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Academic Entrepreneurship in India

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Abstract

Universities acting as catalyst for entrepreneurial activities are central to the phenomenon of academic entrepreneurship. Lack of appropriate academic entrepreneurship models has hindered the smooth transfer of knowledge/technology from university to industry in India. The study explores the synergy between the academia and industry through academic entrepreneurship which is crucial to develop a world class higher education system. This paper attempts to understand the processes and stages of academic entrepreneurship activities besides focussing on education and entrepreneurship in India. Further, it discusses a few models and frameworks which integrate academic entrepreneurship, economic development and education in developing countries. The paper concludes with the argument that it is essential to restructure education/research to enable its integration within the economy which nurtures entrepreneurship.

Keywords: Academic Entrepreneurship, Education, India, Universities

Introduction

Academic Entrepreneurship (AE) is a broad term used to refer to the efforts and activities undertaken by universities in collaboration with the industry partners for commercialising the outcomes of faculty research (O'Shea, Allen, & Chevalier, 2005). It includes all modes of knowledge/technology transfer that occur in a university such as start-ups, new firm creations, patenting, licensing, formal research collaboration, university, academic spin-offs, etc. Conventionally however, the expression ''academic entrepreneurship'' is used to refer to a "university spin-off" or an institutional transfer of research, development and technology to innovate new ventures, etc (Shane, 2004).

Academic entrepreneurship is important primarily because pure research has its own limitations as the prototype research may not yield significant commercial product results. Secondly, industry interface with the universities becomes essential to prepare students for job opportunities. The possible platform to explore such interface and interactions is through academic entrepreneurship activities. If designed properly, it can serve academicians, students and industry in their research endeavour. The research could be conducted on existing products or collaborate to create new products for overall benefit of society. Often, through AE, isolated research and experimentation on various products in university/research centres can be integrated, the outcome of which can be used for larger societal benefits (Sharma, Bhattacharya, & Vidyapeeth, 2014).

Knowledge/ Technology Transfer from University to Industry

Fig. 1 shows the intersection of university and industry in a knowledge transfer process. The process involves invention/innovation, venture creation and institutional transfer of knowledge/technology from university to industry. The core activities of university include research and teaching while the industry's core activities focus on profits. In universities, knowledge exists for the sake of knowledge while industry endeavours to harness knowledge into profit. While industry enjoys the

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academic freedom and aspects of open discourse, there is an element of confidentiality and limited public disclosure while indulging in activities related to industry. The synergy between the academia and industry could create dynamic environments resulting in application of the knowledge created by the university besides generating revenue through commercialisation process of the new technology or knowledge.

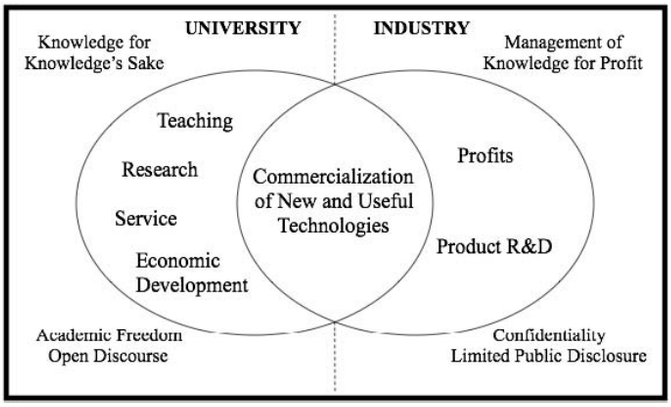

Fig. 1: Knowledge Transfer from University to Industry

Source: Severso (2014)

The knowledge/technology transfer from universities for venture creation may take different forms such as: (1) university spin-offs, (2) technology licensing agreements, (3) new venture ideas incubated and supported by university's technological knowledge and expertise. University spin-off is an institutional transfer of research, development & technology to start innovative ventures (Shane, 2004). It involves the creation of a new business around the university's inventions and innovations, often with the extensive involvement of the research faculty concerned. While the university retains the ownership of the spin-off, it may choose to create the venture under the inventor-entrepreneur model (Radosevich, 1995), where the faculty or researcher assumes the role of an entrepreneur, or the surrogate or external entrepreneur model, where an external entrepreneur is co-opted for developing and implementing the project. The latter model is often necessitated by the lack of entrepreneurial competencies on the part of researchers, who are unable to effectively deal with the challenges of the start-up stage (Vohora, Wright, & Lockett, 2004). Technology licensing agreements are an option for universities to commercialise their innovations when they do not want to have the hassles of managing a business. So, they transfer the rights of commercialising their innovations to an external agency for continued royalty payments or for a fixed fee. A third mechanism for academic entrepreneurship is to provide incubation support to new ventures based on innovative ideas from within or outside the system with the help of its technology resources and expertise.

An essential feature of university spin-off research is that the university faculty or researcher assumes the role of an entrepreneur and it is known as the inventor entrepreneur model (Radosevich, 1995). It becomes a surrogate or external entrepreneur model when an external person (who is not the original academic inventor), acquires the rights to develop university technology and enacts the role of an entrepreneur. Spin-offs usually face challenges during the early stages since they originate from a typical non-commercial university context (Vohora *et al*., 2004). It includes challenges such as developing a business model that match technological and market needs (Ndonzuau, Pirnay, & Surlemont, 2002), mobilising financial and human resources, finding a target market, etc. Creation of Lycos (Internet search engine), Genentech (biotechnology firm) and Cirrus Logic (semiconductor) are some examples of well-known university spin-offs from American universities. There are several classification schemes for university spin-offs. For instance, Fini, Lacetera, and Shane (2010) classify spin-offs based on whether they were a result of patented technology or an outcome of technology owned by inventor's university. Wright, Clarysse, Mustar, and Lockett (2007) classify university spin-offs based on the market goals and identify three types, namely, venture capital-backed spinoffs; prospector spin-offs, technology-based with less immediate market potential, and lifestyle spin-offs established by academicians with consultancy orientation. Nicoloau and Birley (2003) make distinctions between (1) orthodox, referring to firms whose technology and inventors spin-off from the university; (2) hybrid, referring to those firms whose technology is licensed but the inventor remains a university employee while having a relationship with the firm; and (3) firms with which the inventor has no connection.

Academic Entrepreneurship: A Review

The literature on academic entrepreneurship has been fragmented focusing either on individual attributes or on the organisational structure and systems which promote entrepreneurship activities. Table 1 displays the findings of selected empirical studies on academic entrepreneurship.

Table 1: Selected Studies on Academic Entrepreneurship

Authors	*Data Sets*	*Key Results*
Link and Ruhm (2009)	National Institutes of Health SBIR Project and Firm-Level Data	University's involvement in research enhances the probability of successful commercialisation
Vanaelst, Clarysse, Wright, Lockett, and S'Jegers (2006)	Start-ups and Entrepreneurial Team Members	There was active involvement of researchers in the first phase of the spin-off exit. Some faculty members worked part-time in a technology development role for spin-off, although they remained with the university.
Lockett and Wright (2005)	TTOs and University-Based Start-ups	There is a correlation between the university's rate of start-up formation and with its expenditure on intellectual property protection, the business development capabilities of TTOs, and royalty distribution formula.
Link and Siegel (2005)	AUTM, NSF, US Census Data and Interviews	Land-grant universities were more efficient in technology transfer.
Lach and Schankerman (2004)	AUTM, NSF, NRC	Higher the royalty share for faculty members, greater was the licensing income.
O'Shea *et al*. (2005)	University-based Start-ups	Past success of the university in technology transfer was the key determinant to measure the rate of start-up formation.
Di Gregorio and Shane (2003)	AUTM Survey	Faculty quality and the capacity of the university and inventors to take equity in a start-up, in lieu of licensing of royalty fees were the two key determinants of start-up formation.
Bercovitz Feldman, Feller, and Burton (2001)	AUTM, Case Studies and Interviews	Analysis of organisations' structures for technology transfer at Duke, John Hopkins, and Penn State.
Franklin, Wright and Lockett (2001)	TTOs and University-based Start-ups	There should be a combination of academic and surrogate entrepreneurship to launch successful technology transfer start-ups in the universities.

(Source: Extracts from Siegel, 2012)

Besides the studies mentioned in Table 1, other studies reveal that universities that generated most start-ups had strategies that were well-defined regarding the formation and management of spinouts. They tend to employ surrogate (external) entrepreneurs, instead of academic entrepreneurs to manage the entire process (Lockett, Wright, & Franklin, 2003). Similarly study by Degroof and Roberts (2004) examined the significance of university policies essential for academic entrepreneurship to flourish.

Academic entrepreneurship cannot be confined to one single activity; rather it is a continuous process comprising in its fold series of events (Wood, 2011). It has several multi-layered stages and phases such as *(*a) innovation disclosure and intellectual disclosure stage, (b) awareness and securing industry partnership stage, (c) commercialisation mechanism selection stage, and (d) commercialisation stage. Often there is a tendency among the scholars to study academic entrepreneurial activity at one particular stage or understand the domain of academic entrepreneurship around its specific parts of commercial process. For instance, there is a substantial entrepreneurial literature focusing specifically on the role of Technology Transfer Office (TTO)[1] in campuses. There are also a number of studies particularly on spin-offs, licensing, patenting, university-industry collaboration, etc. While

[1] TTOs in universities are responsible for implementing the Bayh-Dole Act by licensing inventions of university researchers to industry. There are several challenges that university technology offices encounter during technology transfer from universities. Often, there is asymmetric information in the valuation of inventions which hinders smooth technology transfer between university and industry.

these specific studies on commercialisation processes are important, it is essential that they are integrated with other aspects and stages of entrepreneurial activity for a holistic understanding. Most of the studies deal certain aspects of entrepreneurial activity in the university campus, thus missing the big picture. Besides, there are not many evidences of literature on academic entrepreneurship that focus on economic development especially in Asian countries.

The idea of AE has become popular in Asian countries only in the last decade. Policy makers, educationalists, and corporate leaders have become increasingly aware of the potential of AE and the benefits it can generate to the society. On the other hand, academic entrepreneurship has significantly developed in western countries and its existence has been since the early 1980s. For instance, during early '80s, about 72 percent of high technology companies in Boston were the results of the technologies originally developed at MIT. Likewise, about 40 percent of all high technology companies established in France between 1987 and 1997 were the results of university spinoffs. About 17 percent of the technology companies in the Cambridge area of the United Kingdom were university spinoffs (Shane, 2004). It is clear that academic entrepreneurship has contributed to the growth of the US economy in several areas such as computer/software, management consulting, education, networks (radio, TV), news and entertainment, health care, finance, etc. Given the many advantages, AE is massively promoted in many university/colleges of the western countries. Several models/frameworks have also emerged which indicates the university-industry partnership/interface to develop prototypes which later will be converted into products.

Academic Entrepreneurship Models

Based on the studies of various spin-offs, Sharma *et al*. (2014) discuss the impact of academic entrepreneurship in the current times. They have examined how the theories of academic entrepreneurship will increase profits and benefit university spin-offs formation process. The authors have used the data from government-sponsored technology business incubators and contributions to national growth. Their research indicates that the incubation process positively contributes to the entrepreneurship. They suggest the need for deeper and extensive collaboration of academicians, corporate and entrepreneurs to build a culture of entrepreneurship. The authors conclude stating that the AE has a huge potential to facilitate the expansion of global economy. Financial resources alone are not sufficient for AE to thrive and flourish in a university campus. More than financial support and the infrastructure, more essential are the individual talent, urge, zeal, and passion to work towards creating an entrepreneurial ambience.

Many universities at a global level have adopted the AE model at their own convenience to suit their organisational and institutional context. The presence of TTOs in many of the universities in the US and Europe is an evidence to such efforts suggesting that there are initiatives undertaken to inculcate the spirit of entrepreneurship in an academic platform. TTO's office is central to the entire technology transfer process. Most of the US and Canadian universities rely on the TTO's office for identifying the university spin-off opportunities (Sharma *et al*., 2014). The TTO usually undertakes the following tasks:

(a) Compilation of research papers/innovation/discovery from academicians.

(b) Selection of potential papers/innovation/for patenting.

(c) Seeking IP protection approval from the Technology Transfer Committee.

(d) Filing of the IP protection for the innovation.

(e) Exploring the commercial potential of the innovation/research.

(f) Promoting the commercialisation of researches.

(g) Identifying the secure industry partnership/collaborations.

As a consequence of Bayh-Dole Act in the 1980s, US universities can own patents of researches funded by the government. This benefits both universities and researchers to gain from the commercialisation process. The system supports and aids both private sector and the government to help the universities to transform more research patents into commercial projects. It is believed that with the passage of Bayh-Dole Act[2], US universities have made accelerated progress in knowledge transfer,

[2] The Bayh-Dole act, enacted on December 12, 1980 in the United States provided a uniform patent policy among many federal agencies that fund research. The act provided a mechanism through which IP generated under federal research grants could become the property of the university, rather than the funding agency sponsoring the research. The act has been influential in alluring many universities in the United States to engage in technology transfer and commercialisation activities (Mark-man, Phan, Balkan, & Gianiods, 2005). It has significantly contributed towards accelerating commercialisation activities of universities and diffusion of technologies developed in research labs (Siegal et al., 2007).

technology commercialisation, and activities related to academic entrepreneurship. The Bayh-Dole Act basically helped US universities to register patents for commercialisation and eventually benefit the public. Many Asian countries are seeking to learn from the US experience, the ways to augment the flow of knowledge/ technology from university campuses towards industry to boost regional economy.

Academic Entrepreneurship in India

Several efforts are made by Indian government bridge academics and industry gaps through collaborative polices and action. But, it is also noticed that not many industries support university-driven research projects and continue to have a conventional mindset of viewing universities as just teaching and research schools. Even the few opportunities for collaborations through consulting would involve small and medium sized projects (Sharma *et al*., 2014). IITs in India have set up incubation centres for research activities within their campuses to build entrepreneurship through the involvement of angel investors and venture capitalists. DST (Department of Science and Technology) also play a crucial role in supporting research activities in colleges and universities. There are efforts made by DST to focus on indigenous product development activities. Yet Indian universities have a long way before they perfect the management of intellectual property rights.

The universities in the US and Europe have already established formalised practice models and institutionalised mechanisms to manage the different forms of technology commercialisation. For instance, in the western model, TTOs are well known, whereas in India and other developing countries, such kind of similar model in terms of systems, structures and infrastructures to regulate the technology transfer do not exist. However, the presence IPR cells, FIIT in IIT Delhi, IRCC in IIT Mumbai, and Research Park in IIT Madras etc have undertaken the task of regulating technology transfer and related activities. IPR cells are established in almost all the IITs and also in some of the IIMS. They are set up considering the potential for the development and growth of IPR education, training and research. Foundation for Innovation and Technology Transfer (FITT) in IIT Delhi is an industrial interface of IIT Delhi. It aims at effective interface with the industry to sustain and foster commercialisation efforts in the IIT for mutual benefits. Industrial Research and Consultancy Centre (IRCC) in IIT Bombay, acts as an interface between industry and the institute, by coordinating sponsored research and consultancy projects. It undertakes all activities related to IP protection and technology transfer. The activities of IRCC are also extended to administrative, technical and account sections. The technical section consists of a chief technical officer along with two technical officers and supporting staff. The 'Kanwal Rekhi School of Information Technology' was set up as an incubator in 1999 and has been an important source of creating an environment for entrepreneurship. This initiative by IITB which was supported by DST has encouraged many institutes to set up incubator schemes. Further, IITB also set up an 'Independent Society for Innovation and Entrepreneurship' (SINE) in 2004 to boost the transfer of technologies from IIT and commercialise R&D. Similarly, IIT Madras has set up 'Research Park' with the mission of creating a collaborative environment between the university and industry. It intends to leverage IITM's technological capacities to innovate and promote entrepreneurship by developing ideas into incubating products and processes; processes into ventures; and ventures into enterprises. Centre for Industrial Consultancy and Sponsored Research (CICSR) at IIT Madras is responsible of facilitation, promotion, coordination and administration of all sponsored and consultancy projects of IITM faculty. The centre also handles the technology transfer and technology commercialisation activities such as licensing, start-up, incubation, etc.

Most of the firms incubated from IIT Madras are by students and partners outside the institute. Midas Communications was the earliest firm which got incubated from IITM. It designed integrated circuits (IC) in collaboration with US-based Analog Devices and has offices and outlets in some 25 countries. Other incubated firms partnered with global ICTs are Intel Corporation and Polaris Software and national firms such as Electronics Corporation of India. The successful IITB incubators include Geosyndicate Power Private Limited. The technology transferred involves the non-conventional energy mechanisms and delivers high-efficiency but low-cost electricity in Indian power sector markets. In IITB, 50% of the spin-offs are from computer science, 18% from tele-communication, 14% from energy, 7% from mechanical sciences, and 11% from others. By March 2009, 33 SINE companies were formed from IITB of which 14 have graduated, 15 are residents at IITB campus, and 4 incubation units did not succeed. Software firms which incubated from IITB

include Voyager2 Infotech, Myzus Technologies, Seclore Technologies, Eisodus Networks Pvt. Ltd.

Education, Entrepreneurship and Economic Development

There are many entrepreneurship models for economic development. The model described here is based on the Schumpeterian economic development theory, which argues that the entrepreneur is a key driver of economic growth and development. The model is hence necessity-driven, opportunity-based, resource-enabled and result-oriented; that which is essential to improve the income-earning and wealth-creating capacity of individuals, firms and the economy. Likewise, it provides opportunity to create globally marketable value-added products. It is enabled with natural resources that serve as basis for innovation and entrepreneurship. It is result-oriented in its own way as it targets economic development of the nation. See Appendix 1 for the model (Olutuase, 2014). This model consists of four major facilitating roles/ functions namely *tailor, integrate, channel,* and *evaluate,* due to which it is called TICE. It also has five key pillars namely 'window', 'network', 'corridor', 'product', and 'outcome'. The window in the centre refers to the spectrum of economic advantages and opportunities which need to be exploited to realise the economic ends such as rapid industrialisation process, higher standard of living, etc. However, these opportunities need to be investigated before being exploited. The model is used specifically to drive economic development strategy in developing countries and hence the key assumption underlying the model is that most developing countries are rich with vast natural resources which remain unexploited and can be tapped for economic opportunities. Hence, this model considers natural resources as the basis and bedrock of the economic window. The other quadrants that complete the economic window are education & research, global dynamics, and socio-economic needs. It is clearly indicated in the figure in the centre.

Entrepreneurship in India has the potential to tap natural resources and provide impetus for economic growth. The developing countries which own these natural resources have a cost advantage if they are able to harness these resources and translate them into economic benefits. As a result, they can reduce their import of finished goods at high cost and also reduce export of minerals and other products at low cost. Economic benefits could be innumerable such as creation of jobs opportunities, increase in revenue generation, boosting of the local economy, etc. On the other hand, by increasing the export of natural resources to developed countries and import of finished products at high cost will not aid the developing countries in generating more income. Hence, natural resources if properly exploited can enable the developing nation to have a cost advantage. Similarly, education and research are fundamental for any nation. The importance of education and research in accelerating the development of a nation cannot be underestimated. This model recognises education and research as fundamental resources for sustainable development. The second quadrant of the economic window recognises that education & research is a potential resource for developing indigenous technology of know-how if it is orientated towards exploiting the rich natural resources. Given the fact that in India, the large percentage of population constitutes youth below the age of 40 years, and given the potential of indigenous resources and technology in the country, the model is a good fit for India. However, this may require a strategic focus on education system and its functioning so that it is based on excellence besides local opportunities and local support system. Higher education policy needs to be framed keeping such things in mind. It is believed that the outcome of such a model where education/research is oriented towards exploring the nation's natural resources will lead to flow of product ideas which may require further development followed by commercialisation. In case of India, the due attention paid to skill-based vocational learning and education in the recent past would be appropriate. If the core skills and knowledge result in successful entrepreneur drive, this model would be suitable for the country. The third quadrant of the economic window namely the 'global context' manages bilateral relations and also facilitates the regional, sub-regional and continental integration. If the relations are systematically managed, there could be sea of opportunities which could be tapped from the synergy which results from such integration and diplomacy among nations. For India, SAARC nations could be the source of such potential synergy. The fourth quadrant of the window refers to the 'socio-economic needs'. The drive to improve the living standards and employment opportunities, etc. is common to all developing nations in their quest for survival. This model in a way also suggests that the entrepreneurial tendencies are within such human

quest for survival in developing nations. For example, search for means of livelihood when there is high rate of employment may inspire and lead an individual towards the entrepreneurial path. The situation may make him/her think critically which could constructively contribute towards starting a new enterprise. It is argued that many great entrepreneurs are born as a result of such a situation. This view co-relates with the classical views of many scholars (Olutuase, 2014).

'Network', the second pillar of the model suggests that realising sustainable economic development would depend on collaboration. The network and collaborations have to be established, coordinated and explored effectively in order to harness the opportunities presented by the window. The five key players involved in the entrepreneurial network include government, individual entrepreneurs, education/research, firms foreign and local, and foreign direct investment (FDI). The role of the government is likely to change from that of a custodian of the nation's economy to that of a facilitator. Only then, entrepreneurship can thrive leading to free enterprise and competition. For a nation intending to derive results with this model, it is essential that its economic development policy is formulated on these lines. The role of individual entrepreneurs forms the core of the network as the country's wealth and dynamism depend upon the competitiveness and capabilities of its entrepreneurs. Hence, the economic development plan should focus on the individual entrepreneurs spread across the various sectors of the economy. Education and research remain the key players in the entrepreneurial network. This sector will aid in discovery of new technologies and thus drive the economy. Funding of this sector should not be left exclusively to the government, rather corporate world, industries and firms should get involved. Similarly, the TICE model considers firms and FDI to be crucial to the entrepreneurial network (Olutuase, 2014).

'Corridor' being the third pillar of the model refers to the concept of value chain. From a macroeconomic perspective, the entire economy can be viewed as a complex value-adding system and it must be well-structured and coordinated to be considered as a 'producing economy'. Various sectors of the economy namely transport, manufacturing, energy, banking, communications, marketing, etc. must coherently work together based on the government policies and programs. Often, there are contradicting policies from regime to regime and at different levels which actually hampers the 'corridor' in the economy. From microeconomic perspective, value chain refers to a set of interconnected value-creating activities performed by the organisation from procurement of productive inputs up to the marketing of the end products to the consumers. The corridor has to be clear throughout for ideas and action to flow. The 'product' which is the fourth pillar emphasises that if education/research is tailored and oriented towards developing country's vast natural resources, then outcome should ideally result in a mix of products which can be developed and marketed to the rest of the world at competitive cost advantage. Hence, according to this model, products and its development depend upon the focus and orientation of education/research. In India, besides software products and services, skilled human resources, the strength lies in the indigenous and spiritual resources given the ancient heritage, etc. The call of the hour is the need to trigger and direct our education as well as research so that these areas are exploited and explored which should ideally result in end products creating value at a global level. Finally the 'Outcome' acts as the last pillar in the model. In general, developing countries hope to reap economic benefits such as improved living standards, better infrastructure, stable economy, etc. Although these are 'felt' outcomes, the pillar of outcome in 'TICE' model besides the above assumes the following; increase in the production of indigenous high-tech goods/services, platform for wealth creation/ownership at the micro level (through entrepreneurship and enterprise) with an objective to reduce poverty and increase the per capita income. It also includes home sourcing of products for local consumption and a well-diversified economy with strong industrial base. The framework needs to be evaluated regularly. Continuous evaluation of rules & regulations, polices, programmes, infrastructure, etc., constitutes the core function of the TICE model. It also includes periodical up-gradation of the framework adopted to yield positive results that include both economic strategy cum development (Olutuase, 2014).

Education and Academic Entrepreneurship

In the context of academic entrepreneurship, TICE model becomes relevant. Education/research is critical and core to the functioning of the entire model as it should be tailored to exploit the natural resources. First, the education/research sector of the nation should be

re-structured so that it would impart entrepreneurial skills. This task should be introduced at every level so that students graduating at each level are equipped and prepared to establish their own start-ups. It would be ideal if these start-ups contained indigenous product ideas, process and adapted technologies to add manufacturing value to natural resource available in abundance. While re-structuring the education and research sector, it should be ensured that factors such as performance, accountability and reward structure are also embedded within it. Basically, it should lead to excellence and innovation. Secondly, synergies sprouting from the entrepreneurial network such as collaborations, research grants/funds technical expertise, etc. should be effectively channelled to develop new products conducive for local consumption and export. Essentially, it should enable the economy to grow within the framework of entrepreneurship. Thirdly, the education/research sector should be well-integrated into other economic sectors such as governance, manufacturing, business, financial, etc. so that the country's intellectual insights are best used to harness the natural resources. Appendix 2 shows the way to re-structure the education/research sector (Olutuase, 2014).

Scholars such as Sharma *et al*. (2014) have worked on AE model suggesting the possible ways to increase the national economic growth. The model is an attempt to build an overall economy with the help of entrepreneurs. Given the socio-cultural and political context, one can create environment that integrates the settings of national framework and the existing entrepreneurial conditions. Such a framework provides and nurtures (a) entrepreneurial opportunities, (b) entrepreneurial capacities, (c) major established firms, and (d) small and medium firms. In an ideal situation, it should eventually result in more business churning finally adding to the national economic growth. AE model offers a platform through which many stakeholders of the society and economy such as government, universities, industries, academicians, scholars, students, youth, etc. can work together and leverage both the individual researcher's strength on one hand and the overall strength of the economy. If planned and designed properly, it can reduce costs of research and the collaboration could generate employment opportunities and help in building great companies. It is argued that the overall economy can be re-built by fostering academic entrepreneurs who will play a crucial role in creating micro, small and medium firms. These firms comprises of large number of entrepreneurs who can add potential value to the national economic growth.

Conclusion

Since the phenomenon of academic entrepreneurship is largely unexplored in India, the proposed study generates interesting propositions and insights. This study contributes to the emerging literature on academic entrepreneurship in India. Lack of research on academic entrepreneurship in Asian countries impacts the policy makers during decision making, formulation of policies and implementation. The paper proposes an economic model which integrates education and entrepreneurship. Lack of appropriate academic entrepreneurship models has hindered the smooth transfer of knowledge/technology from university to industry in India. India lacks the framework and policies to adopt and integrate academic entrepreneurship into its national innovation system. The study explores the synergy between the academia and industry through academic entrepreneurship which is crucial to develop a world class higher education system. It would be beneficial to both academicians and entrepreneurs. Academic entrepreneurship is an emerging phenomenon in many Asian countries especially in India in the current times when the debates regarding change in the national education policies is underway. Besides, the new Foreign University Bill has revoked discussions regarding possibilities of transforming Indian universities into potential places of knowledge/technology transfer. Hence this study can serve as a valuable road map towards internationalisation of research activities in Indian universities and institutions.

The goal of entrepreneurial and academic leadership in education ideally should not be oriented towards revenue generation; rather it should channelise public access to innovations through avenue of commercialisation and reap macro benefits for the society. It can be possibly achieved by re-structuring the education/research sector of the nations in such a way that it would impart entrepreneurial skills. In other words, the economy should basically grow within the framework of education and entrepreneurship.

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Appendix 1: Entrepreneurship Model for Economic Development

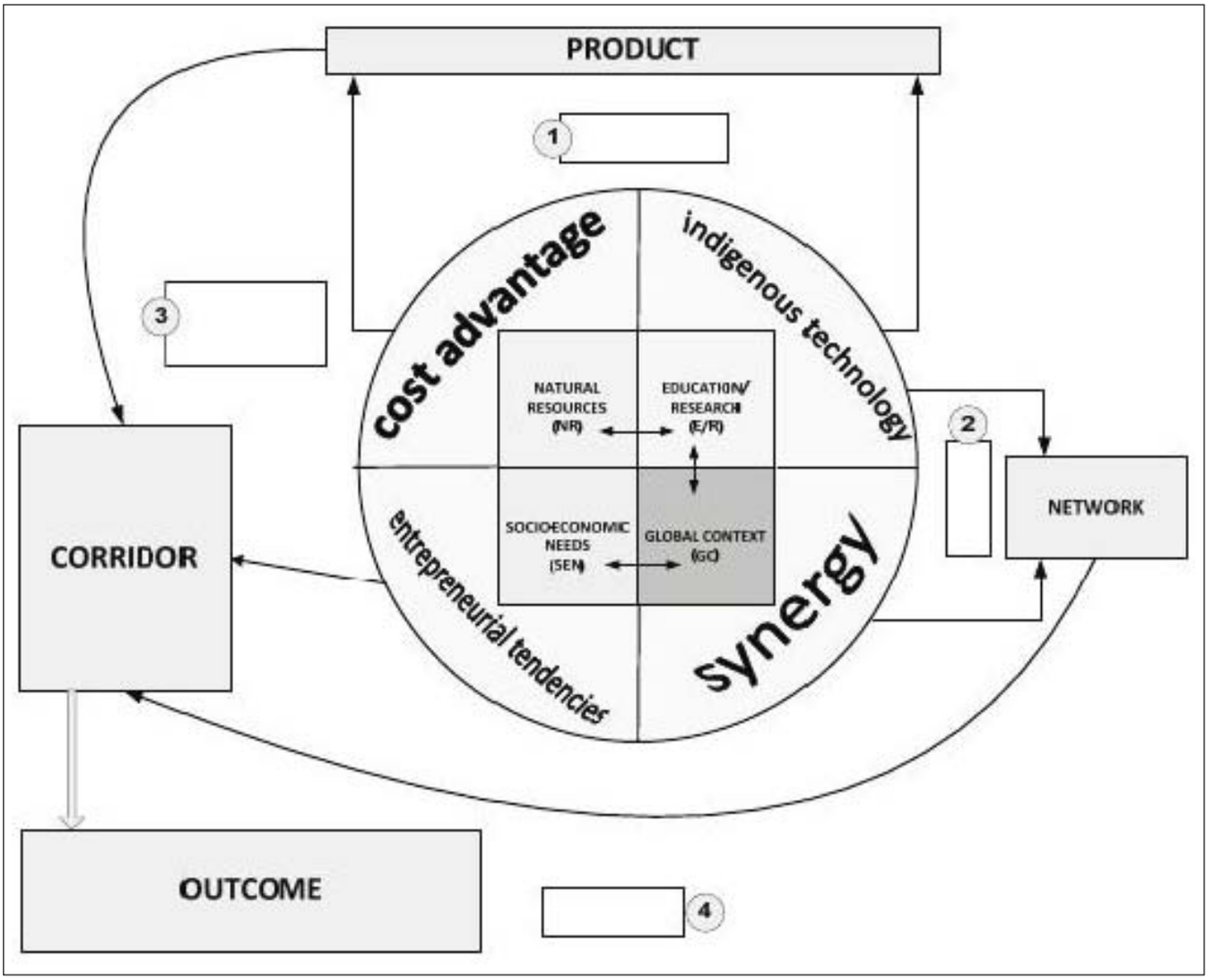

Fig. 2: Entrepreneurship Model for Economic Development

Source: Olutuase, 2014

Appendix 2: Integration of Education, Entrepreneurship and Economy

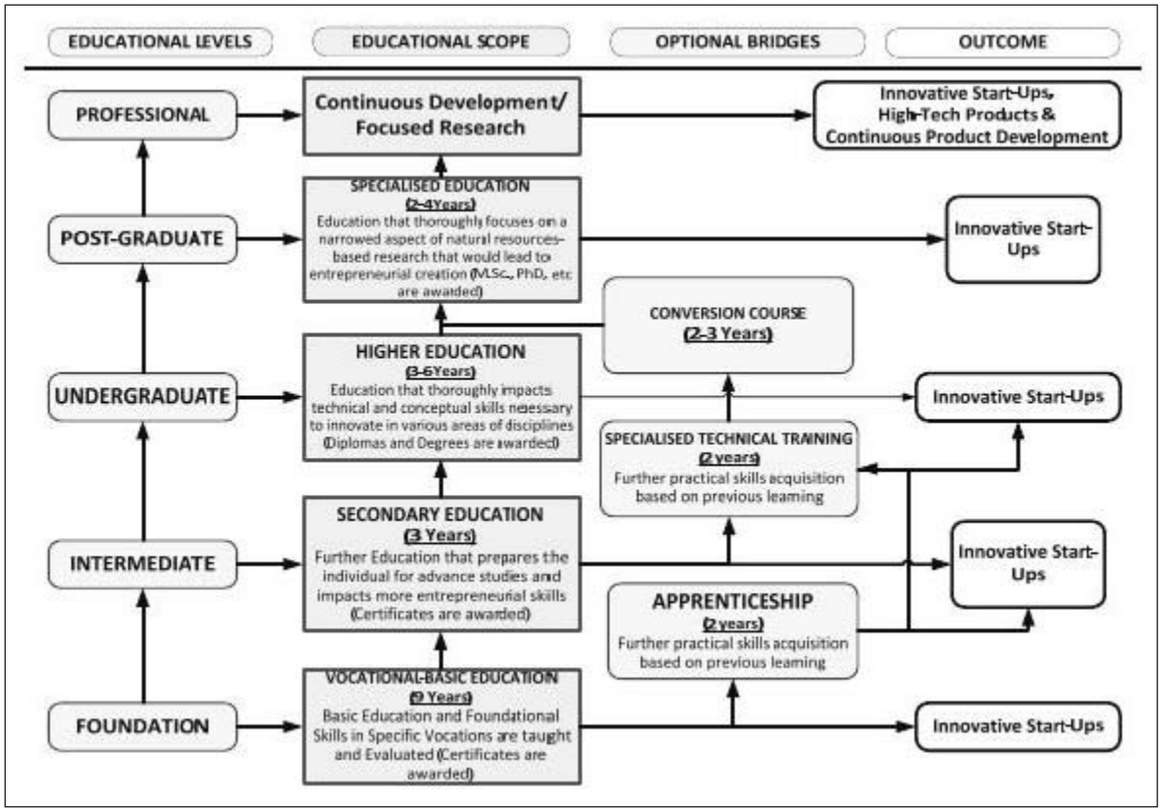

Fig. 3: Integration of Education, Entrepreneurship and Economy

Source: Olutuase, 2014