A Novel Approach for Low-Income Markets through Isr and Ise Model

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Abstract Innovation is generally understood as a successful introduction of a new thing or method. It is the embodiment, combination or synthesis of knowledge in original, relevant, valued new products, processes or services. There are many innovative approaches for the low-income markets from the economics, business, technology, sociology point of views. This paper describes a novel approach how to tackle the markets in a strategically way in terms of all the above mentioned areas with various models to improve market access of poor developing countries by promoting improved business support services, better means of organization and policies that enhance competitiveness. The models basically deals with strategically application oriented integrated with various modern technologies to develop methods, tools and applications that address the entrepreneurial needs of business development partners that support poor countries, with an emphasis on market linkage based on collective action, diversification and value-addition in terms of Industry-Science Relations (ISR) and Industry Supported economy (ISE). Both ISR and ISE model based on knowledge transfer, benchmarking and industry integrated.

Key words low-income market, competitiveness, collective action, diversification

1 Introduction

The major concern is low-income market where every economist will think the lesser demand as well as lesser supply. So the equilibrium point stands at a very low point where the social development is not at all possible.

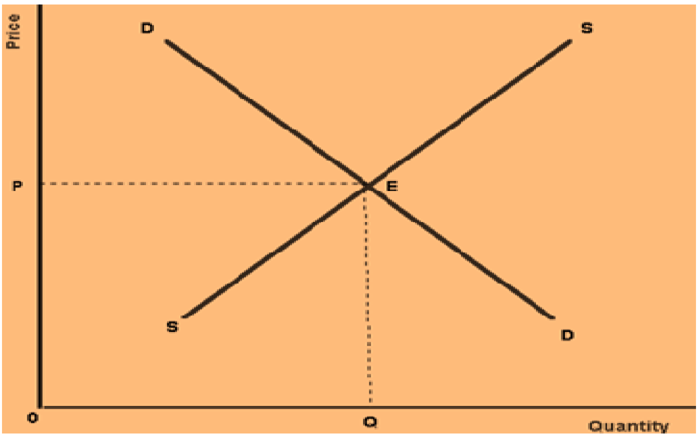


Figure 1 Equilibirium Point in Supply-Demand Curve

Now there is a need of an innovation for sustainable market development keeping eye on the society development. Now as a broader sense taking account as low-income market countries such as Angola, Antigua and Barbuda, Bangladesh, Barbados, Belize, Benin, Botswana, Burkina Faso, Burundi, Cambodia, Cameroon, Central African Republic, Chad, Republic of Congo, Côte d'Ivoire, Cuba, Democratic Republic of the Congo, Djibouti, Dominica, Dominican Republic, Egypt, Fiji, Gabon, Gambia, Ghana, Grenada, Guinea (Conakry), Guinea Bissau, Guyana, Haiti, Jamaica, Kenya, Lesotho, Madagascar, Malawi, Maldives, Mali, Mauritania, Mauritius, Morocco, Mozambique, Myanmar, Namibia, Nepal, Niger, Nigeria, Papua New Guinea, Rwanda, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Senegal, Sierra Leone, Solomon Islands, South Africa, Suriname, Swaziland, Tanzania, Togo, Trinidad and Tobago, Tunisia, Uganda, Zambia, Zimbabwe are suffering from the various problems. Least developed countries(LDC)[1] generally suffer conditions of extreme poverty, ongoing and widespread conflict (including civil war or ethnic clashes), extensive political corruption, and lack political and social stability. The form of government in such countries is often authoritarian in nature, and may comprise a dictatorship, warlordism, or a kleptocracy. AIDS is a major issue in a lot of these countries because lack of proper education. The majority of LDCs are in Sub-Saharan Africa. The practices of the "Communism" are completely failure in today's globalised world. And most of the countries which undergoes in the category of LDC used to practice this. The problems faced by these countries are uncountable and they need a strategical method.

Market trends are rapidly changing the livelihood prospects for poor developing countries. The effects of liberalization and free trade agreements have led to increasing competition in both domestic and export markets. Iterative rounds of mergers and acquisitions in the private sector have also led to considerable market concentration. These changes have benefited wholesalers, retailers and consumers, but for most, particularly those in developing countries, income earning potential and terms of trade has steadily declined.

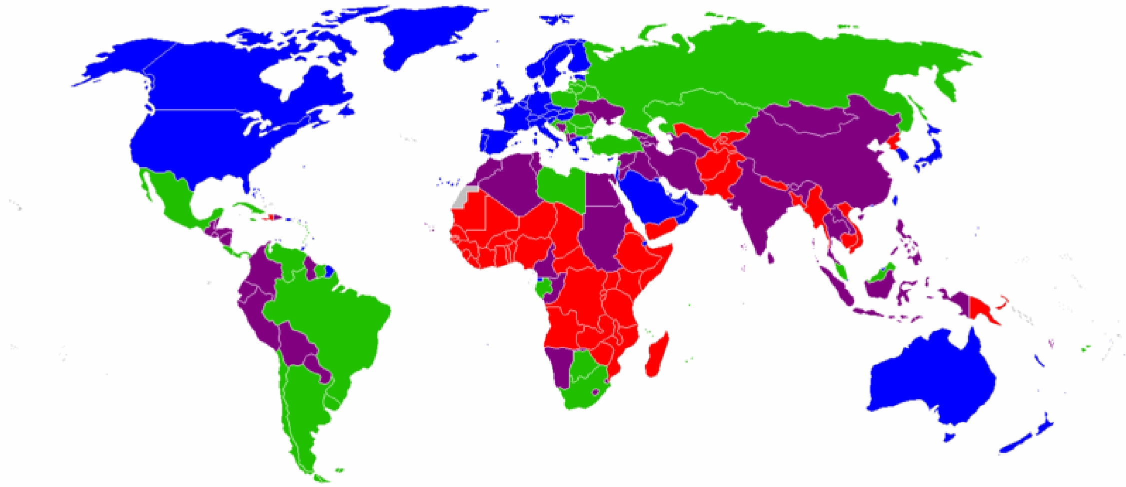


Figure 2 Listing out of Countries based on Income [2]

First, characteristics of the main market actors (enterprises and public science institutions, i.e. higher education institutions – HEI, and public sector research establishments – PSRE) represent demand and supply on the national knowledge market. The coherence of demand and supply structures determines the potential demand for interaction and shape incentives and barriers for market actors.

Second, framework conditionssuch as public promotion programmes intermediary infrastructures, legislation and regulation, and institutional settings, may either stimulate ISR by reducing barriers and setting behavioural incentives, or impede ISR by erecting barriers or by setting disincentives.

Third, performance indicators for ISR measure to which extent industry and science interact with each other in various channels and in different fields of technology. A detailed analysis of both structural characteristics and policy framework conditions in areas with a high ISR performance allows us to identify good practices and areas where learning can take place.

Example: Low-Income Market oF Afghanistan

Table 1 Statistics [3]

Statistics **GDP** (PPP) $31.9 billion (2006) (91st)
GDP growth 14% (2005)
GDP per capita $1,490 (2007)
GDP by sector agriculture: 38% industry: 24% services: 38% (2005)
Inflation (CPI) 16.3% (2005)
Population below poverty line 53% (2003)
Labor force 15 million (2004)
Labor force by occupation agriculture 80%, industry 10%, services 10% (2004) **Unemployment** 40% (2005)
Main industries small-scale production of textiles, soap, furniture, shoes, fertilizer, and cement; hand-woven rugs; natural gas, petroleum, coal, copper

Table 2 External[3]

Exports $500 million (2007)4
Export goods opium, wheat, fruits and nuts, hand-woven rugs, wool, cotton, hides and pelts, precious and semi-precious stones
Main export partners United States 25.3%, Pakistan 24.9%, Iran 11.8%, Finland 4% (2005) **Imports** $5 billion (2007)4
Import goods capital goods, food, textiles and petroleum products; most consumer goods
Main import partners Pakistan 23.9%, United States 11.8%, Germany 6.8%, India 6.5%, Turkey 5.1%, Turkmenistan 5%, Russia 4.7%, Kenya 4.4% (2005)

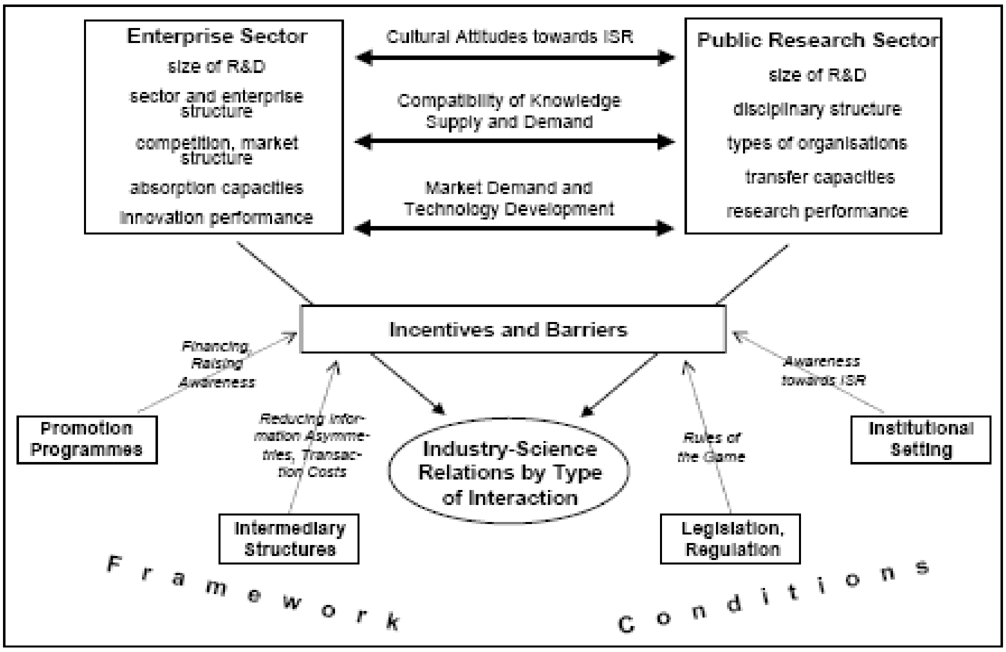
Table 3Public Finance[3]

Public debt external: $1.23 billion to Russia and Multilateral Development Banks (2007)5
Revenues $269 million
Expenses $561 million
Economic aid recipient: multi-billion dollars as non-returnable grants to cover 2002 to 2010, most of it from the United States and European Union (2007)6,7

2 Suggestions

2.1 Method-1

The structure and performance of the enterprise sector determines the demand for industry-science relations and is the prerequisite for any level of ISR in an economy. Here, we consider: the composition of the sector (i.e. the relative size of research in different fields of technology); enterprise structure (relevance of large corporations versus SMEs, relevance of foreign-owned enterprises); market structures within each field of technology (degree of competition, level and quality of demand absorptive capacities(i.e. skills, innovation, management capabilities of enterprises);and The level of ISR is strongly affected by the extent to which demand for knowledge interaction and absorptive capacities in industry meets knowledge supply and transfer capacities in science. Here, the congruence between technology specialization in the enterprise sector and disciplinary structures in science plays a crucial role. Furthermore, the specialization of enterprises within the innovation cycle (i.e. invention, adaptation, diffusion and product differentiation stages) and the orientation of research performance in science on industry needs, affect the level of ISR. Market demand and technology development trends in the various fields of technology also play a major role as they represent major information sources and competitive pressures for firms to direct and strengthen their innovation activities. innovation performance with respect to the specialization of certain stages in the innovation cycle and the level of innovation activities. A low R&D potential and an unfavorable structural setting for innovation activities will significantly reduce the demand for scientific knowledge and thus, the relevance of ISR for the enterprise sector.



Source: presented by the authors

Figure 3 A Conceptual Model for Industry-Science Relation

On the other side of the 'knowledge market', the structure and performance of the public research sector determines knowledge supply and knowledge transfer capacities. Major variables here are: the disciplinary structure (i.e. the share of different scientific disciplines in total research activities); the types of organizations (relevance of various types of public research institutions such as universities, polytechnic colleges, public research labs, joint industry-university labs, as well as the relation between civil and military research); the transfer capacities governing the research orientation and research mission (long-term, pure basic research, oriented basic research, short-term applied research); as well as the mode of financing, personnel qualification and personnel capacities; and the research performance with respect to scientific excellence and patent applications.

Finally, there is the impact of cultural and social attitudes towards the role of science in society and the degree to which it should be oriented towards technology transfer to industry and adjust its scientific efforts and themes of research on industry needs, which may be regarded as a particular feature of a national innovation system and not directly affected by policy measures.

Matching knowledge supply and demand is a necessary condition for establishing ISR in innovation activities. The extent to which this potential is utilized depends on how incentive structures and barriers work inside an innovation system and the way they influence the behaviour and decisions of market actors. Figure A.2.1.Shows major incentives for and barriers to, ISR in the enterprise sector, in the public research sector, and in the relation between both sectors.

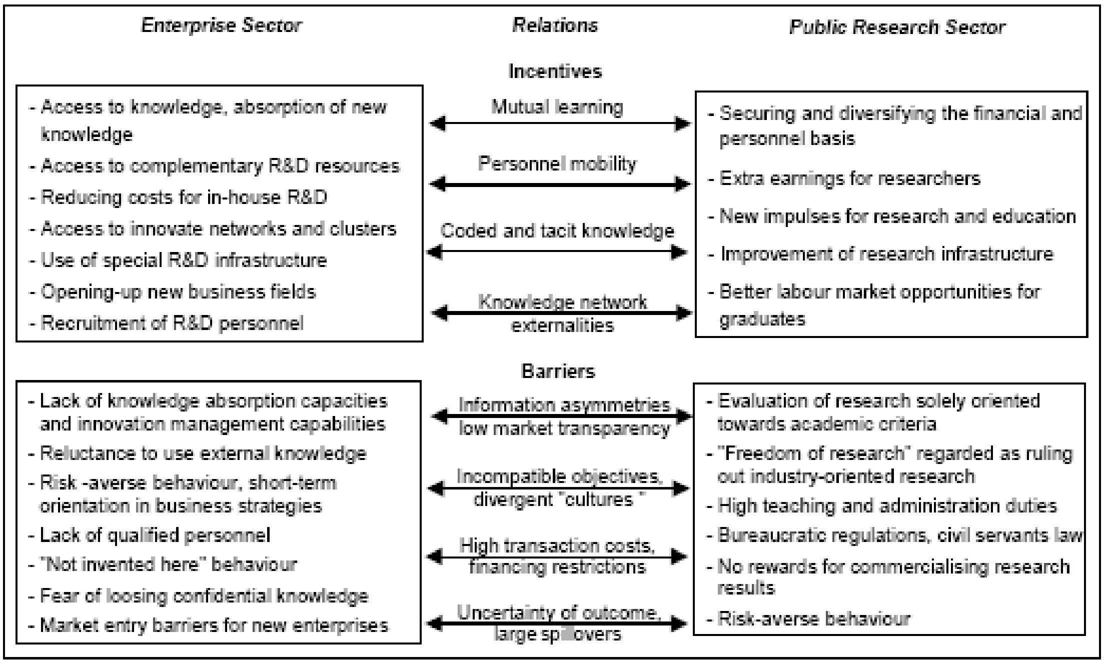


Figure 4 Incentives for and Barriers to ISR

Of course, the main incentives are the income for public research institutions from research collaboration with enterprises, and the access to knowledge for enterprises, which may act as a competitive advantage. Other incentives are in the field of education and personnel recruitment, network building, and mutual learning. The barriers to ISR are dependent upon: certain behavioural features of the market actors (such as risk-averse behaviour, idiosyncratic behaviour, innovation management capabilities); market inefficiencies (such as a lack of qualified personnel or in financing sources); market failures (information asymmetries, lack of transparency, transaction costs, spillovers, uncertainty etc.); and incentive structures which are not favourable for ISR (such as evaluation solely oriented towards academic criteria or short-term orientation in enterprise strategies due to short-term oriented financial markets)[8]

2.1.1 Identification of Parameters

First, some general guidelines have to be developed for the analysis of best practices.

Based on the above theoretical background, we initially propose to focus on three broad and inter-linked parameters associated with fostering the public research base and its links with industry.

1) schemes or mechanisms which seek to remove barriers and/or create incentives to establish new or deeper links between the public research base and industry;

2) Schemes or mechanisms which more directly seek to encourage more private sector research activity within industry.

3) examples of how the nature and operation of public research institutions have changed to make them commercially minded in creating new private sector activities (for example, through spin-offs or licensing activities) or more responsive to private sector requirements (CREST,2004)

2.1.2 Scope of Regional Knowledge Transfer Schemes

Under the word 'scheme' we understand any policy, initiative or mechanism operated by governments, agencies or private firms which targets one or more of the parameters listed above. (CREST, 2004)

The level on which the scheme will be defined, should be comparable and clearly defined and agreed upon depending on the perceived best practices of each region.

To define the scope, the following areas of ISR can be taken into account:

- Collaboration in R&D (joint R&D activities, contract research, R&D consulting, cooperation in innovation, informal and personal networks)
- personnel mobility (temporary or permanent movement of researchers from industry to science and vice versa)

- co-operation in training and education (further professional education, curricula planning, graduate education, PhD programmes)
- commercialization of R&D results in science through spin-offs (disclosures of inventions, licensing patents, start-ups of new enterprises)

2.1.3 Benchmarking

The exercise intends to go beyond a mere comparison of performance indicators and try instead to describe, analyse and systematically compare the processes that lie behind the differences in performance. 'Policy learning' is only possible with knowledge about these processes and a broad discussion involving all 'stakeholders'. Two approaches therefore are likely to be combined:

1) Key performance indicators of ISR to be identified based on existing statistics and studies covering:

- knowledge production capacity of industry and science,
- level of knowledge transfer
- Knowledge absorption capacity in industry.

Specific indicators will have to be selected against which to measure the performance of KT schemes.

2) More qualitative variables characterizing the ISR and information on the mechanisms how ISR work, to be collected for example by the means of expert interviews. Taking into account all stakeholders, the actual KT schemes will be subjected to a SWOT analysis [9].

2.1.4 Selection of the Indicators

The partners will select some key indicators (as far they are available) for their best practices.

Key indicators should fulfil the SMART–criteria. The indicators have to be:

- Specific
- Measurable: objective
- Achievable- acceptable: the indicators should fit with the missions, vision
- Realistic and relevant: the goals have to be feasible
- Time-related

2.1.5 Construction of KT Assessment Matrix

In order to make a first selection of the best practices, an evaluation instrument will be developed enabling to present all the regional best practice results into a knowledge transfer assessment matrix.

The following tasks are required from the partners:

- select a best practice for the first exercise
- try to fill in the above template as completely as possible: give information on important indicators and data that can be provided.
- when filling in the question of reasons of successfulness, bring forward some critical success factors that can be used as key criteria for transferability of the R4R best practices. All these criteria will be collected
- in an overview table and will be used for the selection of the four best practices.

Table 4

Transferability Parameters for selecting best practices	**Remarks**
1.	
2.	
3.	
4.	
5.	
TOTAL SCORE:	

2.2 Method 2

To overcome the difficulties occurring as a result of foreign competition, which usually impede any real economic growth and stand in the ways of any technology yield and export, in third world communities, we propose a model.

The diagram of Figure 5 is a conglomeration of a number of various components that by nature are closely coupled in an already industry-based economy, which need to be so in countries aspiring to achieve sustainable development based on some industrial base. In the less developed world and countries of the third world, the picture shown in the diagram could be, at present, significantly different with varying degrees from one country to another.

For their economic development, fourth world countries have either relied on availability of natural resources, viz., Oil, Natural Gas, Minerals, etc., tourism, educational services, service industries, amongst others, or on foreign aid for the most part. Countries like these, especially those relying on natural resource export such as Oil and Natural gas, have long relied on their ability to export these resources to countries around the world, which need these resources for industrial production, to achieve economic growth. Just a few of these countries started to realize that reliance on export of natural resources alone would not guarantee economic stability or sustainable development on the long run. In their effort to safeguard their economies against inevitable failures, some of these countries started, just in recent years, to launch initiatives that would create some “industrial models” to help lead them, at the end, towards achieving sustainable development. In many cases, however, industrial models developed, as such, are still rather crude and are of the transformational industry types. Furthermore, tertiary systems possessed by these countries are still of the teaching-only type, which would not support industry-grade research to uphold an industry in the real sense of the word.

To give a real industry a kick start in any developing country would, in most cases, require the assistance and possibly guidance of already established industries in the developed world. It, also, would require the refurbishing and complete review of curricula of existing tertiary systems to re-tool them to give them some level of competence/credibility that would lead to outcomes (both quality of graduates and research outcomes) that would uphold any imminent industries; something which requires collaboration with world- class academic institutions in industrial nations, initially. The model shown in Figure 5 above does, indeed, reflect the need for these components. The model, as presented above, shows the level of coupling needed between the academic and industrial components, through collaboration, provisioning of trained/skilled workforce, industrial feedback, etc.

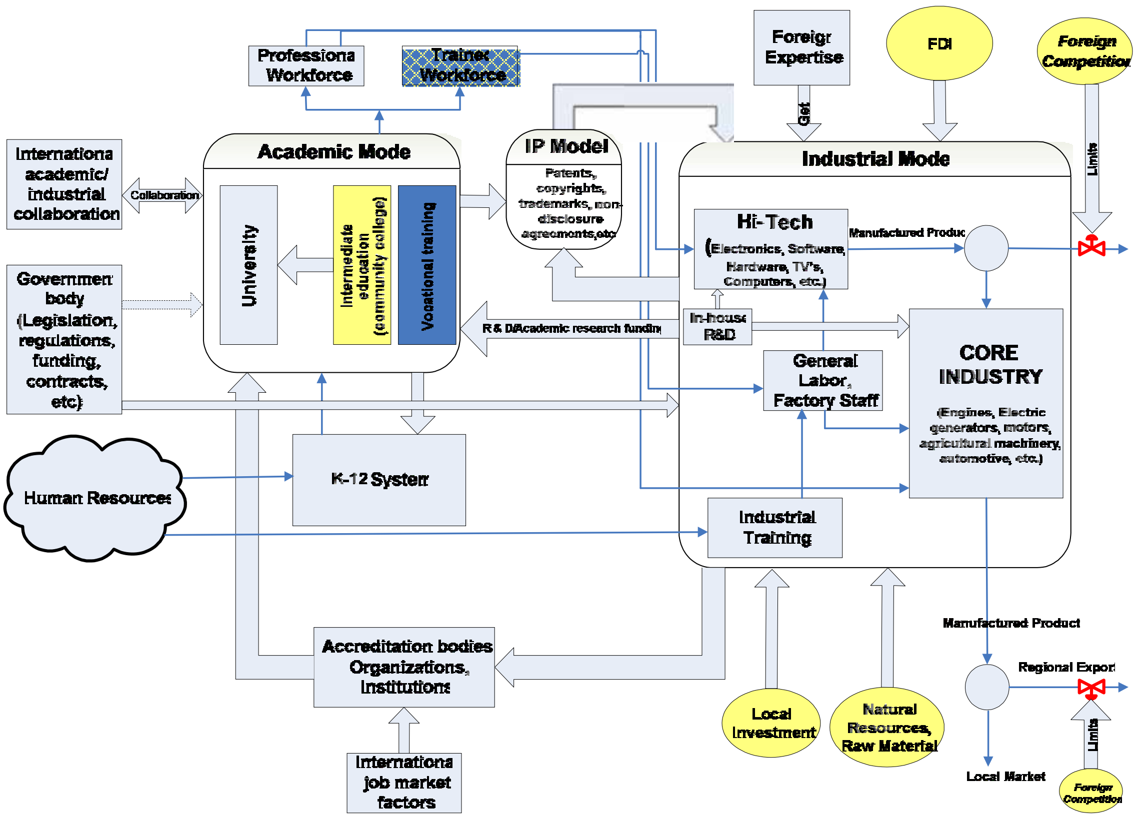


Figure 5 A Proposed Model to Achieve Integration for an Industry-Supported Economy (ISE) [11][12]

The model shows that for a developing country to be a stakeholder in any Hi-Tech industry, viz., Software, Electronics, Computers, etc., and to sustain itself in the face of international competition, would require that the concerned country, also, develop some form of core industry that would serve its immediate needs and, possibly, the needs of the immediately neighboring markets. For example, if country x desires to develop a software industry, in anticipation of some global market share, then it might also want to consider having other associated industries (Core Industries like engine industries, agricultural machinery, electric generators, etc) that would, naturally, absorb part of the work products from its projected software industry. This would ultimately provide the indigenous Hi-Tech producing industries the relief needed in the face of international competition, since international competition would initially step in as a significant limiting factor on exports of globally unproven industrial work products. The model also requires the existence of in-house R&D of the associated industries which would be directly linked up to ongoing research efforts at academic institutions. This, in turn, requires direct industrial-academic collaboration through industrial funding of industry-grade research at academic institutions who would-be stakeholders in the whole process.

In the model, there is a significant component that is usually missing, altogether, in the strategic planning of any given country in the developing world, viz. the Intellectual Property (IP)[10] component 3.An IP component is an integral part of any industrial framework to be successful, for without IP rights many researchers and industrialists would automatically refrain from putting out work products on the market without the legislative framework that would protect them against patent, copyright, trademark, and other intellectual infringements. It would also hinder efforts to bring in potential foreign investors via Foreign Direct Investment (FDI) or lure multi-national firms to set up manufacturing facilities in the countries affected.

Since in fourth world countries possibilities for uneducated workforce still exist, the proposed model also calls for some form of industrial training to those people who did not have a chance to go through schooling, and hence ended up illiterate, by choice or due to hardly pressing economic circumstances, to create possibilities for them to be part of any industrial development processes. In the following sections we discuss the roles of various entities involved; government, universities, industry, etc., in the overall developmental process, as shown in Figure 5.

3 Conclusions and Recommendations

LDC countries suffer some pronounced downturns both in the quality of tertiary education and the lack of industry-grade research. This is usually augmented with the absence of any viable industrial-economic model that would bring forth some form of core industries to the incumbent economies of these countries. Situations like these have stood in the ways of any sustainable development in the economies of the countries involved; where, in many cases, countries were relying on export of natural resources to drive their economies forward, one tends to find very few of them developing any strategic planning to foster some form of an industrial core.

Research efforts were neither of the level required for supporting any local industry i.e., nor were they of the quality that would incite citation of the research work products. As such many countries within the realm of the developing world, now, lack the level of visibility that would allow them to compete globally. Here, it is well noted that without industry-grade research that would lead to real development.

In this paper we addressed this issue from various perspectives, taking into account collaborative efforts that must avail themselves between the industrial and knowledge sectors, role of governments, R&D within the industrial sector itself, and assistance of outside parties, amongst many others. We presented a model which would set some practical niches for developing countries to conceptualize their own industrial infrastructure which would lead their economies towards sustainable development.

We strongly recommend for countries of the fourth world to move up the industrial ladder, while developing core industries of their own, which would ultimately open export markets to them, that they adopt the model proposed in this paper, or parts thereof. The versatility of this model allows it to be deployed in piecemeal fashion while lining up priorities appropriately, each country on its own, according to the national strategic planning and economic circumstances prevailing.

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