast iterations, learning & validation from user. The critical stage is the translational research or pilot stage, pre-commercial development and can be taken up only by industry. There are promotional programs like PATSER of DSIR that supported up-scaling lab projects. The rationale for providing `public funds` for `private R&D` was articulated by rao (2008). Evaluation of those programs PATSER/ HGT/ TDB etc had shown that there should be more budgetary allocation for prototype iteration as one cannot shoot a moving target with single bullet. Like many other initiatives of government, all these programs have become dormant or shelved. Fortunately non-government sources have emerged, dedicated funds are available for impact investment and crowd funding platforms like *kickstarter*, *indiegogo* are attracting design startups.

Absence of early adopters

MVP strategy requires quick iterations based on user feedback and early adopters who want to stick around are essential. Bell shaped Innovation adoption curve of Roger visualized a process with a small group of technology savvy users excited at things new, trying new things firsthand. Their critical reviews matter most in shaping evolution of new product. And, they cannot be expected to be excited about an Indian product introduced late in the day. After crossing the chasm, the startup meets early adopters, opinion leaders for majority of users. Cost-benefit draws this group to try Indian products but not MVP. Hence, most startups plan to enter Indian market only after acceptance abroad and hybrid model with one leg in Silicon Valley and another in Bangalore has its merits.

“In India we see demanding customers who are used to ‘readymade’ products from West, well on their way down the adoption and commercialization curve, but have never sponsored innovative early stage products locally.” - Myshkin Ingawale, Co-Founder of Biosense Technologies

Summery

Lean startup model built on Minimum Viable Product has many converts. There are institutional gaps in IP depth, funds for iteration, lack of involved adopters etc. These known problems were discussed by Inc 42 team with Rohildev, Founder of RHLvision. His advise:

1. *Build a basic prototype. You no longer have to invest in expensive development kits at this stage. Open-source hardware stacks such as Arduino and mbed are allowing*

professional engineers and amateur tinkerers alike to build functioning systems quickly for a couple hundred dollars. CAD packages and 3D printing are now cheap enough for anyone to build a system that not only is functional but also looks great without the long-term commitment of tools and expensive licenses that may be obsolete in version 0.2. Make sure you know how much it will cost to develop a scalable, manufacturable version to avoid a common pitfall, which we will discuss next time.

- 2. Build a following, and use the Internet and social media to test the water. Crowdfunding platforms such as Kickstarter and Indiegogo make it possible to avoid the chicken-and-egg situation of needing money to prove the market but not being able to get money without a proven concept. With a great YouTube video, a working prototype, and some well-targeted PR, it is possible to come up with all the money needed to get to market. Balancing public disclosure with protecting sensitive intellectual property is tricky, but it's no more so than at any other stage. Be sensible with what you reveal, and protect what you can. Intellectual property doesn't have to cost the Earth.*
- 3. Build your product. With the money you need in the bank, it is time to double down and design/build your product with a view to volume sales. Your careful manufacturing planning (step 1) will help you avoid the problems that have plagued some high-profile Kickstarter efforts. The key thing here is to keep your backers up to date and informed. They invested in you and now have a long time to wait before they see you launch. Treat them just like any other investor, and be open about how you're getting along. Delivering what you said -- on time and on budget -- goes a long way toward creating a fan base of backers who will promote your product for you. That is the best form of advertising.*
- 4. Raise the money to scale production. With a successful crowd funding campaign under your belt and some initial sales and market traction, it will be a lot easier to raise money from private investors or venture capitalists should you need it. Scaling hardware is expensive, and poor payment terms can leave a financial chasm that often can be bridged only with some serious investment. So long as the plan is strong and the crowd funded launch was a success, this phase should be on an even keel for even the scrappiest of software startups. The Pebble e-paper display watch and the Ouya Android games console followed this trajectory and closed venture funding rounds of \$15 million each. They began with crowd sourced funding rounds that blew past modest goals and went on to multimillion-dollar amounts themselves.*

In a country that has traditionally taken to the services company's space, where returns are much quicker, it is much more difficult for hardware product companies to catch up in terms of speed, as product development cycles take much longer. We are in phase zero of Product Development learning cycle and large body of young technocrats taking the route of startup augurs well for India.

For Researchers

- How important IP portfolio is for a product start-up?
- What is the relationship between open source software / hardware and fast iteration series at low cost?
- Do social networks provide lead testers, early adopters?

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