

INTERSECTIONS OF APPLIED INNOVATION AND “GLOBAL INCLUSIVE SCALABLE VENTURES” FOR INCLUSIVE ECONOMIC DEVELOPMENT

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This paper establishes the linkages and methodology of a unique process towards inclusive economic development by appropriately intersecting the available applied innovation and its concomitant culmination into a “Global Inclusive Scalable Venture” facilitated by an academic network. The resulting ventures lead to necessary scalability through creation of capacity and capability of the local community enabled enterprises, which can eventually solve complex problems of providing healthcare, energy, education, sanitation and environmentally sustainable lifestyles by initiating and utilizing applied innovation. Global collaboration through networking of businesses and government, catalyzed within a knowledge-sharing framework in an inspired university system that transgresses its usual role as a giver of education to an enabler of knowledge systems to provide an inclusive society as an outcome of economic development. This paper will elaborate on the structural and functional linkages of such an ecosystem created around university systems like that of IIT systems in India, with three base elements: Entrepreneurial Ecosystem, Academic Platform and Global Applied Innovation. It discusses the outcome of such unique experimentation in developmental entrepreneurship through ecosystem creation that addresses balanced economic development lead by investments and consumption, while providing deserved human rights to its citizens possessing respectable human development index in a sustainable mechanism.

I. INTRODUCTION AND BACKGROUND

The dynamic socio-economic scenario facing the nations post 2008 financial crisis, necessitates the need of novel tools and methods for empowering new age economic development. Developmental economists primarily espouse two theories of regional development, one led by Amartya Sen¹ (Harvard University) stressing on the need to invest more in social infrastructure to boost the productivity of its people and thereby raise growth, while Jagdish Bhagwati² (Columbia University) argues that only a focus on growth can yield enough resources for investing in social sector schemes. Considerable research has been conducted linking poverty alleviation to improvement of accessibility to healthcare, education, food, sanitation, housing, water, internet and sustainable lifestyle. It has also been linked to human rights and has formed the basis of an inclusive society³. Evidences and researches have already established the fact that entrepreneurship is the only realistic solution to empower people for fast forwarding economic development in either of the two scenarios, but are constrained by traditional market driven solutions that had faltered in pre 2008 conditions. Creation of new enterprises that are globally born and scalable while based in inclusivity and sustainability, inherently empowering people with the ability to solve problems through applied innovation, creating every day solutions that are beyond conventional deliverables of faster, better and cheaper, is the unifying developmental entrepreneurship methodology between the two developmental economic approaches.

However, it requires a paradigm shift of economic development driven by utilization of applied innovation for creation of new type of enterprises, GISV to create holistic economic development that meets maximum requirements of inclusive economic development. It is “Global” as a result of its genesis of problem solutions and sustainability through global collaboration to pull in the best of technology and practices. It is ‘Inclusive’ as its desired business output is to mitigate the local problems of the local community to attain a respectable levels of human rights and dignified living as its for-profit motives, yet technology and business enabled for sustainable solutions. It is “Scalable” because otherwise such solutions will not be implementable and available for the entire local community, with technology innovation driven business models creating paradigm shifts in socio-economic outputs as developmental entrepreneurship with global collaborations. The basic tenets of increasing economic efficiency and optimal allocation of resources are better served through the creation and assimilation of GISV. Such new GISV enterprises will increase a nation’s both capacities and capabilities towards development and sustainability with transformational implications for the society powered by uniquely positioned applied innovations.

The platform creation is pivoted around structural and functional linkages of such an ecosystem created around university systems like that of Indian Institute of Technology (IIT) systems in India, with three base elements i.e. entrepreneurial ecosystem, Academic Platform and Global Applied Innovation. A cohesive and comprehensive knowledge driven resource creation platform has developed on these three pillars. This resource creation platform with the capacity and capability to support GISV enterprises in various domains for market ready solutions for the basic societal needs i.e., drinking water, Low cost housing, affordable and accessible healthcare, inclusive education system, easily available energy, accessible sanitation and water resources etc. will be discussed. Various companies and educational institutes are directly or indirectly part of this resource creation platform in the IIT system, without which inequality will widen and the growth process itself will falter. Growth may raise inequality initially but sustained growth through unique GISVs will eventually raise enough resources for the state to redistribute and mitigate the effects of the initial inequality. In this experimental doctrine of applied innovation, sprouts the creation of global ventures by local people for solving unique local problems one at a time. This realistic and effective equalizer can be both cost effective and economically bringing together the two apparent conflicting methodologies of economic development through the powerful disruptive forces of applied innovation out of university systems cradled in the hot bed of GISV driven entrepreneurship.

The entrepreneurs with the vision of changing the society have been introducing GISV so as to cater the solutions for the basic social needs. It is the only cost effective way to solve the existing social problems by providing innovative solutions and add values to the welfare of the community. Powerful academic networks by business and technology practitioners through global collaborations with the primary focus of creation of GISV unique enterprises in this study is geared towards providing solutions for all, which is irrespective of socio-economic status of the people. Inclusiveness is the most important factor for the ventures through which they can provide available, accessible, affordable and quality solutions for the basic needs of the maximum number of people in the community. Needless to say that scalability of the proposed ventures has been found to be an important aspect for future sustainability. Identification of innovative ideas to provide low-cost solutions while maintaining the service quality has raised the question of sustainability of the ventures. This entire process of providing solution for local community problems through inclusive scalable ventures is associated with high risk of failure, but its unique mitigation by scalable inclusiveness has become an important subject of study among the entrepreneurship communities.

II. THE FRAMEWORK CREATION AND UTILIZATION

The appropriate economic growth model relevant to the socio economic conditions is a non-trivial situation and both Sen and Bhagwati as well their associates have well debated on this. Since independence and sovereignty of most emerging nations⁴ around end of Second World War, there has been intense soul searching on the best practises necessary to uplift the standard of living in the developing nations through creation of either free enterprises or state enterprises. Our search for a framework for GISV are based on the scintillating debate of appropriate economic growth models^{5,6,7} for an emerging economy like India, is equally applicable to low growth western economies. It is needless to mention that the emerging and developing economies needs to provide millions of jobs to its growing and aspiring youth population every year, where in India alone this is over 10 million every year. In spite of this stupendous challenges it is necessary to celebrate the poverty reduction from 45% in 1994 to 37% 2007 and eventually 22% in 2014, with a current goal of eradicating it by 2022⁸. Improvement in basic services is necessary with only fractional governmental spending than at current levels if global inclusive scalable venture creation process can be unleashed that will break the productivity barriers, delivery impediments and reduce inefficient distribution into a thriving delivery model powered by innovative collaborative solutions of local problems. Added emphasis is needed to create non-farm jobs and rapid increases in farm productivity so that jobless growth is replaced by inclusive sustainable manufacturing/ services job creation lead high economic growth for true poverty eradication in line with both Sen and Bhagwati models. Basic necessities may be classified in Fig 1 as follows:-

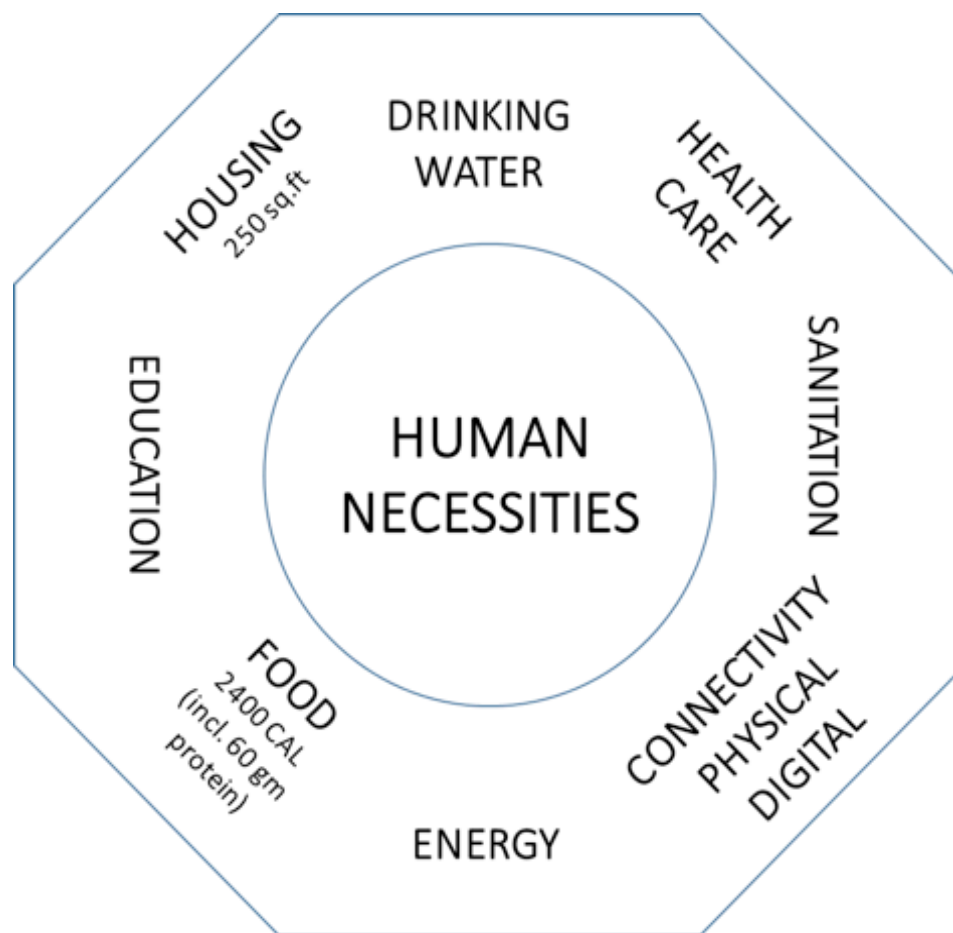


Figure 1: Mitigation of different aspects of human necessities for a GISV

Even the western economies facing stagflation and low economic growth rates has the risk of being

unable to support the standard of living of its future progeny. There have been age old interactive distractions of market and socialist economic doctrines by Schumpeter⁹, which lingered in the society for almost seven decades. Such dilemmas have been rekindled with debates on entrepreneurship, innovation and growth in North America¹⁰ and Scandinavia¹¹. Recently, Accenture¹² has been propounding a circular advantage of innovative business models to address the growing gap of resources and constraints faced by conventional business in today's changes in socio-economic scenarios. This is depicted in Figure 2.

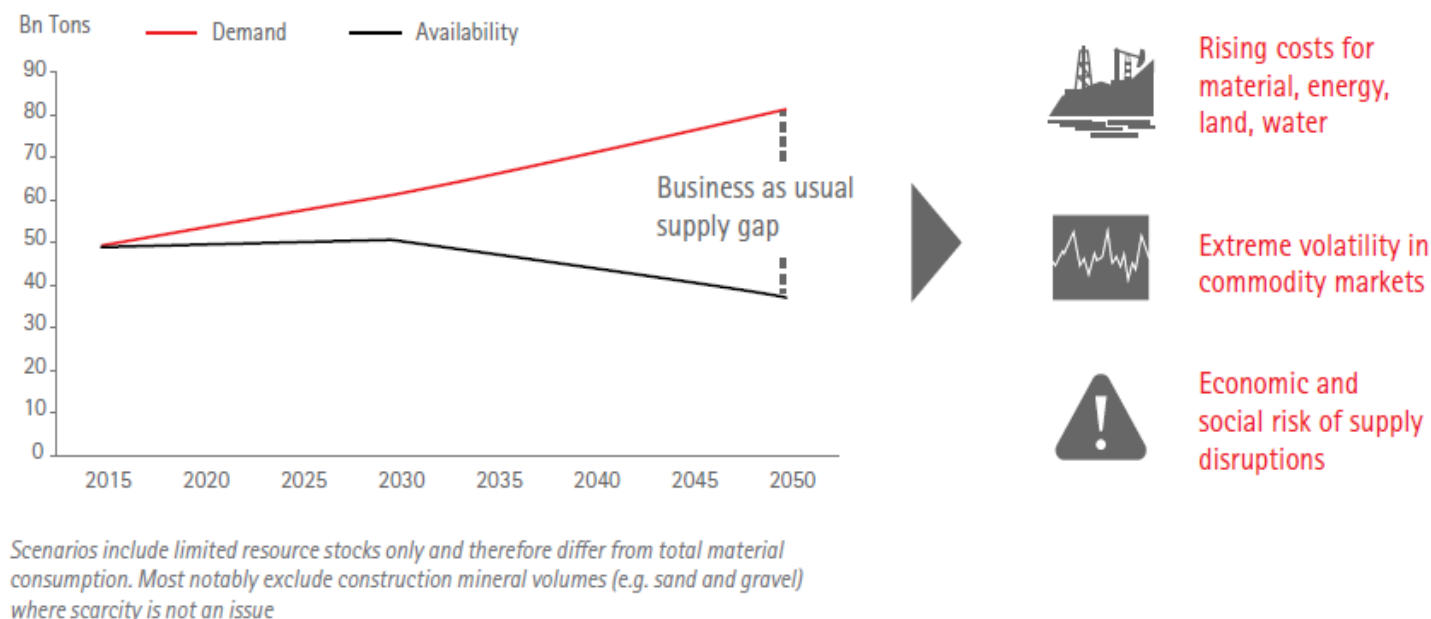


Figure 2: Resource Supply Demand Imbalance 2015-2050. Source Accenture¹²

Local resource constraints, lack of adequate manufacturing and service jobs, flight of manufacturing hubs to Asia, and higher cost of labor worsened by the demands of higher living costs have brought in the urgency for new models of venture creations, where such crippling bottlenecks will not stifle economic growth that is urgently required for a balanced world economic development through innovation-led economic models. Added to such uncertainty are the financial inconsistencies driven by pre-2008 Wall Street-dominated money and power relationships¹³ leading to financial crisis and the post-2008 period of lower growth. This necessitates a new innovation-led entrepreneurial model not akin to earlier existing practices of venture economics.

It is obvious that an inclusive growth approach takes a longer term perspective because of its emphasis on improving the productive capacity of individuals and creating conducive environments for employment, rather than its focus on income redistribution as a means of increasing incomes for excluded groups. There is an explicit focus on structural transformation and internal migration in the inclusive growth analytics framework as a result of this longer term perspective. It may be noted that, in developing countries, a significant part of growth is generated through reallocation of labor from low-productivity to high-productivity sectors. This necessitates a goal to identify a bundle of binding constraints rather than a specific binding constraint, and then sequence these constraints to maximize inclusive growth in a country. This should not be misconstrued that we go back to the "laundry list" approach, but rather to a limited set of constraints. However, sequencing of these constraints may require further in-depth studies of the feasibility and costs of specific policy implications. The typical "one solution for all problems" is no longer applicable even though such a business model has been the staple of big multinationals for last half a century. A product or a service solution developed for one geographical area is most likely not suitable for another area of the world due to differences in local underpinnings. Drinking water sup-

ply is one such problem whereby a solution is not geography independent in terms of water sources, aggregation and storage, distribution, waste treatment and natural harvesting. Therefore, involvement of local community in the role of entrepreneur, subsequent creation of a localised home grown solution supplemented by external technologies through global collaboration, and sustainment with appropriate scalability is the most viable solution instead of a copy/paste solution.

However, current embedded venture models based on conventional businesses are inadequate in providing entrepreneurial solutions towards the creation of necessary enterprises. A combination of new technologies, new collaborators, new stakeholders and ownership and newer end use based business cycles are necessary, which provided the genesis of GISV. It is nothing new to bring together the industry, government and academia in a grand alliance to create entrepreneurial ecosystems and has been well elaborated by Etzkowitz and Leydesdorff^{14,15} in Triple Helix Model. However, even in such collaborative efforts, the frameworks and missions are inadequate in addressing the teething problems of economic development in the post-2008 world, both in developed, emerging and developing economies as enumerated earlier. The author has observed the practical problems facing the urban/semi-urban/rural communities in the context of an Higher Education Institution (HEI) of international importance like that of Indian Institute of Technology, Kharagpur for over a decade, and then initiated, nurtured and fine-tuned the structural and functional linkages into a newer framework of Education-Enterprise model^{16,17,18} (E-E). The role of government is diminished by choice so that uninterrupted free market mechanisms and knowledge support from academic institution will result in creation of new GISV with many benefits. This will lead to better capital allocation, risk mitigation, pragmatic innovations and optimum delivery of basic needs to the society in disruptive business models with full buy-in of the local community as an output of developmental entrepreneurship. Such E-E model-based entrepreneurship ecosystem has been developed to facilitate new GISV creation processes around IIT in Figure 3 below.

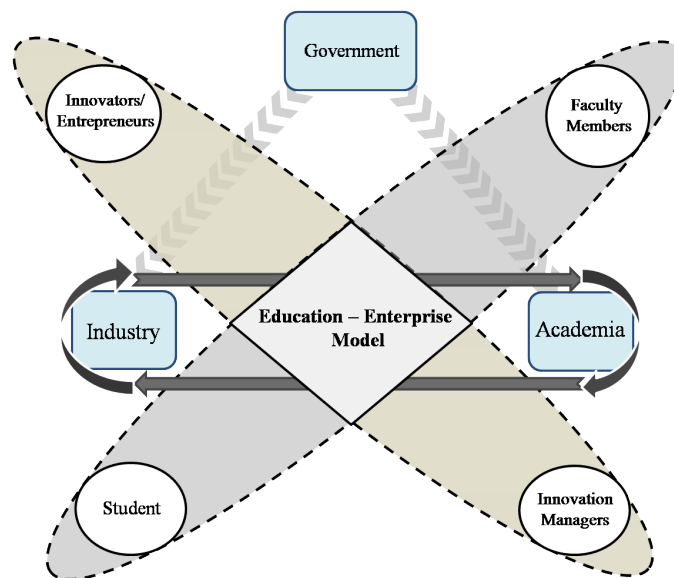


Figure 3: Collaborative Education-Enterprise Model of Business Creation

It may be noted that the academic platform of a renowned university plays the critical leadership role to bring together the disparate groups together consisting of entrepreneurs and customers in a dynamic relationship leading to formation of GISV ventures in our framework. This has been formalised by the author at IIT into a dedicated School of Engineering Entrepreneurship, where engineers, while pursuing their academic degree, are needed to put together a business plan for a venture, preferably for a GISV venture, get the necessary funding from the university under free competition among others and grow the venture into a reality before their graduation. Below is the functional diagram (Figure 4) for the novel entity.

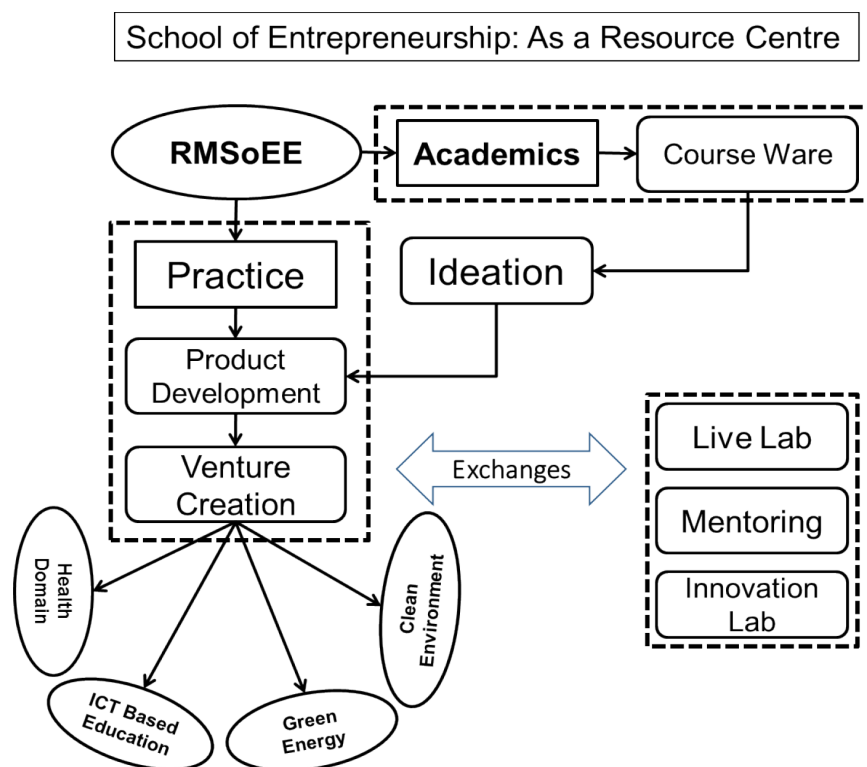


Figure 4: Role of the Entrepreneurial Academia

However, the university rules and regulations slow down enterprise formation process, more so in emerging economies with strong government—though our adopted Education-Enterprise model pre-requisites little influence of government. But such controls are difficult to avoid in reality at this moment. Therefore, a university based foundation, here Society of Social Entrepreneurs' (SSE) since 2006, run by professors and students acts as an interface within this framework. It facilitates the resourcing of appropriate applied innovations for enabling the enterprise, which attempts to address a particular local problem in the community through a technology business solution. The local community is deeply engaged and the students are brought towards the local community, much like an intertwined lasso. This connects the students from all across the nation at IIT to focus on the engineering and business solution of a local problem, which must address the particulars of inclusivity, scalability and globally born credentials. Unique solutions are created for such problems to drive the efficiencies at a higher level, what we call "beyond better, beyond faster, beyond cheaper." Scalability will be cost effective in such a localised solution, customized yet low cost and output achieved through pulling in all the local resources through healthy collaboration with the developed world.

It is quite common that student teams mentored by faculty and industry patrons will create a rapid collaborative framework along the tenets of the University of California and IIT based early stage Global Venture Labs. The student teams then create a prototype, deploy and understand the feedback from the local community and mitigate product features with technology and business innovations to improve scalability of the solutions and adaptability for the local population. Routinely, impact analysis is carried out and further optimisation measures are undertaken. Figure 5 explains the relationships with SSE within the framework and positions the formative stages of GISV through solutions for wide ranging problems through the application of innovation and entrepreneurship, under market economics. Such a solution transforms and transgresses the role of the academic institution from merely imparting education to providing caring solutions by embedding the local community. The true strength of GISV is sustained through this unique ecosystem. Such noble relationships impart true inclusivity to the venture

foundations as a n

development.

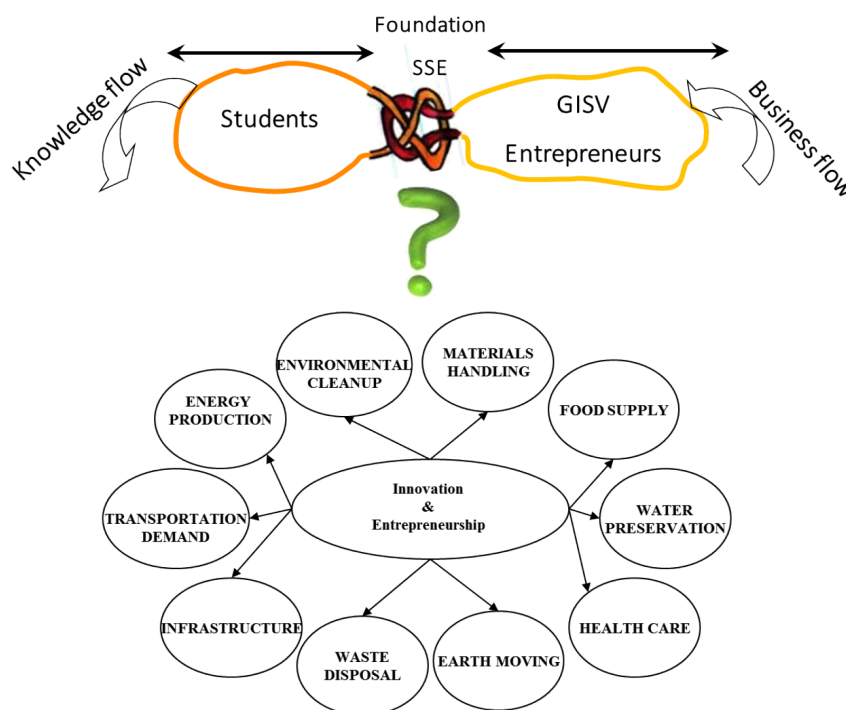


Figure 5: Role of the Interface Foundation: Society of Social Entrepreneurs

The entire system has evolved and been implemented around authors' research habitats around IIT Kharagpur and is driven by the visions of providing the solutions for the problems affecting the human development index in our country. All the promotion, incubation, training and academic programs are designed, developed and delivered to achieve this capability and capacity. This system has three base elements: entrepreneurial ecosystem, academic platform and one of the most successful incubation facilities in this country. A cohesive and comprehensive knowledge-driven resource creation platform has developed on these three pillars (Figure 6) as a key component of the framework to provide resources to GISV implementations. This resource creation platform has the capacity and capability to support new enterprise creations in various domains such as healthcare, ICT, product design and development, electrical, low cost housing and alternative energy in both traditional and social enterprise arenas. Various companies and educational institutes are directly or indirectly part of this resource creation platform.

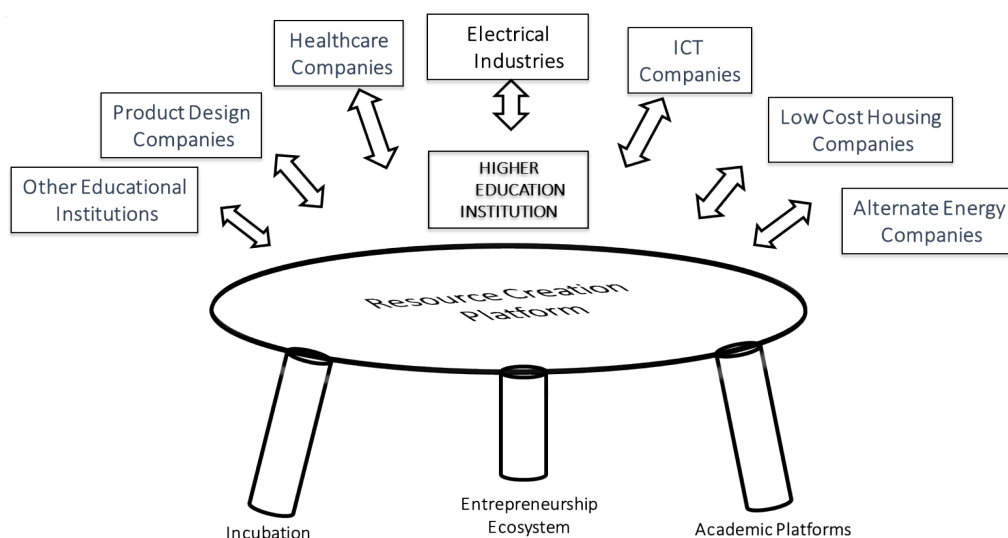


Figure 6: Concept of Resource Creation Platform in HEIs

Currently, this resource creation platform is leveraged for their inclusive and scalable healthcare and e-governance and e-education platforms in IIT Campus. Optimized juxtaposition of the efforts arising out of the resource platforms of the School with the Entrepreneurship Foundation SSE is further amalgamated by the local community-driven entrepreneurs, which is then integrated towards the creation of GISVs as shown in Figure 7. This process of venture creation by GISV is key to essential pathways of the new framework.

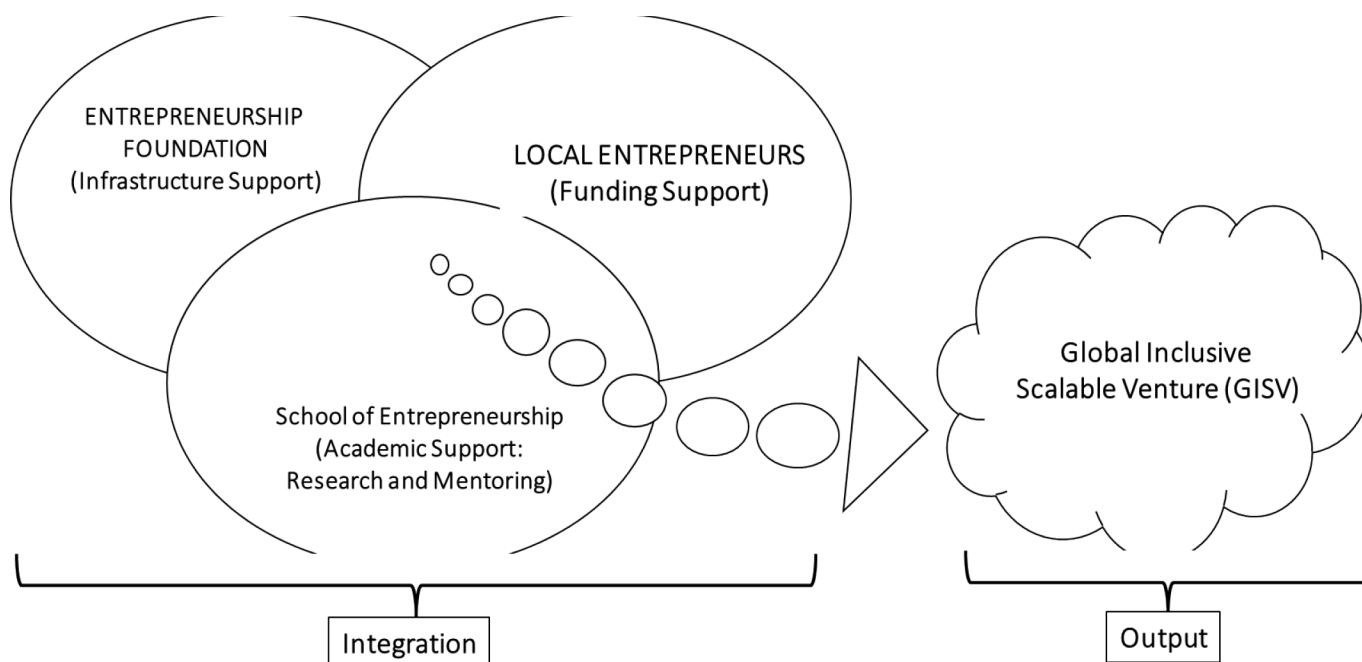


Figure 7: Process of venture creation by GISV roll outs

III. DEMONSTRATIONS OF GISV IN THIS RESEARCH

In the early stages of this unique live experimentation at IIT Kharagpur, four focus areas of interest were education, energy, environment and health (EEEEH paradigms) with the local area around the District of W. Midnapore, West Bengal, India. This semi-urban and mostly rural area is around 150 km south-west of the metropolis of Kolkata. This geographical area historically has been then political hot bed of Indian freedom wars, including the Maoist movements from the 70s and very recent farming land-owners protest movements. The population is poor, but seeks better education for their social upliftment and is in need of healthcare, better energy solutions, drinking water, sanitation and low cost homes towards improvements in their human development index. This makes the area ideally suited to the research experimentation toward a better economic growth model, which could be empowered by world class IIT as its epicentre. The foundation SSE played a key role as a facilitator of the stake holders within and outside the community. An education based GISV known as E-Turns was started in 2006 with local stakeholders from the adjoining rural area to educate the high school students in existing lagging schools to bring them at par with the best in digital content and trained local teachers, with IIT students taking a key part in content creation and teachers training¹⁹. This enterprise did very well until scalability became an issue as an early stage mortality to the GISV creation initiative. This was followed by incubation of several technology start-ups in IC design in an effort to create an IT cluster to attract high technology jobs in the local area for accelerated economic development²⁰.

With accumulation of experiences and global collaborations from University of California at Berkeley and Jyväskylä University, Finland, unique scalable health delivery models were experimented (Fig. 8, 9) by SSE²¹. This time the geographical area was expanded into west north-central W. Bengal within the districts of Bardhaman and Birbhum (150 kms from IIT), including the home base of W. Midnapore.

This initiative by the author was awarded the Global Academic Cup from University Alliance Finland. The financial awards and collaborative linkages with Jyväskylä University (Prof. Marco Seppa and Mari Suoranta) and the University of California at Berkeley (Prof. Ikhtlaq Sidhu) quickly culminated into a dedicated separate foundation Aegles Angels Foundation under the mentorship of the author and overall guidance from SSE including infrastructural support and early stage funding.

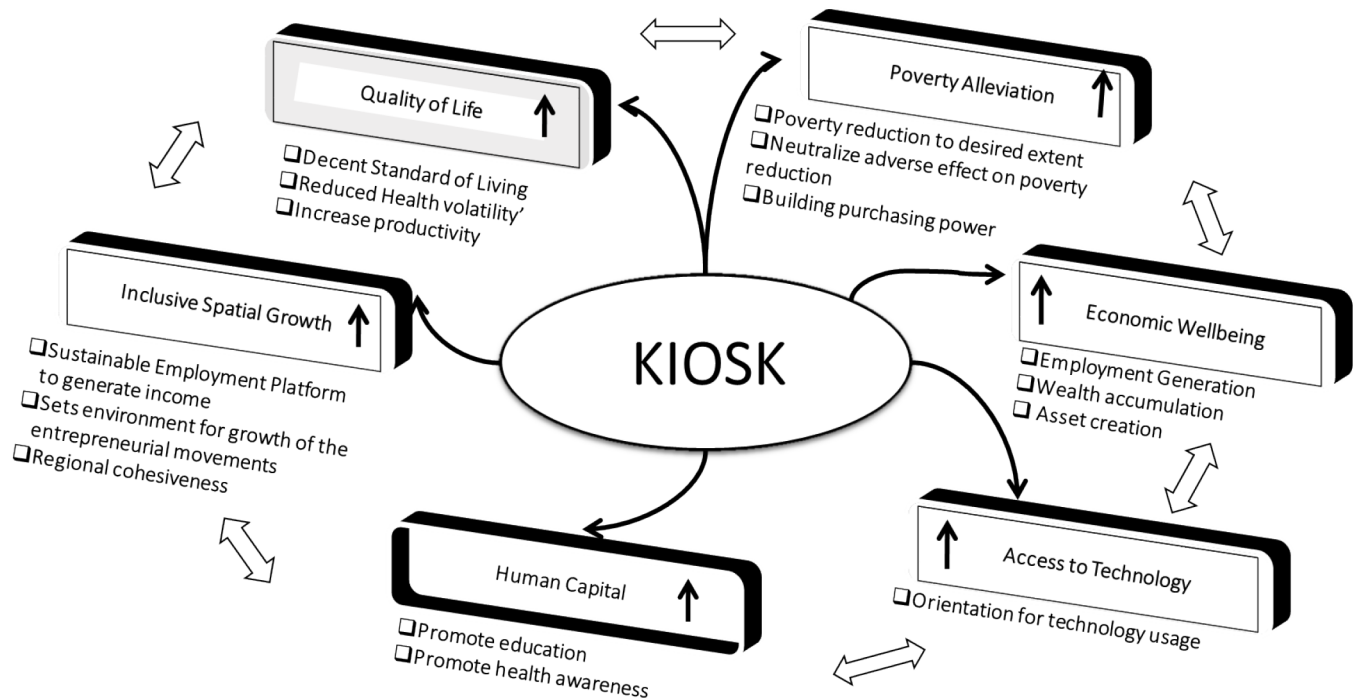


Figure 8: The unique health delivery scalable model based GISV

It expeditiously addressed the problems of availability, accessibility, affordability and quality of tertiary health care with emphasis on cardiac and diabetic patients, the two most prevalent diseases in India, due to its socioeconomic conditions. Appropriate Android-based interface tools were collaboratively innovated (hardware, software and service) and patients within the local community became the beneficiaries. The measured patient at the community kiosk was indexed dynamically using cloud services for data analysis and subsequent aggregation, and the patient was escalated to an appropriate hospital under a specific doctor according to the distance of the hospital from the patient, the severity of the disease and the financial situation of the patient within the business models of the service^{22,23}. Local entrepreneurs were the angels committed to providing basic measurements of the health condition at the kiosk, as well as transportation of the patient to the hospital, maintenance and up gradation of the network. The network was scaled up to 15 kiosks, 590 entrepreneurs, 3 affiliate tertiary care hospitals and about 500 patients serviced on a daily basis, a large proportion who otherwise could have succumbed to the disease in view of the grim situation of tertiary health care in India beyond the metro cities. These efforts were eventually constrained with further scalability issues, non-viable business partners and inexperienced entrepreneurs, lack of awareness about socio-economic benefits of GISV and better differentiated business models.

Considerable success brought in foreign partners interested in utilizing a similar concept to provide low cost housing, maternity care and education, insurance and other financial services to the rural population. More roll outs are expected to substantially cover more services through creation of more GISVs. There are many other GISVs (over 40 in healthcare, education, energy and drinking water) that were independently created out of this initiative and are currently under various stages of growth in their respective business cycles.

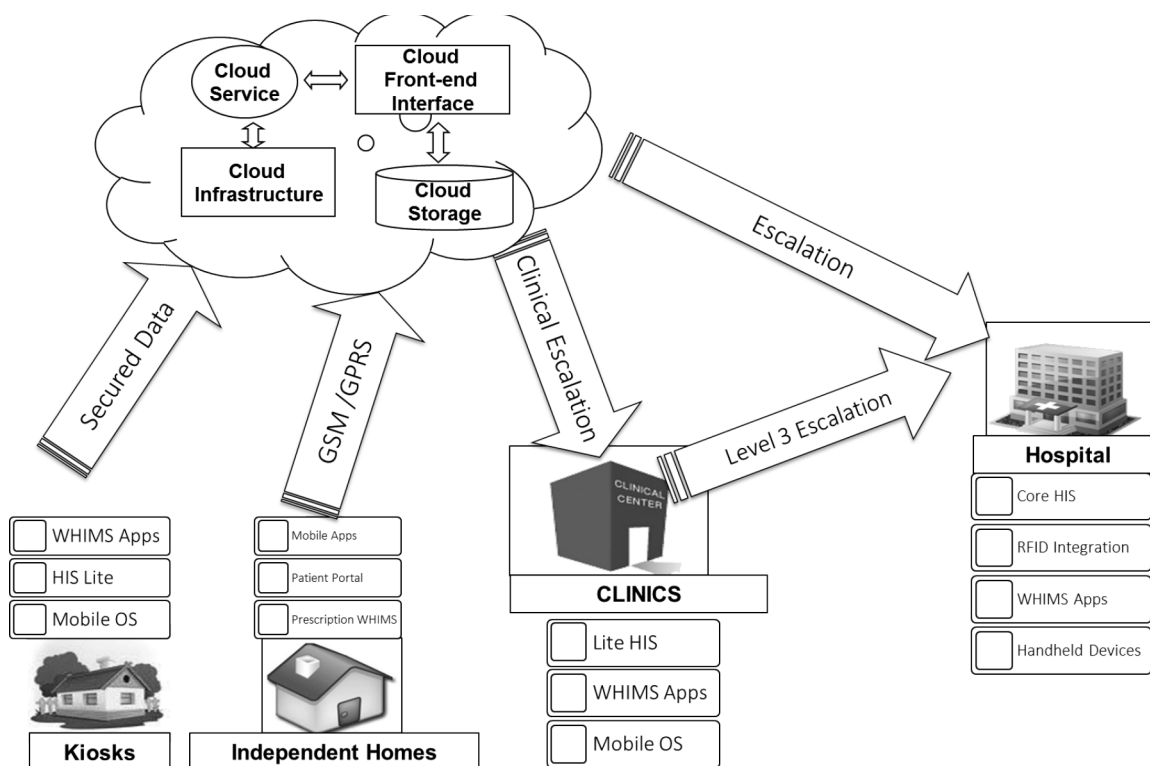


Figure 9: Architecture of the Health-based GISV in West Bengal, India

IV. CONCLUSION AND FUTURE DIRECTION

As we are undertaking impact analysis of the major initiatives, a lot more needs to be understood to accelerate the GISV formation and realize holistic economic development both along the lines of Sen and Bhagwati. Despite of our enormous efforts towards creating an entrepreneurial environment, our initiatives are not getting its desired academic and enterprise values. Though the government is working with the HEIs for better result, still these initiatives are not well accepted in the academic communities in India in comparison to the western economies. Our strides in this regard are neither automatic nor inevitable, therefore vigorous concerted efforts must be made to achieve the perfect intersection of GISV and applied innovation for inclusive economic development. We have successfully developed the framework that lead to creation of new GISVs, facilitated and mobilized by HEI through active interaction with private enterprises of the HEI and adjoining physical communities.

While investment driven growth is favoured by the current government in India instead of relying on current consumption driven processes, neighbouring China is doing a rebalancing by focusing on more consumption driven models while taking a backseat from the much dependable investment driven process that was pursued by the Chinese government for last 30 years. In either case, both the countries and other emerging nations as well as previously explained developed economies need to focus on GISV lead venture creation process which will lead to an inclusive world free of poverty and economic growth that provides a balanced world for our progeny with respectable human development index for all. We need to prioritize a restructured entrepreneurial society through setting up of localised distributed GISV as the backbone architecture of economic enterprise that will solve the local problems through local people by application of innovative global solutions to create an economically vibrant, globally collaborated and integrated inclusive society.

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Lab as early stage global incubator between Finland (University of Jyväskylä), USA (Univ of California at Berkeley) and India (IITKGP). He has set up unique health services delivery model collaboratively with University Alliance Finland, Alto University, University of California at Berkeley and super-specialty hospitals in W. Bengal, for all-inclusive globally scalable personal-wellness program, for which he was awarded the prestigious “Global Academic Cup” from EBRF Europe in Nov 2010. Prof. Biswas has graduated several Ph.D students, numerous masters’ students, authored over 170 technical papers, books and holds patents.