"Make in India" through PPP for IT Industry: IT Independence of Indian Economy

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Abstract:

Asian Countries are emerging independent countries and are rapidly occupying good share in world economy. India will be second largest economy after China in next one or two decades because of its young population, comparatively low dependency ratio, healthy savings and investment rates. The long term growth prospective of the Indian economy is positive due to adoption of import substitution. Due to favorable scenario of young population and healthy savings; government of India has chosen import based strategies to promote industrialization through "Make in India". However possibilities for software product development; through "Make in India" is still in infancy and have a small dot on the big canvas. India is a major exporter of IT services; this is the fastest-growing part of the economy, which is used to maintaining import export balance. The growth in the IT sector is based on specialization, and availability of a large pool of low-cost, highly skilled workers matched by demand from global customers. One advantage is India's service cost; that is, approximately 3-4 times cheaper than other countries, and it is USP (Unique Selling Proposition) in the global market.

The efficiency of Indian IT professional is limited to software consultancy project or business process management (BPM) services, because the private sector companies are mostly based on the business strategy for revenues generation. They are hiring talented persons from India and providing their services to overseas clients at a relatively cheaper rate. In the entrepreneur point of view, the service providing route would be less risky and quicker to earn profits, than building a software product based company. A venture capitalists perspective also advocates investing in low risk and better rewarding project and therefore, IT-service sector is more reasonable than software development. The IT independence in India could be reached by establishing R&D agencies through PPP under Make in India project. This paper critically discuses factors hindering establishment of R&D labs through PPP for Software and Hardware Startup in India. The manuscript strongly advocates the need of Research Labs under Public Private Participation.

Keywords: *Make in India, Hard Ware Startup, Software Startup, PPP*

1.0 Introduction

Indian IT industry is divided into four major segments – IT services, Business Process Management (BPM), software products, and hardware. The IT service sector and BPM sector is doing well and contributed at par in Indian economy. The BPM industry in India is heading towards efficient services and global competitiveness. These two sectors have increased its contribution to India's GDP from 1.2% in 1998 to 7.5% in 2012, however; Indian software-product and hardware market share is still low and treated as undeserved market for software development

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and for hardware manufacturing as well. Some local software companies are serving Indian market, but most of their turnover is less than Rs 10 crores, which is insufficient contribution in market share. India is waiting for good leading companies and business houses to invest in software & hardware startup; with proper integration of appropriate business model.

Indian IT companies majorly provide software service, with minor presence in the software development sector. The major challenge is increasing share in software-product-market and to establish R&D based software development companies, so that software like operating systems, web browsers, network protocols and e-commerce tools could be develop to substitute Microsoft or Adobe software's. Major constraint in establishment of such venture in India; is lack of investment for R&D project by government agencies. NASSCOM-Zinnov startup report 2016 stated main reason behind slow growth in hardware startups in India is lack of infrastructure, poor distribution systems and the absence of a B2C market. These are some big challenges need to overcome. Also in investor's point of view, software-based startup is preferred as above issues are eliminated in the matter of integration and scale up. Hardware manufacturing in India is also in infancy and has major challenges ranging from issues like skill development, experimental lab for prototype design and raising funds for mass production.

2.0 Present Scenario

Hardware manufacturing in India is in infancy and has major challenges ranging from issues, like skill development, experimental lab for prototype design and raising funds for mass production. We also have a big lack in structured economical system to support investment for experimental lab and prototyping of hardware chip and other devices. It is a matter of surprise for hardware manufacturing companies when the flagship "Make in India" initiative has declared by government of India, and the idea is extended to develop India as a global manufacturing hub for hardware devices. India's manufacturing sector, contributing just 16 to -17 percent of gross domestic product (GDP). However it, holds enough untapped potential. "Make in India" program has created a consolidate ground for further growth in hardware and software manufacturing sectors. Many remarkable initiatives have been taken by the government to promote software and hardware manufacturing under "Make in India" campaign.

The **Intel Maker Lab** has been launched to with collaboration of IIT Mumbai and the Department of Science & Technology. The primarily objectives of this venture is to provide infrastructure, tools and mentorship for such labs and, to promote R&D in the country. Another objective is, to provide fearless environment to the hardware incubators and investors. The "Make in India" campaign is surely a good step towards making India as a product development hub, especially for electronic and computer hardware. Slowly but continuously; the hardware startups are gaining enough adherence because of innovation in technology, the availability of experimental maker's labs will make it simple to ideate something innovative that can be easily translated into real designing. In the present scenario, the startups under flagship of "Make in India" have brought lots of encouragement and, therefore, 10 to 12 percent growth per year is expected. However, it will take some years for good results of the program, as the economic system around hardware and software manufacturing must first need to be developed, including infrastructure, connectivity and skilled manpower.

3.0 The Need of Appropriate PPP Business Model

Public private Partnership model for various startups is more effective and efficient model; due to technical, financial and economical aspects. The services and products offered by private sector are of high quality. People have good amount of trust of private companies because of their systematic work culture, standardized manufacturing process and more importantly due to answerability and fear to loss of the goodwill. On the other hand; government manufacturing units are considered less reliable due to time consuming process of manufacturing, lack of responsibility and answerability. Many of the government projects are get entangle in endless pipeline of government machinery. Government of India is increasingly interested in exploring fair possibilities of PPP in hardware and software startups, due to following important reasons: 1) Demand of software product and infrastructure is rising faster than government's ability to fulfill, PPP has effectively helping government to respond quickly for demand of product and services. 2) PPP assists government to do more in less resources and minimum formalities of government machinery. 3) PPPs combine deployment of private sector capital to improve services and public sector. 4) When private sector capital is in risk the commercial decision about design, operation, investment and timely delivery is taken carefully. 5) The PPP are often considered politically safer than privatization. In practical sense, PPP represents a form of collaboration under contract by which both public and private can act together and achieve profit with equal sense of financial security and responsibility. Many PPP initiatives are working for society at large, but putting such model of PPPs for hardware & software startup is different matter. The value-for-money is important and more emphasized issue in business world. Therefore, an appropriate business model for profit sharing and ensuring benefits is significantly required. In spite of numerous advantages of Public Private Partnership, many issues need to be settled while deciding mutual beneficiary terms & conditions for a PPP contract.

4.0 Challenges Faced by PPP for IT Startups

The Public Private Partnership is collaborative arrangement for sharing revenue, risk, responsibility and reward, and hence operational issues and terms & conditions are well defined and based on mutual benefits. Startup for hardware manufacturing required good amount of investment with comparatively less and immediate chances of profit. Public sector companies want immediate and guaranteed return of investment. Also the software development startup needs talented software engineers and skilled programmer; that is also a patient project. Some issues like terms & conditions of contract, duration of contract, royalty issues and change in government's policies are majorly considerable. Some of the major issues are:

4.1 Financial Issues

The return on investment and financial risk is the most important factor for private companies; there are various methods with government to overcome possible loss but private sector does not take it granted. Software and hardware manufacturing required huge amount of investment for long time, Indian political instability and complex process of policy decision and implementation is also a big fear in private sector companies. Therefore, investing large capitals for long time surely a matter of think & rethink for private companies. Another issue is late policy decision and time consuming approval of launching or upgrading new projects or technology. Technologies are changing day by day. We must be synchronized our hardware and software platforms in present and

rapidly changing scenario. If hardware manufacturing startups does not produce or upgrade the products well in time, they will face financial losses; therefore the project must be approved by government within defined time. Another financial issue is defining share of risk and rewards. There must be some scientific method to fix the shear of investment, also penalties if private sector or government defaults. The government should be cooperative for ensuring no financial loss to private sector, for reasons like wrong or late policy decisions or laxity by the government.

4.2 Conflict Management

It is another critical issue. Generally the PPP's contract does not clearly defined state of Contractual defaults; the financial risk, ownership of assets and loyalty benefits should be clearly defined. The contract should give sufficient protection to private company. A well-defined Service Level Agreement (SLA) may be implies that must be equally imposed on government agencies. Presently most of the project does not have such document imposed on government departments and this is major reason for failure or unlimited delay of the project. The duration of contract is also important. It is challengeable for both parties to make an agreement about contract period in such manner that private party can recover the investment; and same time, the intellectual property and copyrights are expiring after certain& definite time, so that private party could not impose monopoly in the market.

4.3 Technical Issues

Major technical issue is rapidly changing technology and upgrading the product with world class technology. Especially, software production unit requires a dynamic setup regarding recruitment and training of skilled staff such as programmer and software engineers, however hardware manufacturing unit required continuous research to make more efficient and compact devices. Another concern is the ownership of technical infrastructure after expiry of the contract or due to default of any party or any other reasons. Thirdly; sometimes technology does complete spinoff on the pre-settled business model and the situation come to the picture that had not been considered before. This leads to conflicts between both parties. For example, a biometric sensor developed for recording biometric password may be used for crime investigation or, some hardware GPS chip is used for unsocial activities. This may violate issues related to IPR.

Research Lab / Maker's Asylum: Technologies are changing day by day we must be synchronized our hardware and software platforms with global scenario. In this rapid shifting technological scenario, technical issues also include risk involving with network, data-server, operating system, communication protocols and data security for e-commerce. This also includes maintainability of hardware and software infrastructure with rapid changing global standards. Hardware manufacturing startup requires experimental labs for experimenting with prototype models. Government needs to take individual initiatives for establishing such "*Makers Asylum"* in the capable NITs and IITs of the country.

4.4 Human Resource Development

Skill development for software and hardware engineers is not one-time task, for significant research and development a constant updating is require. It seems crucial to establish separate training institute and research lab, that is open for all engineering students of public domain, however, using PPP such project oriented labs and training institute could be established during life cycle of project development. Motivation for skill

employees to perform in technologically changed environment is another important issue; employees do resist the change. Some motivation rather than penalty must be involved to the employees for switching in to new adventures. Due to rapid advancement in information and software technology 'IT engineering and education sector' is also needs to be developed. Such startup also needs to designed practical oriented course curriculum for IT engineers. To design such course curriculum, the industry expectation must be kept in mind, and hence suggestions and recommendation from competent private companies should be incorporated. The new software needs to make available free of cost to the education community, so that students, teachers and researchers become well-trained. In PPP model one big challenge is to maintain stability of knowledge worker, and to impose 'work discipline' to the government employees. This may regulate by providing attractive rewards similar to knowledge worker of private sector.

4.5 Right of IPR

Hardware manufacturing of electronic chip is governing under semiconductor law. The design and prototyping of electronic chip or circuit is a matter of copyright and ownership. Hardware manufacturing startups under PPP model have IPR sharing over products, model, design and concept. This becomes more relevant when new hardware or software products are developed with innovations and advancement. On the other hand, PPP structure is a partnership structure between government and private sector, which held responsibility to ensure infrastructure, technology and knowledge is made available to the society, so that further research could be proceed. Usually, ownership and copyright is carried for limited period of time, this period must expire after completing project or within short duration after completing the project. The contract term and condition must be clearly defined in this regards.
In software development scenario; the IPR and Copyright issued are more complex, because of software design and coding. If open source software is used for product development, the code must be revealed to the society and correspondent forum. In case of development using licensed version of software, it is although not necessary. Developing system software like Operating system and Compiler requires complex IPR strategies because the developed product carries long term mutual benefits and affects in market. The developed product also need maintenance and support for long time. Therefore, the issues related to maintenance and service must be included in contract and also enforced towards whole operating life of the product.

4.6 Regulatory& Rating Issues

It is general consideration that PPPs typically introduced against private parties, and this attitude is obvious due to certain reason. In PPP startup, it is observed that government has no SLAs (Service Level Agreements). For example, if private players make too profit after taking market risk, government re-negotiate the deal to maximize profit share. On the other hand, if the private party makes loss, government does not offer re-negation in deal or term & conditions. Presently, there is no regulatory body to settle PPP project pertaining issues related to infrastructure, ownership, IPR, SLAs or other conflicts. This kind of authority is required for providing a framework for PPP, so that Private parties may encourage investing in such startup projects.

A rating mechanism may be introduced for PPP projects so that participation of government organization and parties should be encouraged. The private parties enter into PPP venture with lots of calculations about the profitability and risk ventures. Such type of rating and recognition in

goodwill helps in raising capital for the private sector companies. Such rating also helps to select appropriate PPP partner that have good work discipline and experience in past projects. It also encourages employees of the PPP for better service and to develop trust in themselves.

5.1 Future Possibilities for Hardware Startup

India has started engaging startup with hardware community in a couple of years ago. Engineers are working hard to develop world class hardware products. **Hardware product lifecycle** starts with ideation, the concept stage to real engineering design that needs to be validated. Then complex manufacturing process will be started. Major problem in conceptualizing new hardware design is lack of experimental labs. Establishing such labs required long time investment, and therefore technology based substitutes need to explore.
Computer Graphics based simulation technique can be efficiently useful to reduce cost of experimentation, and prototyping. Conceptual designing of hardware may take leverage of digital designing process to create a virtual prototype using CAD/CAM based modeling. Engineers are using CAD / CAM based tools like Fusion 360 for design, creation, validation and manufacturing of hardware including programmable semiconductor chip. Fusion 360 is CAD, CAM, and CAE tool that supervise entire product development process. Some advance technology like 3D printing, can also be useful for prototype modeling & simulation of hardware devices. The key is to translate your creative idea into reality. These substitute and disruptive technologies can significantly minimize the costs of experiment and manufacturing, and also support designing more products.

Bangalore is known as the hub of software market. Many leading MNCs like Google and Microsoft have their headquarters in Bangalore. Some well-known companies also have their experimental labs for hardware prototyping in Bangalore, but the level of hardware R&D is limited re-engineering or modification of product. The southwestern city state Kerala is an emerging hardware startup hub of India. Hardware startups like Sector Qube, Exploride, Bisko, Mindhelix, Labs and Fin Robotics, all have their establishment in startup village near Kochi in Kerala. The PPP initiatives in this reference are appreciating but insufficient, more experimental labs (Maker's Asylum) is required across the country especially in north India.

Hardware startup is different from the software startups, because many factors involved in manufacturing hardware product for commercial purpose. There are possibilities of changes after making the product, even after it is released and installed. The up-gradation of software product is easy to handle, as a new version of software may be released for "update", but that's not the case for a hardware product; company has to take back the product, work on it and resend it. It is also possible that many changes could not be incorporated; and then the hardware products has to scraped and redo the whole process again. The two way distribution and market logistic is a batter solution of this problem. Expensive and exclusive hardware chip and the devices used in assembling of other machines are only sale by online medium. However government can impose booking of such product with proper verification to identity of purchaser.

5.2 Near Possibilities in Software Startup

The software startup has bright scope in comparison to hardware startup; but the challenges of software startup are tremendously different. It carries interesting challenges related to rapid changes in software technology, cyber security, analyzing e-commerce transaction and eavesdropping of government data. Indian

software engineers have proved their talent in service and consultancy sector. There are fair possibilities to encourage our engineers for developing Indianize system software such as Operating System, Web browsers, Search Engines, Network & Electronic Data Interchange (EDI) Protocols. Although we have good amount of trust on software technology outsourced from Microsoft, Google, MasterCard and VISA, but the business analytics tools can analyzed all our data stored in various server. India has potential to establish such software development organization with less efforts using PPP model. Government of India sincerely promoting use of secure Made in India software to reduce risk of financial data security. Government has successfully converted commitment in to reality, some example are: BHIM App, RuPay Card, M-Kawach etc. C-DAC and National Payments Corporation of India is presently working on more ventures to ensure IT independence.

Government has Launched BHIM app that is developed by National Payments Corporation of India (NPCI) and completely made in India application. It is secure and reliable payment tool that provide facility of payments through mobile phone. BHIM is interoperable with other Unified Payment Interface (UPI) applications. The UPI interface is regulated by the RBI and works by instantly transferring funds between two bank accounts using mobile phone. Government is taking appreciating initiative to promote use of BHIM app and positive results are begin to come. It is a big revolution in terms of financial transactions because, valuable electronic data could be keep secrete from external servers.

National Payments Corporation of India launched RuPay card as a substitute of international MasterCard and VISA cards. However, EDI protocol used in RuPay card is based on international technology. But due cryptography based verification RuPay Card is consider to be more secure. May RuPay card is consider as a first step towards substitution of financial services in India, but it encourage Government agencies to develop such software in the future.

Our software engineers also providing security applications for mobile devices. M-Kavach is a comprehensive security application for Android mobile phones. It protects various threats related to cyber security. It also protect to misuse of mobile services such as Bluetooth, Wife, Camera & personal data by preventing unauthorized access by Malware. Users can restrict the access to critical applications like mobile wallets. In near future similar security application or anti viruses will be made available for desktop machines as well.

6.0 Conclusion

Government's ambition is to establish India as manufacturing hub for IT products and give global recognition to the Indian economy. Presently, 16 percent of GDP is captured by manufacturing sector; government is looking possibilities to increase it by 25 per cent in 2025. This manuscript discus the hindering of IT startups and helps to analyze, prepare and plan a PPP model to run for successful manufacturing startup in India. PPP in Hardware and Software Startups may provide solutions to the constraints faced by industry and government. PPP model also helps in establishing infrastructure for such startups. It also provides solutions to the challenges discussed above. The professional attitude of private sector increase efficiency of government employees which, leads efficient government services and prompt response. The private sector needs to encourage for exploring their participation in startups ventures of software and hardware manufacturing. IT engineers are working well in software development ventures, especially for Electronic

Data Interchange (EDI). It provides data security in electronic fund transfer. It will be interesting to know that engineers are exploring possibilities of developing Made in India operating system, compilers and other system software. Although our Software Engineers are working excellent in area of software development; however two significant areas are still unconquered or better saying, is untouched by Indian software engineers: The development of Web browser and development of search engine. Academic institute like IITs and NITs are doing research in this area. Also our government, policy-makers, scientists, teachers and students are working hard for IT Independence of Indian Economy.

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