

Infrastructure Development Department (IDD)
GOVERNMENT OF KARNATAKA

**Institutional Strengthening & Sector Inventory for
PPP Mainstreaming in Education**

**Pre-Feasibility Report
Setting Up of Knowledge City**



ICRA Management Consulting Services Limited

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Abbreviations

Abbreviation	Expansion
IISc	Indian Institute of Science
KC	Knowledge city
IIT	Indian Institute of Technology
IIM	Indian Institute of Management
UNESCO	United Nations Educational, Scientific and Cultural Organization
GER	Gross Enrollment Ratio
FICCI	Federation of Indian Chambers of Commerce and Industry
NIT	National Institute of Technology
MoU	Memorandum of Understanding
NLS	National Law School
IRR	Internal Rate of Return

Chapter 1: Executive Summary

Background

The Infrastructure Development Department (IDD) of Government of Karnataka has initiated the process of exploring Public – Private – Partnership (PPP) opportunities in Karnataka in several sectors including education. To achieve its objective, it had invited proposals from empanelled consultants for “Institutional Strengthening and Sector Specific Inventory for PPP Mainstreaming”. Through a competitive bidding process, ICRA Management Consulting Services (IMaCS) was awarded the project for education. IMaCS has conducted five pre-feasibility studies for exploring PPP opportunities in education in Karnataka.

In this report, we are focusing on establishment of Knowledge City. We have conducted the study through a combination of primary and secondary research. We held detailed discussions with key stakeholders in education including the government, potential investors, the education institutes and the youth. The secondary research was analysis of the global education trend, the various knowledge cities in the world and the models they have adopted.

Project Concept

Knowledge city refers to the development of knowledge based economy with world class infrastructure and market oriented courses. Here, the key point that needs to be borne is that knowledge city development should not be viewed as real estate development but as a holistic development of an ecosystem that is driven by the passion to create knowledge.

Knowledge city thrives on the idea of propelling quality education attracting the international talent pool based on several global trends. Some of the global trends which justify why the concept of knowledge city has gained prominence in recent times are:

- Globalization in education
- Growth of private sector in education
- Importance of research
- Demographical factors

In addition to these global trends, the education scenario in India has undergone a massive change. There is increased quality consciousness in the youth who prefer to have an experience while doing their degrees. The Indian education sector, valued at Rs 5,000 crores is poised for more growth. In addition, trends like increased interest in the youth to focus on experience while studying and demand for world class infrastructure attuned to research point at the readiness to transcend to a knowledge economy. Hence, the idea of an exclusive knowledge based zone in India that attracts the international cohort

which migrates for quality education is the concept behind why India will be a good center for this development.

Finally, the state of Karnataka with its brand image of being a center for educational excellence through the times is the state that can be positioned for the knowledge city.

Project Design

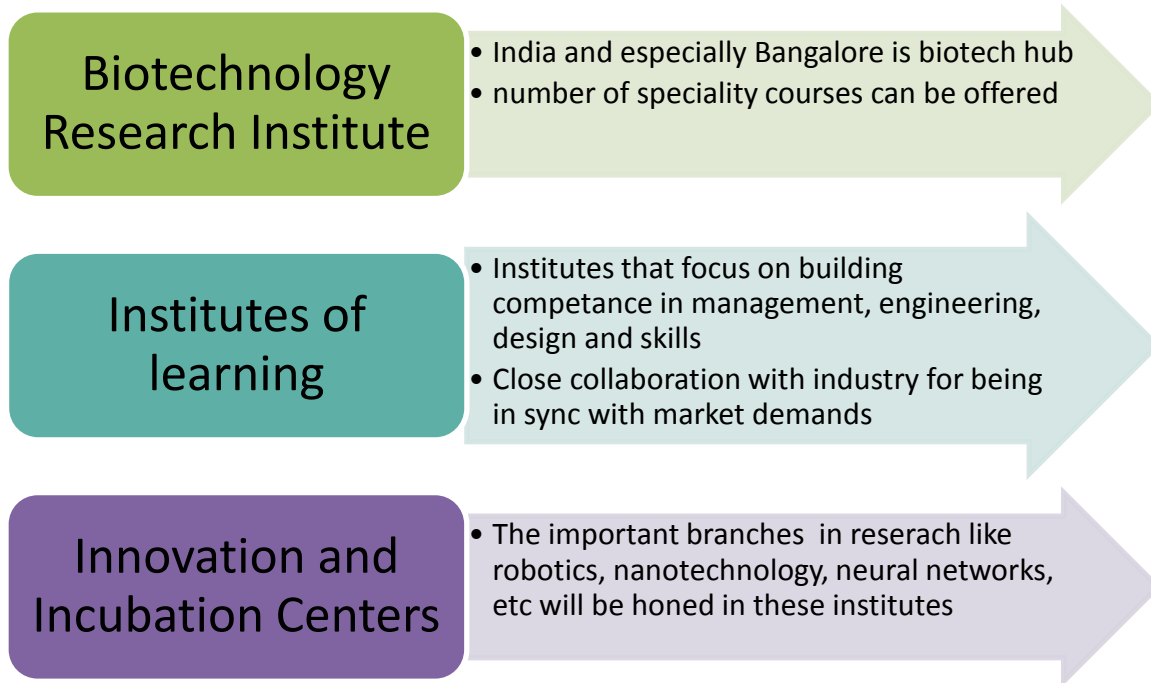
Project design here refers to components of the knowledge city. Across the world, knowledge city models were studied on various parameters. This analysis resulted in the identification of key takeaways from functioning knowledge cities which assumes relevance in the design and structuring.

Table 1: Key Takeaways

Name	Type of Knowledge City	Key Takeaways
Dubai Knowledge Village	Government promoted	Attraction of global institutes and talent pool with benefits being offered in the free zone
Doncaster Education City	Private/ Consortium promoted	Thrust exclusively on vocational education – effectively assessing the high demand for technically trained manpower and catering to it
Kuala Lumpur Education City	Private/ Consortium promoted	Formation of special zone and attracting with benefits attached to it
Doha Education City	Private/ Consortium promoted	Having a wide bouquet of institutes with varied service offerings that target many segments of academia
Singapore Global School House	Institution promoted	Targeting the students who migrate from South East Asia, this is hinged on apt market assessment
Caribbean Knowledge City	Private/ Consortium promoted	High end infrastructure being planned here, which fulfills the need for quality in higher education
Panama City of Knowledge	Private/ Consortium promoted	Bringing a robust organizational structure for the functioning of the knowledge city ensuring ease of operations
Barcelona Knowledge City	Private/ Consortium promoted	The concept of the development of sustainable and quality oriented society

Based on the locational and service assessment on where the knowledge city will be best suited and the best courses that can be offered gave the following design:

Figure 1: Knowledge City Design



PPP Model

Considering the vast investment that is required, a PPP is the way ahead to setup knowledge city in India. The Government and private sector should form an entity that acts as single window to clear the projects and also do the monitoring of the knowledge city progress.

Financials

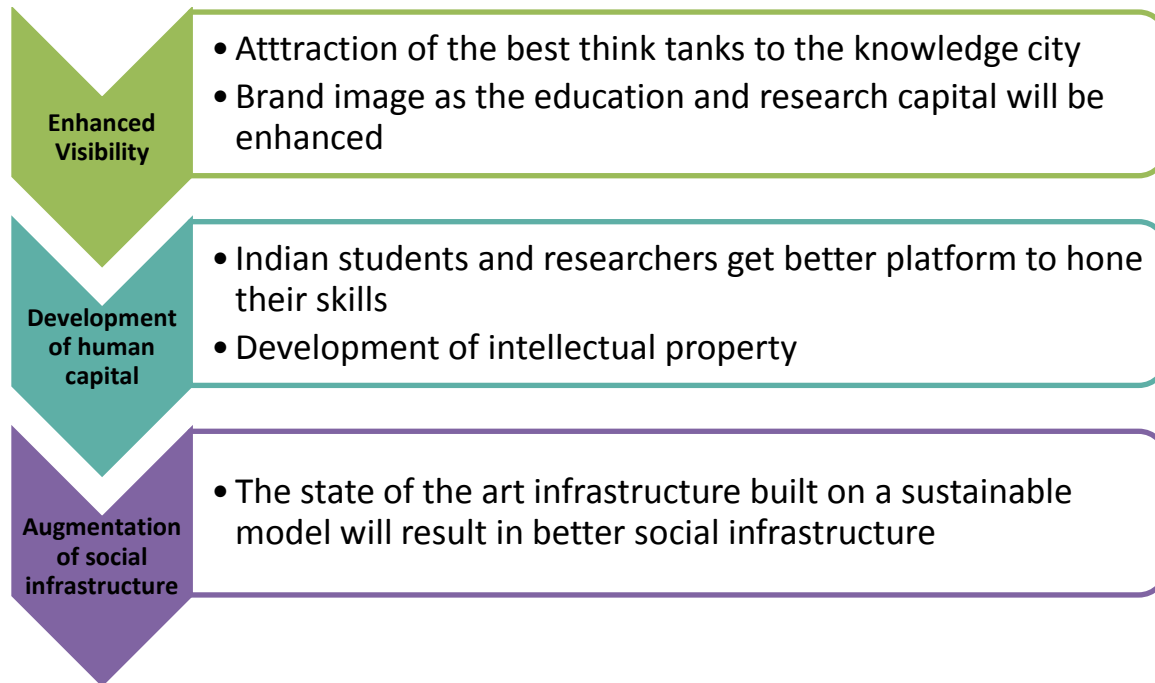
The financials have been worked out considering two broad portions in the knowledge city – Core and Non - core. Core refers to the institutes' classifications i.e. the institute for learning, biotechnology research center and the innovation and incubation center.

The overall cost of the project is Rs. 2,790 crores. At the end of 15 years, full utilization of the facilities will generate revenues of Rs. 9,058 crores. The project IRR is 18 per cent.

The Way Ahead

The development of knowledge city will be a viable and successful venture in Karnataka. In addition to the slew of high quality institutes that will be a part of this venture, the area will have the following benefits.

Figure 2: Benefits of Knowledge City



Chapter 2: Introduction

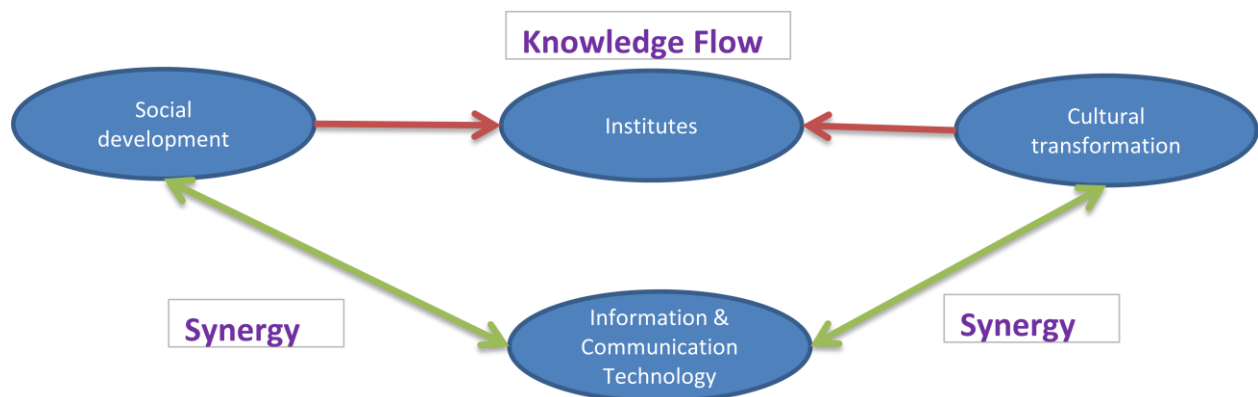
2.1 Project Idea

The concept of knowledge city has caught the imagination of the academic world and the corporate sector due to its multi-faceted approach to building a knowledge based economy.

Though many definitions and ways to conceptualize this knowledge based education hubs have been given, the best way to explain the same has been put forth by Mr. Gozalez-Paras, the Mexican pioneer – “It is a geographical territory where, based on a plan and general strategy jointly adopted by society and the government, its players have the common goal of building an economy based on the development of knowledge.”

The dynamics of the knowledge city can be understood by imagining a society that is aimed at knowledge creation and propagation.

Figure 3: Understanding Knowledge City



Given the vast scope, the concept of knowledge city is often misinterpreted. Some of the things the any knowledge city is NOT are:

- It is not a real estate project – But there may be real estate developments.
- It is not a university campus – But universities play a key role.
- It is not a city of researchers – Everyone is capable of creating, but researchers play a key role.
- It is not a short term project – it is long term where there is creation of an ecosystem
- It is not “continuous improvement” – It is disruptive changes

The creation of knowledge city assumes significant importance in Karnataka. There is already cognizance in Karnataka about the importance of the transition into knowledge based economy. In fact, Karnataka had presented its vision for the education sector titled ‘Education 2020’ in 2009.

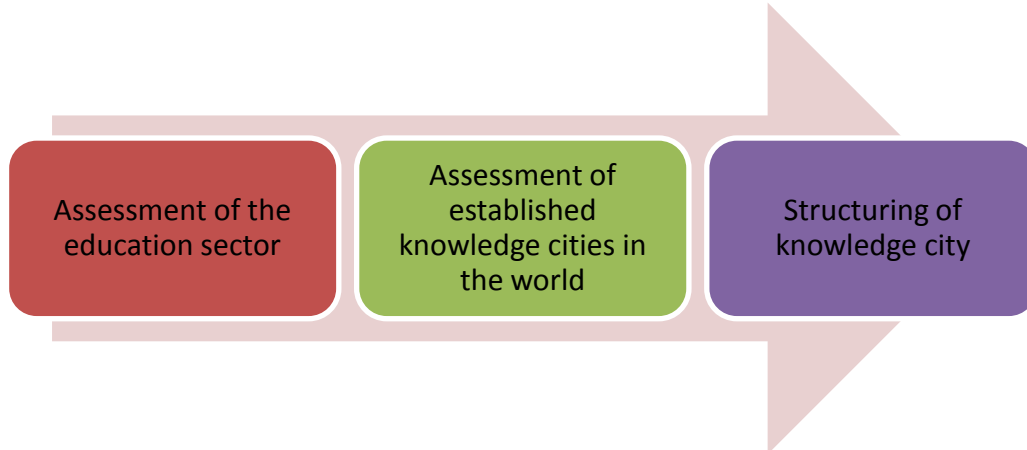
Across its three sections, the report set the tone for education becoming available across the state, quality being improved and education also being made inclusive. Also, another aspect the report wanted to improve was the colleges in the state being isolated units, active only for a limited period. The Vision 2020 aims to make these institutes work round the clock with greater autonomy and be developed as knowledge centers.

The development of knowledge city in the state is a direct consequence of making the education quality and infrastructure world class. The knowledge city would help the evolution of knowledge economy and accelerating the development of human capital by providing high quality education to the students. Thus, the knowledge city is envisaged as state-of-the-art knowledge based community development. The ideals of research, innovation, incubation and honing of specialized skills will be at the nucleus.

The Karnataka Jnana Aayoga has conducted a research study that has revealed the changing aspiration of the youth. The survey concluded that the youth of Karnataka are very vibrant section ready for change. This change in the overall context also reflects on the education quality and the opportunities. The development of knowledge city, with unparalleled infrastructure, research labs, centers for innovation and institutes for specialized studies will make Karnataka the preferred destination for the academic and corporate world.

2.2 Approach and Methodology

Approach:



1. Assessment of education sector:

The objective of this phase is to assess the key trends that are driving the education sector, both in India and globally.

This included a comprehensive analysis of the education sector to observe the trends exhibited recently. This analysis will be top down i.e. starting from the global education sector trends that are observed, the national scenario where there are challenges that possess the education sector which can be converted to opportunities and finally the Karnataka education sector, where knowledge city has to be established.

The outcome of this phase is to map the all the trends that pinpoint to the successful establishment of knowledge cities and why Karnataka will be an apt location for the same.

2. Assessment of established knowledge cities:

The objective of this phase is to map the best practices adopted in existing knowledge cities in the world.

The models will be assessed on the following dimensions:

- a) The location
- b) The components
- c) The special features
- d) The structuring
- e) The promoting entity
- f) The design

How these can be adapted and customized in the Indian regulatory environment is the key takeaway of this phase.

3. Structuring of Knowledge City:

The aim of this phase is to propose a structure for the knowledge city in India.

This will be based on two pronged assessment:

- a) Locational assessment
- b) Service assessment

Thus, the location and its factor advantages were analyzed and subsequently the design of the components.

Methodology:

Primary research was in the form of interaction with stakeholders. The stakeholders met were the youth, potential investors and the government. The primary survey was conducted to understand some of the key factors pertaining to the education like:

- The higher education scenario in Karnataka
- Outlook of the sector
- Understand the context of a knowledge city, within India
- Stakeholders expectation from a knowledge city
- The composition of a knowledge city
- The market opportunities

Secondary research was undertaken to understand the model of several functioning knowledge cities in the world. Their basic rationale and the institutes that have been setup across these cities have been studied.

2.3 Existing Knowledge Cities/Villages

A few centres of excellences based on similar concept of knowledge, innovation and research based theme developments for economic and intellectual growth are at various stages of development around the world. Some of the more well known of these cities are:

- Dubai knowledge village – United Arab Emirates
- Doncaster education city – United Kingdom
- Kuala Lumpur education city - Malaysia
- Doha education city - Qatar
- Bahrain education city – Bahrain (still in discussion phase)
- Singapore global school-house - Singapore
- Incheon free economic zone – South Korea (part of the SEZ will have knowledge city in phase II)

- City of Knowledge, Panama
- Jeju global education city – South Korea
- Caribbean Knowledge city – West Indies
- Barcelona Knowledge Campus - Spain

Most of these knowledge cities will fall into three broad levels of structure:

1. Government promoted
2. Private player promoted
3. Institution promoted

Study of the best known knowledge cities across these three models will reveal what lessons should be carried forward when structuring the knowledge city in India.

Chapter 3: Sector Profile

3.1 Industry Overview

3.1.1 Global Higher Education Scenario

The higher and tertiary education scenario across the globe has undergone several changes in last 50 years. These changes have been across diverse genre and the trends that can be accumulated are qualitative that throw several indicators that show the world's progress towards knowledge based economic developments. These can be leveraged upon to understand why knowledge cities are in vogue today.

Also, there is a marked trend of the governments across the globe spending in more resources into the education sector which focuses on tertiary education. Tertiary education has been expanding worldwide, with 65 million more students enrolled in 2008 than in 1999¹. Much of the growth has occurred in East Asia and the Pacific, with China alone increasing the number of tertiary level seats by more than 20 million from 2005 to 2010².

The trends which can be captured that reflect the reasons for the growing popularity of knowledge cities are:

- Globalization
- Enhanced role of private sector
- Research's growing importance
- Changing demographics

3.1.1.1 Globalization

Globalization as a phenomenon has not only influenced the economy and commerce but also education. Internationalization is manifested in the variety of policies and programs that universities and governments implement to respond to globalization. These typically include sending students to study abroad, setting up a branch campus overseas or engaging in some type of inter-institutional partnership. Internationalization has been very prominent at regional and international level.

Not only large nations, but across the globe, nations are looking for a way to standardize the education quality. The Bologna Process and Lisbon Strategy in Europe are the clearest examples of international engagement at this level. The former is a series of ministerial meetings and agreements between

¹ Source: Global Trends in Higher education - UNESCO

² Source: Global Trends in Higher education - UNESCO

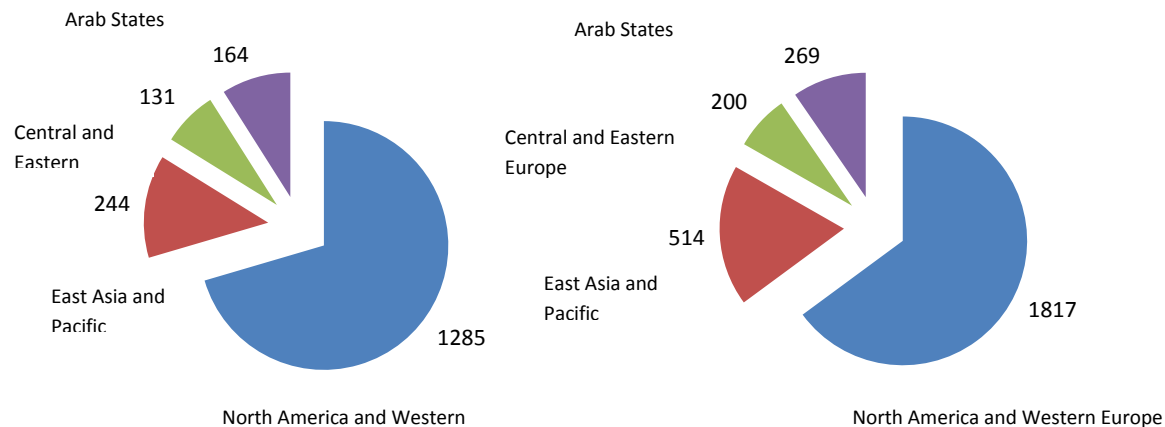
European countries designed to ensure comparability in the standards and quality of higher education qualifications. As of today, there are 47 member nations that are a part of this initiative.

The latter arrives at a strategic map to innovate and increase the productivity and knowledge based economy in Europe. These look to exploit ‘internationalization’ of education.

This key trend of internationalization i.e. students moving out of their home countries is the most marked. About 2.5 million students have ‘migrated’ to pursue education as of 2011. Estimates predict the rise to 7 million international students by 2020³. This segment represents a tremendous target cohort for any knowledge city.

In fact, the successfully operating knowledge cities in the world have exploited this factor to their advantage. Qatar, Malaysia and the United Arab Emirates stand out as examples of countries that have boldly promoted internationalization as a matter of national policies: they have MoU with prestigious foreign universities to establish local campuses, with the goal of expanding access for the local student population and serving as higher education "hubs" for their regions.

Figure 4: Internationally Mobile Students in 2000 vs. 2009 (in ‘000s)



Source: Trends in Global Higher Education - UNESCO

The mobility of international students involves the movement of students from Asia entering the major academic systems of North America, Western Europe, and Australia. Countries like the United Kingdom, Australia and Canada have adjusted visa and immigration requirements to attract foreign students, motivated to a significant degree by the desire to maintain economic competitiveness and realize financial gains by enrolling large numbers of full fee-paying internationals. Also, now there is enhanced interest across the globe on India and China as the economies are growing. Using this interest and the migration pattern of students, the knowledge city can be made a viable model.

³ Source: UNESCO Report – Trends in Global Higher Education

3.1.1.2 The Role of the Private Sector

The involvement of the private sector in the global education scenario is also peaking with over 30 per cent of the global tertiary education enrollment being in private funded/owned institutions.⁴

The infrastructure crunch for higher education has resulted in a paradigm shift. Private sector participation, once viewed with suspicion, is now a given in higher education. The main reasons why private sector looks attractive in education are:

- The financial strength of the private sector
- Quality of infrastructure
- The employment linkages in private institutions that assure students of enhanced job opportunities

An analysis of the increment in private institutions enrollment has revealed an increasing trend. In developing nations like Malaysia, India, Brazil and Indonesia about 40-60 per cent of the students are enrolled in private institutes. In developed nations also about 20-30 per cent is in the private institutes.⁵

With the private sector now waking up to the business opportunities in the education sphere, knowledge cities are being established with close collaborations to usher in quality of the highest level.

3.1.1.3 Research's Growing Importance

With growing competition and need for innovation, the research orientation in education has gained enhanced focus. Intellectual property is a growing challenge in higher education but especially in research universities. Who owns knowledge? Who benefits from research? Universities, seeking to maximize revenues, want to protect intellectual property - research results that promise patents, licenses and income.

The estimate of the amount of funds spent globally on research is \$100 trillion in 2011. Majority of these funds were pumped into the institutions by industrial sponsors to up the ante in research.

⁴ Source: UNESCO Report – Trends in Global Higher Education

⁵ Source: Trends in Global Higher Education, UNESCO

Table 2: Top 10 Research Spending Nations - 2011

Country	Research Spending (in USD billion)
USA	405.3
China	153.7
Japan	144.1
Germany	69.5
South Korea	44.8
France	42.2
United Kingdom	38.4
India	36.1
Canada	24.3
Russia	23.1

Source: *The Business of Innovation Organization Report- 2011*

With such a competitive environment and research gaining popularity, institutes are gearing up for more seats in research and an ideology of having such dedicated institutes in a geographical area focused is one of the main reasons of succeeding knowledge cities.

3.1.1.4 Changing Demographics

Some soft factors are changing which add to the growing attraction for knowledge city. They are

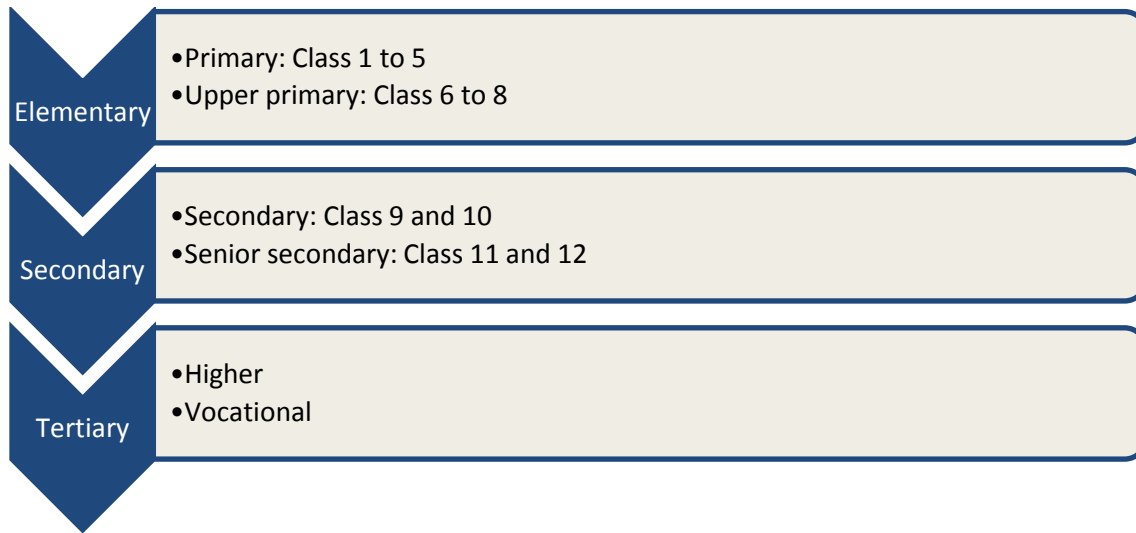
- Students expecting 'an experience' when pursuing education
- More currency to spend as it is viewed as an opportunity cost
- Expecting high end infrastructure everywhere
- Expectation of industry tie-ups
- Prefer international exchange programs

These trends make knowledge city a viable business model with demand from students and corporate alike.

3.1.2 Indian Higher Education Scenario

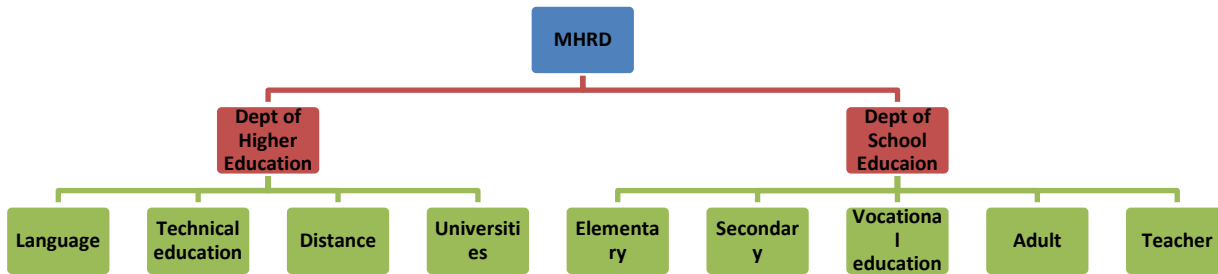
The education system in India follows the elementary, secondary and higher/tertiary levels of progression.

Figure 5: Snapshot of Indian Educational System



The education system is helmed by the Ministry of Human Resource Development. Various offices function under MHRD separately under school and higher education.

Figure 6: Institutional Framework of the Education System



Source: The Ministry of HRD

Higher Education in India⁶

India's higher education system is the third largest in the world (after China and the United States), with it being worth Rs.5,000 crores.

Vision for Higher Education:

To realize India's human resource potential to its fullest in the Higher Education sector, with equity and inclusion.

Mission for Higher Education:

- Provide greater opportunities of access to Higher Education with equity to all the eligible persons and in particular to the vulnerable sections.
- Expand access by supporting existing institutions, establishing new institutions, supporting State Governments and Non-Government Organizations/civil society to supplement public efforts aimed at removing regional or other imbalances that exist at present.
- Initiate policies and programmes for strengthening research and innovations and encourage institutions – public or private – to engage in stretching the frontiers of knowledge.
- Promote the quality of Higher Education by investing in infrastructure and faculty, promoting academic reforms, improving governance and institutional restructuring toward the inclusion of the hitherto deprived communities.

Investment Scenario

The education sector in India is also considered as one of the major areas for investments as the entire education system is going through a process of overhaul, where there is a shift from traditional education to one oriented towards skilling and research.

Total outlay on education by Central and State Governments (combined) has increased at an annual rate of 18.8 per cent between 2006-07 and 2011-12 from Rs.116,933 crores to Rs.276,866 crores. This outlay as a percentage of GDP has increased from 2.72 per cent to 3.11 per cent during the same period. Expenditure on education as a percentage of total Government expenditure has increased from 10.5 per cent to 11.5 per cent.

Further, the higher education sector in India is expected to witness a growth of 18 per cent CAGR till 2020.

⁶ Source: Ministry of Human Resource Development
Exchange rate assumed: \$1 = Rs. 50

Overall Infrastructure Development

In terms of the infrastructure, the country has 544 university level institutions, which includes 261 state universities, 73 state private universities, 42 central universities, 130 deemed universities, 33 institutions of national importance and five institutions established under various state legislations, according to the Ministry of Human Resource Development (HRD) Annual Report 2010-11.

These also include the ‘premier institutes’ – the 79 centrally funded institutions, which includes 15 Indian Institutes of Technology (IITs), 11 Indian Institutes of Management (IIMs) and 30 National Institutes of Technology (NITs).

Higher Education in India

The Higher Education sector, especially, has witnessed a tremendous increase in its institutional capacity in the years since Independence. The number of Universities/University-level institutions has increased 18 times. The number of colleges has also registered manifold increase with just 578 in 1950 growing to be more than 30,000 in 2011.

In India, “University” means a University established or incorporated by or under a Central Act, a Provincial Act or a State Act and includes any such institution as may, in consultation with the University concerned, be recognized by the University Grants Commission (UGC) in accordance with the regulations made in this regard under this Act.

In India, Higher Education is the shared responsibility of both the Centre and the States. The coordination and determination of standards in institutions is the constitutional obligation of the Central Government.

The Central Government provides grants to UGC and establishes Central Universities in the country. The Central Government is also responsible for declaring educational institutions as “deemed-to-be University” on the recommendation of the UGC.

At present, the main constituents of University/University-level Institutions are Central Universities, State Universities, Deemed-to-be Universities and University-level institutions. These are described as follows:

Central University:

A university established or incorporated by a Central Act.

State University:

A university established or incorporated by a Provincial Act or by a State Act.

Private University:

A university established through a State/Central Act by a sponsoring body viz. A Society registered under the Societies Registration Act 1860, or any other corresponding law for the time being in force in a State or a Public Trust or a Company registered under Section 25 of the Companies Act, 1956.

Deemed-to-be University:

An Institution Deemed to be University, commonly known as Deemed University, refers to a high-performing institution, which has been so declared by Central Government under Section 3 of the University Grants Commission (UGC) Act, 1956.

Institution of National Importance:

An Institution established by Act of Parliament and declared as Institution of National Importance.

Institution under State Legislature Act:

An Institution established or incorporated by a State Legislature Act.

The classification of institutes' show that India is yet to find a way to incorporate the foreign universities whose participation is essential for successful knowledge city.

Technical Education

The technical education in India is helmed by the All India Council for Technical Education (AICTE). The AICTE was set up in 1945 as an advisory body and later on in 1987 given the statutory status by an Act of Parliament. The AICTE grants approval for starting new technical institutions, for introduction of new courses and for variation in intake capacity in technical institutions. The AICTE has delegated to the concerned state governments powers to process and grant approval of new institutions, starting new courses and variations in the intake capacity for diploma level technical institutions. It also lays down norms and standards for such institutions. It also ensures quality development of technical education through accreditation of technical institutions or programmes. In addition to its regulatory role, the AICTE also has a promotional role which it implements through schemes for promoting technical education for women, handicapped and weaker section of the society promoting innovations, faculty, research and development, giving grants to technical institutions.

The technical institutions under the AICTE include post-graduate, under-graduate and diploma in the whole spectrum of technical education covering engineering/technology, pharmacy, architecture, hotel management and catering technology, management studies computer applications and applied arts and crafts.

Challenges

The higher education system in Indian has some challenges that it has to overcome. Some of these factors are:

- Inadequate number of institutions to hone researchers and academicians
- Low employability of graduates
- Low levels of public spending
- India has a low Gross Enrollment Ratio (GER) of 20 per cent
- Higher education spending in India is 1.1 per cent of GDP
- No Indian college or university ranks among the top 300 of the prestigious Times Higher Education Supplement (THES) which is based on peer evaluations
- During the period 2000-2010, growth in the number of doctorates has been 20 per cent in India⁷

Outlook:

Notwithstanding the challenges, the outlook for the Indian higher and tertiary education outlook is positive with a growth rate of 10 to 15 per cent expected over the next decade. The Indian education market has witnessed a series of developments and changes in the last few years and more are expected in the coming years which have resulted in an outlook for significant increase in the market size of the education industry compared to previous years.

The establishment of knowledge city will directly tackle some of the above issues and convert them into opportunities to succeed.

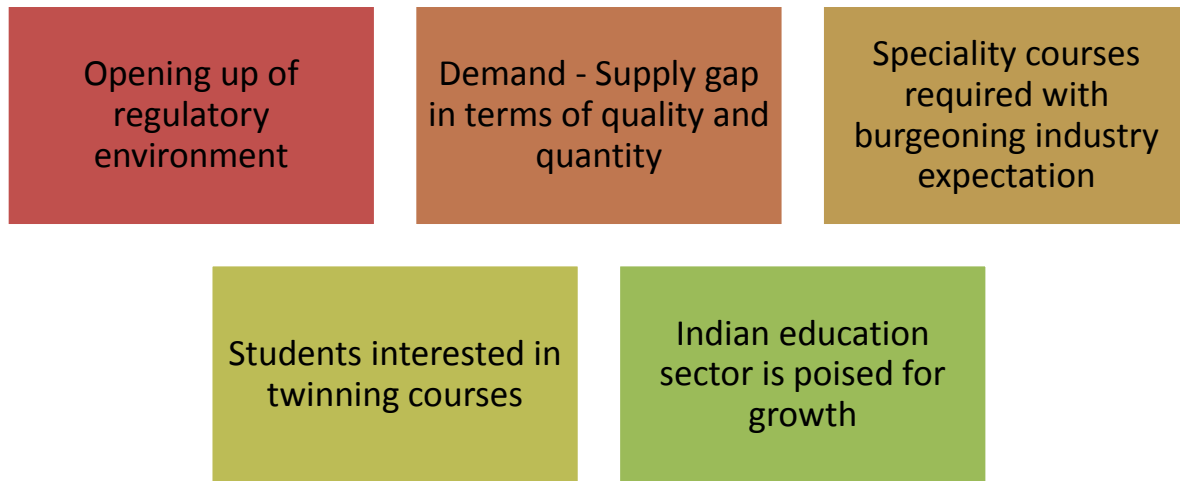
Table 3: Knowledge City - Opportunities

Challenge	Knowledge city conversion to opportunity
Research orientation	Proposed knowledge city has component of research, innovation and incubation center that will hone researchers exclusively
Market oriented education	The center for continuous learning will have close synergy with industry and hence there will be job focused training
Specialized education	The institutes that set up their campuses will adopt their own academic structure, depending on the area of specialization

Thus, the following factors, overall, present a positive future for the establishment of knowledge city in India.

⁷ Knowledge Commission Report

Figure 7: Factors that Aid Knowledge City in India



3.2 Regional profile – Karnataka Higher Education Scenario

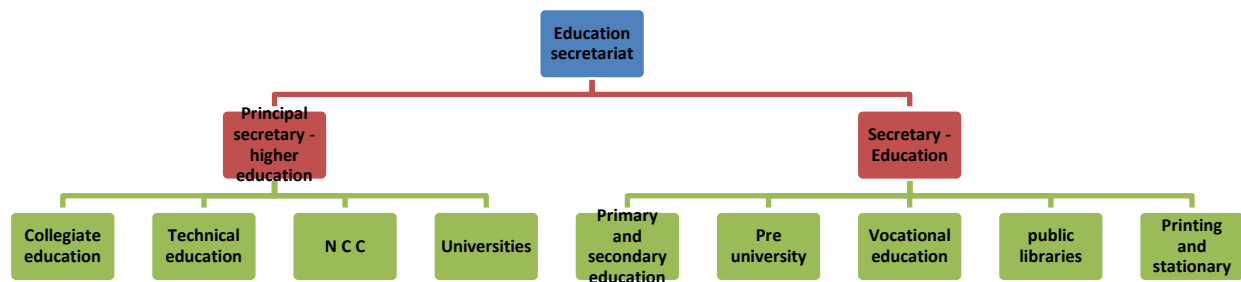
The education scenario in Karnataka is one of the most promising in India. Karnataka's ranking on Education Development Index estimated by National University of Educational Planning and Administration (NUEPA) is 16th in 2011.

In terms of the higher and tertiary education, Karnataka is considered to be a knowledge hub due to the presence of several prestigious institutes and innovation centers.

Institutional Framework

The Education Secretariat in Karnataka has a Principal Secretary, Higher Education who oversees the Department of Higher Education and the Secretary, Education Department (Primary and Secondary Education) who oversees the primary, secondary, pre-university, vocational, adult education, public libraries, printing stationery and publications.

Figure 8: Organization Structure of Karnataka Education



Source: Karnataka Education Department

A snapshot of the higher education centers reveals the presence of over 1000 centers. These centers include the prestigious IISc, IIM, NIT, NLS and other renowned colleges.

The State has 29 universities / deemed universities. There are a total of 1,362 colleges enrolling 515,838 students. Most of the colleges at 52 per cent are private unaided, followed by 26 per cent Government owned and remaining 22 per cent private aided colleges.

The Directorate of Technical Education in the State ensures a planned development of technical education. As of 2010-11, the State had 289 polytechnics offering different technical courses such as in automobile engineering, civil engineering, computer science, electronics, mechanical engineering etc. Their enrolment was 57,038 students. In addition, there were 187 engineering colleges enrolling 56,235 students. In case of technical education, expansion has mainly taken place in the private sector. Government sector is less than 15 per cent in engineering education.

Table 4: Higher Education snapshot – Karnataka 2011

Engineering Institutions						
Year	Govt.	Aided	Private	Total	Enrolment	Average enrolment
2008-09	12	10	123	145	53,489	369
2009-10	14	11	149	174	55,760	320
2010-11	14	11	162	187	56,235	301

Source: Economic Survey of Karnataka, 2010-11

Table 5: University wise Institutions and Enrolment in College Education

Region	Government		Private- Aided		Private-Unaided		Total Colleges	Total strength	Average students per college
	Number	Students	Number	Students	Number	Students			
Bangalore	69	49169	61	58133	265	78478	395	185780	470
Mysore	67	34620	30	23479	38	8371	135	66470	492
Shimoga	48	26544	27	15792	47	3290	122	45626	374
Mangalore	31	13202	35	21265	97	7126	163	41593	255
Dharwad	81	24766	102	66497	117	27720	300	118983	396
Gulbarga	60	17150	41	21020	146	17010	247	55180	232
Total	356	165451	296	206186	710	141995	1362	513632	378

Source: Economic Survey of Karnataka, 2010-11

In addition, there are R&D centers of major multi nationals which foster the scientific temper in the state.

- *Allergan Inc's 4th largest R&D centre in the world focuses in ophthalmology, neurology*
- *Intel's development centre researches software and hardware engineering*
- *IBM's R&D centre researches telecom and mobile, next generation systems and information management*
- *Microsoft Research India announced the opening of a 2nd R&D centre in Bangalore*
- *Philips Innovation Campus in Bangalore involved extensively in designing innovative engineering, healthcare and consumer lifestyle solutions*
- *GE Healthcare, Bangalore is GE's innovation centre providing innovative solutions for healthcare industry*
- *Presence of IBM innovation and research center*

As per the State Budget for 2011-12, the total outlay for the primary and secondary education increased from Rs.8,830 crores in 2010-11 to Rs.10,281 crores in 2011-12. The outlay for higher education increased from Rs.1,676 crores to Rs.2,002 crores in the corresponding period.

Thus, Karnataka which already is branded as the Knowledge Hub of Asia can build on this and focus to bring about quality revolution in higher and tertiary education in India.

3.3 Study of Models of Functional Knowledge Cities/ Villages

There are knowledge cities in various stages of development in the world – fully functional, design stage and at a feasibility stage. As mentioned earlier, study of the successful knowledge city models across the usual structures will bring to the fore the best practices.

Most of these knowledge cities will fall into three broad levels of structure:

1. Government promoted
2. Private player/Consortium promoted
3. Institution promoted

3.3.1 Government Promoted Knowledge Cities

3.1.1.1 Dubai Knowledge Village – DKV



DKV – near hostels

Vision – “To be the Leading Regional Destination for Human Resources Management Providers”

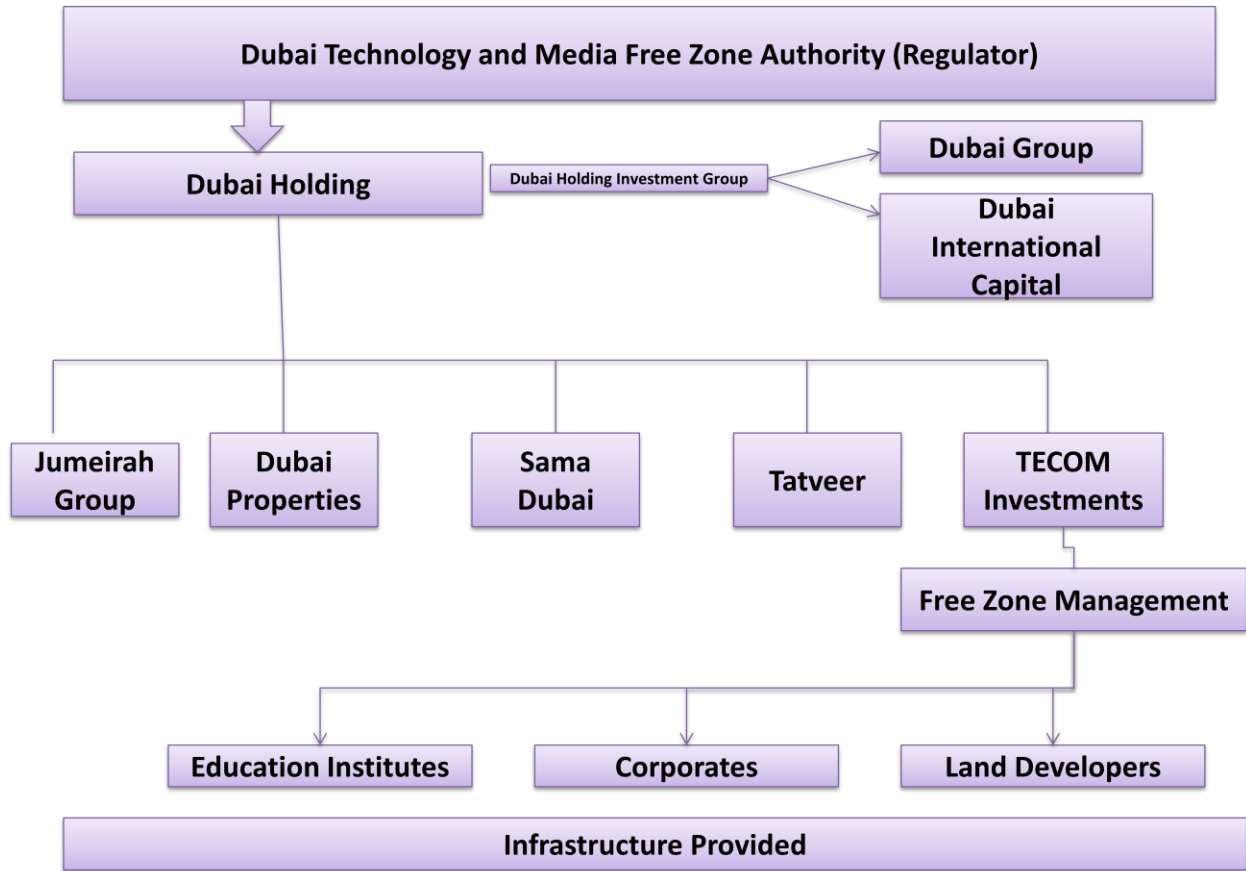
Mission – “Provide quality infrastructure, services and support to the Human Resources Management community to enable their growth and support Dubai’s move into knowledge based economy”

Description	Components	Structure	Some special features
Located in Dubai and managed by the holding company TECOM, DKV is one of the premier knowledge cities in the world. It was established in 2003. Today, DKV operates with 450	<ul style="list-style-type: none"> ▪ Human Resource Development ▪ Executive Search ▪ Linguistics ▪ Assessment & Testing ▪ Research & Development ▪ Human Resource 	Dubai Knowledge Village is located and operates within the jurisdiction of Dubai Technology & Media Free Zone (the “Free Zone”). The Free Zone was established in 2000 by a decree	<ol style="list-style-type: none"> 1. 100% foreign ownership 2. Full repatriation of profits and capital are permitted 3. Guaranteed 50-year exemption

Description	Components	Structure	Some special features
partners in Campus in Dubai which is about 1 km.	<ul style="list-style-type: none"> ▪ Consultancy ▪ Academic Service Providers ▪ Freelancers ▪ Non-Profit Organizations ▪ Retailers 	<p>and has a distinct legal status in the UAE.</p> <p>The Free Zone is regulated by an independent government body, Dubai Technology & Media Free Zone Authority (DTMFZA). DTMFZA develops and implements transparent regulations, in accordance with international standards, which ensure that the companies operating in The Free Zone are able to compete effectively, globally.</p>	<p>from personal, income and corporate taxes</p> <ol style="list-style-type: none"> 4. Exemption from customs duty for goods and services 5. Cluster environment that encourages synergy 6. World class infrastructure support – especially IT 7. Simplified incorporation process and business setting up process 8. Locational advantage

Source: The Dubai Knowledge Village

Figure 9: DKV: Structure



3.3.2 Private/Consortium Promoted Knowledge Cities

3.2.2.1 Education City - Doha



Doha Education city university building

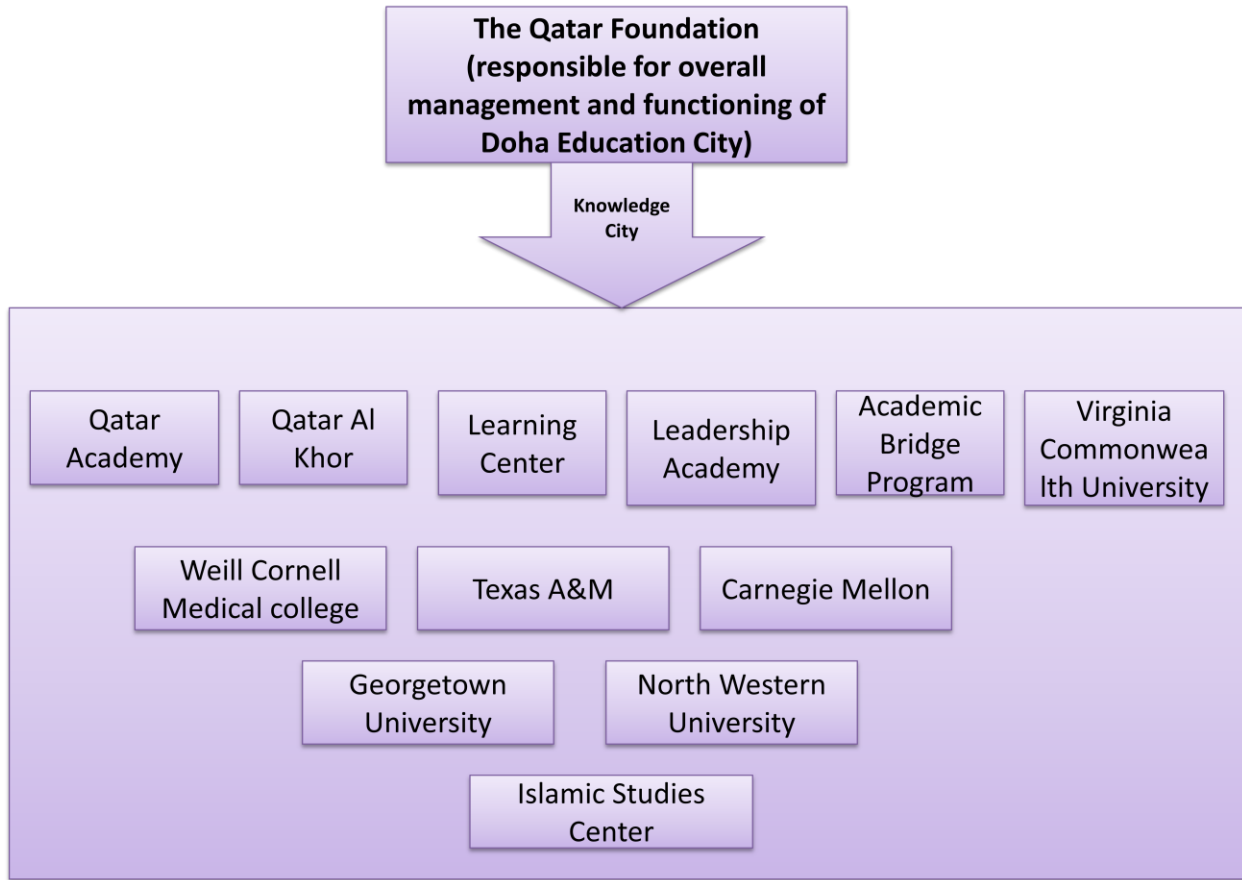
Vision – “To support centers of excellence which develop people's abilities through investments in human capital, innovative technology, state of the art facilities and partnerships with elite organizations, thus raising the competency of people and the quality of life.”

Mission – “To support a network of centers and partnerships with elite institutions, all committed to the principle that a nation's greatest natural resource is its people. Education City, Qatar Foundation's flagship project is envisioned as a Center of Excellence in education and research that will help transform Qatar into a knowledge-based society.”

Description	Components	Structure	Some special features
Education City is an initiative of Qatar Foundation for Education, Science and Community Development. Located on the outskirts of Doha, the capital of Qatar, Education City covers 14 square kilometers and houses educational facilities from school age to research level and branch campuses of some of the world's leading universities. The education city is aimed at making Qatar transform from carbon economy to knowledge based economy	<ul style="list-style-type: none"> ▪ Preschool programs ▪ Secondary school programs ▪ Research centers ▪ International universities ▪ Leadership academy ▪ Centers for Islamic studies ▪ Medical college ▪ Debate centers ▪ Equestrian academy ▪ Publishing house 	Education City is part of Qatar Foundation for Education, Science and Community Development, a private, chartered, non-profit organization in the state of Qatar, founded in 1995 by decree of His Highness Sheikh Hamad Bin Khalifa Al Thani, Emir of Qatar.	Promoted by the government and multi faceted institutes

Source: Education City, Doha

Figure 10: Education City, Doha: Structure



3.2.2.2 Doncaster Education City



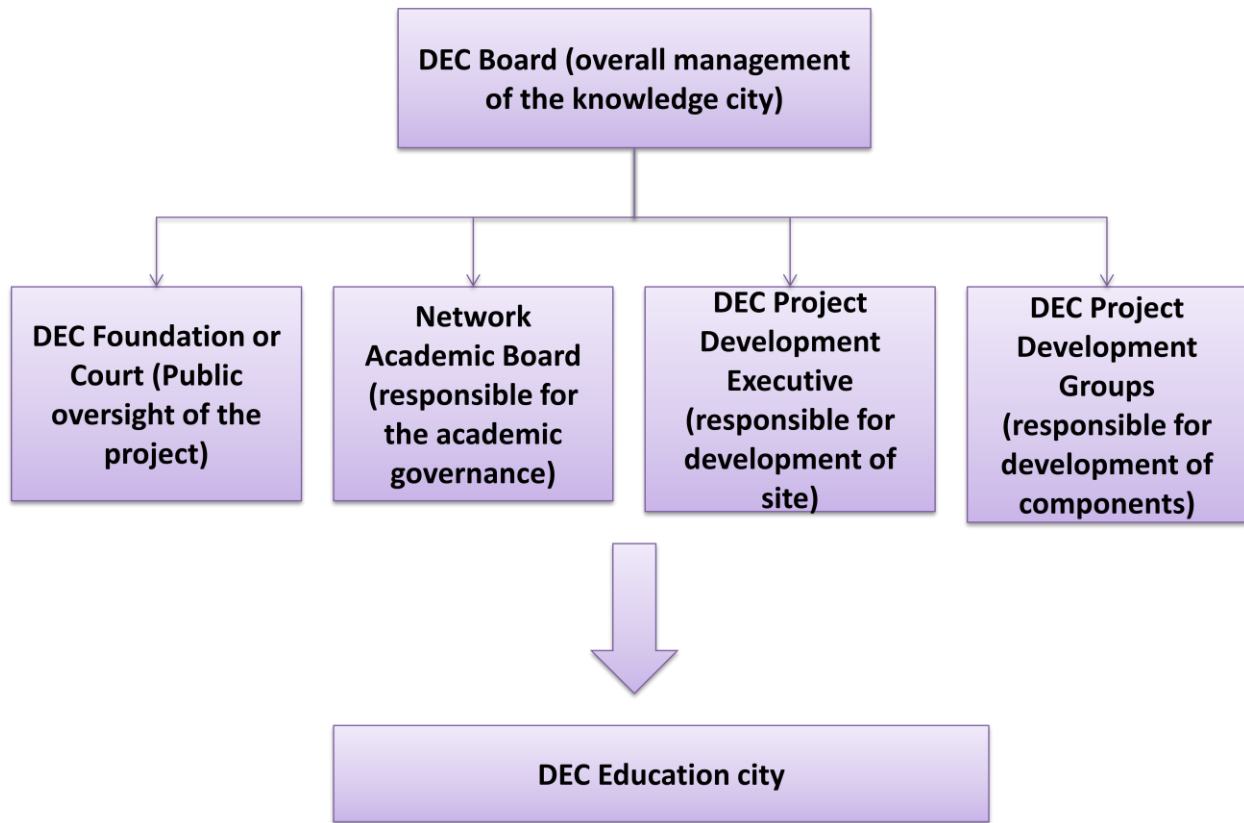
Aerial view of Doncaster education city – new phase

Mission – “Meeting learner needs and aspiring to excellence”

Description	Components	Structure	Some special features
<p>Doncaster Education City (or DEC) is a £90 million higher and further education facility in Doncaster, South Yorkshire, England. The centre piece of the project is a new purpose-built campus in the centre of the town nicknamed The Hub. DEC is a joint project between Doncaster College, Doncaster Metropolitan Borough Council, the South Yorkshire Learning and Skills Council and Yorkshire Forward.</p>	<ul style="list-style-type: none"> ▪ Vocational study institutes ▪ Auditoriums ▪ Plasma screens throughout campus ▪ Drama auditorium 	<p>Joint venture between three institutes, the Doncaster College, the Metropolitan Borough Council and Yorkshire Learning and Skills Council</p>	<ol style="list-style-type: none"> 1. Special thrust given to vocational education 2. A large provider of 16-19 education in South Yorkshire 3. 3,000 Full Time 16-19 year old students 4. Over 10,000 learners enrolled on part and full time courses 5. Centre of Vocational Excellence in 7 different areas

Source: Doncaster Education City

Figure 11: DEC: Structure



3.2.2.3 Caribbean Knowledge City



Proposed structure at the CKC

Vision:

- **Create a supportive, student – centered environment which fosters the acquisition of competence and social awareness**

- Educate and train middle and high level business and professional personnel
- Grant graduate and under-graduate degrees, diplomas and certificates
- Engage industry and the professions in a partnership to promote high performance work places
- Mobilize and manage the required physical, human, technological and financial resources to deliver good quality services on a continuous basis

Mission – “To provide professionally focused tertiary education and training for individuals and organizations, through a student-centered environment that facilitates the acquisition of knowledge, skills and competencies to compete in a global marketplace and which fosters a passion for lifelong learning and excellence, thereby enhancing individual and national economic growth and development. ”

Description	Components	Structure	Some special features
The idea of a knowledge city is a strategic move by the University College of Caribbean Foundation to fuel the formation of creative cities. These creative cities would be located physically in zones throughout the Kingston Metropolitan Area. They will allow the private and public sectors to nurture and support knowledge creation and learning along with innovation.	<ul style="list-style-type: none"> ▪ School zone ▪ Undergrad studies ▪ Grad studies ▪ Corporate studies ▪ Housing zone ▪ Culture zone ▪ Media zone 	<p>In 2002, the Institute of Management Sciences acquired the Institute of Management and Production to form the largest private higher education consortium in Jamaica. The merger created the University College of the Caribbean (UCC). UCC became the parent organization in 2004 and established the second private university college in Jamaica.</p> <p>In 2004 the UCC expanded to form partnerships with the Florida International University (FIU), the University of Florida (UF), and the Florida State University (FSU). In 2005, these partnerships led to the creation of a number</p>	NA

Description	Components	Structure	Some special features
		of training programmes in the fields of business, information technology and engineering.	

Source: Caribbean Knowledge City (still not started full functioning)

3.2.2.4 Panama City of Knowledge



Panama City of knowledge villas

Vision – “From military fort to Center of Knowledge”

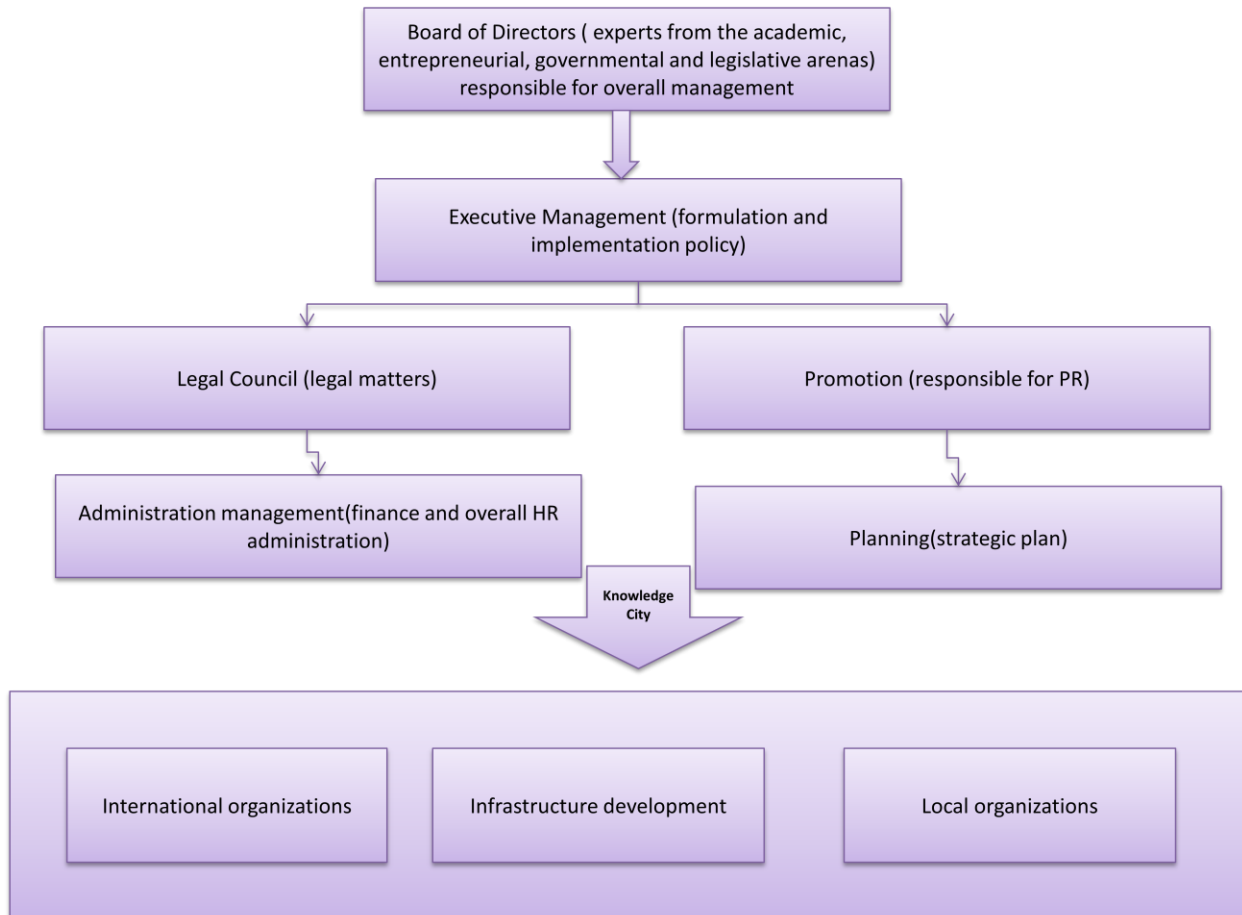
Description	Components	Structure	Some special features
Panama's Ciudad del Saber (Spanish for City of Knowledge) is a government sponsored cluster of academic organizations, technology companies and non-governmental organizations, managed by the foundation of the same name.	<ul style="list-style-type: none"> ▪ IT research ▪ Bioscience institutes ▪ Environmental management institutes ▪ Human development institutes ▪ Entrepreneurship development institutes ▪ Villas ▪ Convention centers ▪ Sports facilities 	Foundation set-up to manage activities of the knowledge city and granted special status by the government	<ol style="list-style-type: none"> 1. Tax and immigration benefits through affiliation to the City of Knowledge Foundation project. 2. Telecommunications, IT and educational technology services, including an intelligent high-tech center with the required capacity for teleconferences, distance learning, fast internet connections,

Description	Components	Structure	Some special features
	<ul style="list-style-type: none"> ▪ Training and business center ▪ Center for conflict resolution 		<p>and other services.</p> <ol style="list-style-type: none"> 3. A Point of Presence - POP- with direct access to the land portion of 5 International Fiber Optic cables that go across Panama (PAC, SAC, ARCOS, Pan-American and MAYA). 4. Infrastructure and buildings in good maintenance condition, easily adaptable to various uses. 5. Technical, administrative and consulting services. Constant electricity flow (99.9%) with redundant power supply from the Panama Canal thermal plant located 300 m (328 yards) away in the Miraflores locks. 6. Complementary accommodation and catering service. 7. Sports and recreation facilities. 8. Access to the major higher learning and scientific research centers in the country. 9. Access to the Panama Canal Basin, a living laboratory for scientific research and technological innovation on advanced tropical ecosystem

Description	Components	Structure	Some special features
			management.

Source: Panama City of Knowledge

Figure 12: Panama City of Knowledge: Structure



3.2.2.6 Barcelona Knowledge Campus



Blue area show the proposed expansions for BKC

Vision:

“Barcelona Knowledge Campus (BKC) is:

- **international leader** in teaching, research, knowledge transfer, innovation and training throughout life
- **focus of university life** in the territory socially integrated, high performance, high quality service and a sustainable development policy that permeates all areas of activity
- **major player in promoting the social**, economic and business in Spain and southern Europe, for its consolidation as a main focus of scientific and technological development”

Mission

“Barcelona Knowledge Campus (BKC) will develop its activities to international excellence through:

- The sum of capabilities and the strategic complementarity of UB and UPC, entities related research and innovation and the social and management to adhere to the proposal.
- active involvement in changing the economic model by generating new activities based on innovation and knowledge
- attracting and encouraging talented

- a comprehensive model committed to its environment favoring sustainable development of society
- comprehensive internationalization
- a process of student-centered learning”

Description	Components	Structure	Some special features
The Barcelona Knowledge Campus is set up in proximity of the Barcelona city in Spain. The aim is to create and hone a scientific temper in the area and gain international prominence for the region in education	<ul style="list-style-type: none"> ▪ Research centers ▪ Innovation centers ▪ Technology transfer center ▪ Entrepreneurship center ▪ Sustainability center 	The University of Barcelona and University of Catalunya International reference institutions have a joint project in the city of Barcelona to create an ecosystem of knowledge that promotes employment, social cohesion and economic development planning. The result of this aggregation strategy is the Barcelona Knowledge Campus.	NA

Source: Barcelona Knowledge Campus (full operations not started)

3.3.3 Regulations Promoted Knowledge Cities

3.3.3.1 Jeju Global Education City



Vision – “To have make Jeju the hub for education in Northeast Asia”

Description	Components	Structure	Some special features
As part of an internationally appealing province creation, Jeju is taking steps to create a knowledge zone for the purpose of attracting international clientele	<ul style="list-style-type: none"> ▪ School zone ▪ University zone ▪ English language zone ▪ Housing zone ▪ Culture zone 	NA	NA

Source: Jeju Global Education City (still not started full functioning)

3.3.3.2 Kuala Lumpur Education City



KLEC Ariel view

Vision – “To foster international collaboration via promotion of the development of clustered network of partner institutions”

Mission – “To create networked, clustered environment for strategic and synergistic learning and teaching, as well as research partnerships”

Description	Components	Structure	Some special features
This was launched in 2007 to transform the education sector of Malaysia. The knowledge city is spread in the Klang Valley, which benefits from the proximity to the international airport.	<ul style="list-style-type: none"> ▪ Tertiary education institutes ▪ Healthcare related institutes ▪ Research centers ▪ Other ecosystem required for development 	<p>Formation of KLEC Group Companies that reflect the various projects that are part of the knowledge city.</p> <p>The main holding company is KLEC incorporated established with a paid up capital of RM 9 million. There are five other partner</p>	<p>1. KLEC has been approved as Entry Point Project (EPP) under the government’s National Economic Transformation Plan</p>

Description	Components	Structure	Some special features
		institutions.	

Source: The Kuala Lumpur Education City (full operations yet to begin)

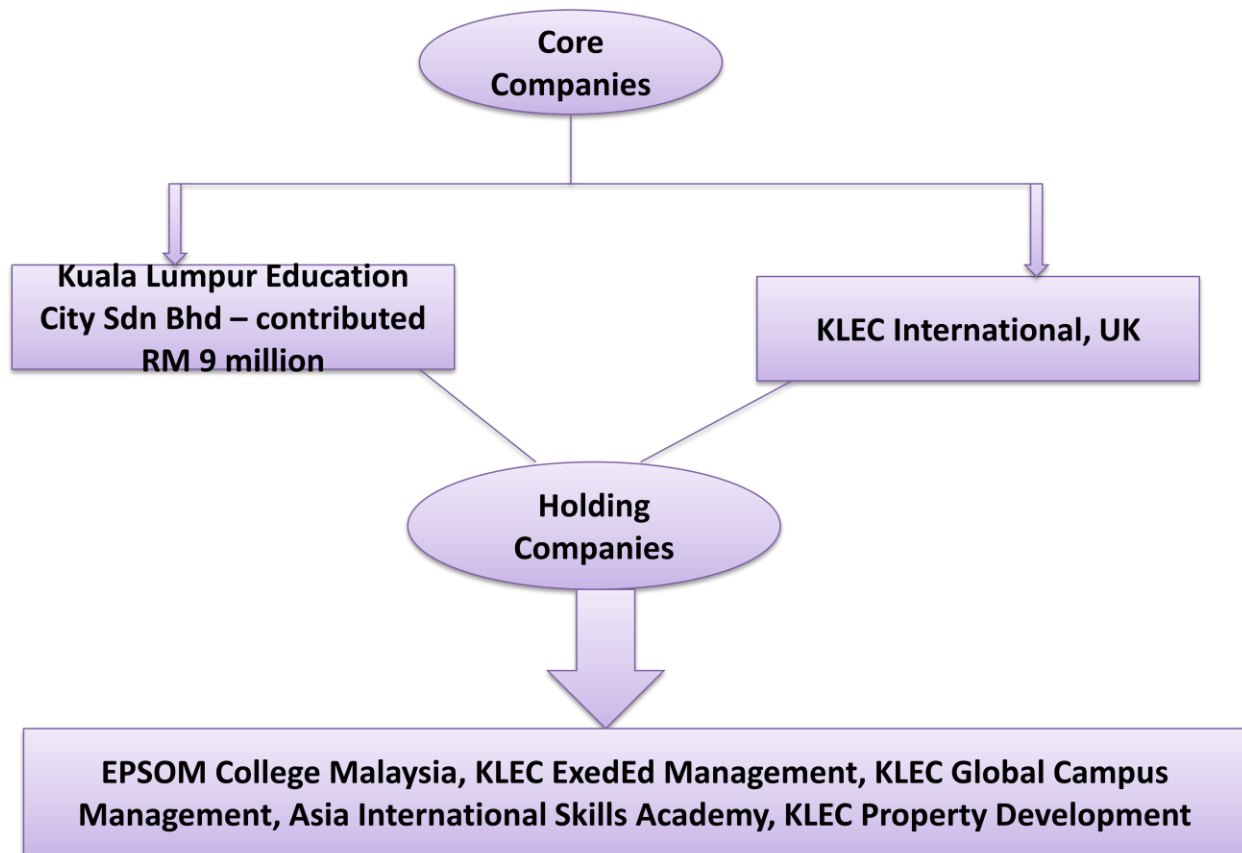
3.3.3.3 Singapore Education City

Vision – “To have sustainable education development”

Description	Components	Structure	Some special features
Knowledge City is a model of sustainable development and industrial upgrading in Guangdong Province. It focuses on Knowledge-oriented economy, an ideal place for high-end talent and Knowledge-oriented businesses with a beautiful environment.	<ul style="list-style-type: none"> ▪ Preschool programs ▪ Secondary school programs ▪ Research centers ▪ International universities ▪ Financial institutions 	Guangzhou reformed the structure of its government agencies in September 2009. This institutional reform resulted in the streamlining of 49 government agencies into 40, and involved the adjustment, dissolution or merger of 29 government agencies and the formation of two new administrative agencies. The reform was aimed at transforming government functions and switching the focus of government work to economic regulation, market supervision, social administration, and public service.	Introduction of the Sino-Singapore Project to promote cooperation between China and the ASEAN Free Trade Area. Also, it will affirm foreign investors' faith in tackling the global financial crisis in Guangdong Province.

Source: Singapore Education City (still not started full functioning)

Figure 13: KLEC: Structure



3.4 Knowledge Cities in India

Though knowledge cities have been established or have started their operations in many parts of the globe, in India this has been a tricky affair. Across the country, several states have made attempts but all the factors are yet to fall into place. The places where attempts have been made or initiated for setting up of a knowledge city are:

1. Jharkhand
2. Delhi
3. Hyderabad
4. Tamil Nadu
5. Gujarat

6. Rajasthan

Some of the more prominent attempts where there has been development in terms of progress to the next stage from the pre-feasibility level are available only in two out of all these attempts.

Table 6: Knowledge Cities in India

Knowledge City	Location	Features	Structure	Status
TRAC Knowledge City	Chennai – Bangalore Corridor	<ul style="list-style-type: none"> ▪ Institutes ▪ Business centers ▪ Hospitality ▪ Real estate ▪ Recreation 	Project financing through Debt will be from the financial institutions, venture capitalists and through FDI in the form of preference shares with cumulative dividend with the option either redeem or convert the debt into equity at par after the project completion	Implementation phase
Baroda knowledge city	Baroda, Gujarat	<ul style="list-style-type: none"> ▪ Institutes ▪ Business centers ▪ Hospitality ▪ Real estate ▪ Recreation 	Equity sort to be a partner. Also, angel investors are solicited. Industrial giants like the TATA group are also invited to have stake	Implementation phase
Jaipur knowledge city	Near the 6 lane Golden Quadrilateral, Jaipur	<ul style="list-style-type: none"> ▪ IT focused institutes ▪ Hospitality ▪ Real estate ▪ Recreation 	Equity participation sought and funding from banks sought in terms of loan. Promoters with educational background invited	Feasibility stage
Hyderabad	Raidurg, near Hi-Tec City	<ul style="list-style-type: none"> ▪ NA 	NA	NA
Delhi	In South Delhi (proposed)	<ul style="list-style-type: none"> ▪ NA 	NA	NA
Jharkhand	Near Ranchi	<ul style="list-style-type: none"> ▪ NA 	TATA Group has offered support	NA

3.5 Key Challenges in Knowledge City Establishment in India

Thus the key challenges in setting up a knowledge city are:

1. Policy and regulations that make PPP in knowledge city a challenge
2. Monitoring mechanism to be evolved

3. The perception of knowledge city ideology becoming a real estate venture
4. Setting up objectives/targets for private and public sectors – as both have fundamentally different ideologies in social sectors like education
5. Perception of knowledge city as a threat by local institutions
6. Ripple effect of increase of education/tuition costs across the value chain
7. Definition of a break-even period in case of service like higher education
8. Creation of a complete education and livelihood ecosystem, from scratch
9. Requirement of big infrastructural investment

Chapter 4: Market Assessment

Market assessment is done to analyze the readiness and potential of a particular product or service to be accepted by the target segment, given a context.

The idea of a knowledge city sounds attractive but the question of where it should come up in Karnataka and what is the bouquet of services that it should offer should be assessed before proceeding to the actual design. This market assessment is two pronged:

- Locational Assessment: analyzing the best possible location where the knowledge city can be situated
- Service Assessment: drawing the broad ambits under which components of knowledge city can house the relevant institutes

4.1 Locational Assessment

The assessment of an area's locational resources is to document its competitive position, and assist it to use its strengths to overcome obstacles to growth will enhance the probability of it being the right site for the establishment of knowledge city.

A knowledge city will be an initiative that requires large investments from both the public and the private sectors. When an investment of such a mammoth scale is on the cards, the site where this initiative is undertaken needs to fulfill certain criteria – of both the hard and the soft nature. The former refers to the criteria which are related to the overall region profile backed by numbers and the latter refers to cultural factors.

Table 7: Hard Locational Assessment Factors

Factors	Explanation
Market Linkage	The overall ecosystem where there can be interface between industry requirement and the academic world
Educational Ecosystem	Funding initiatives must be channeled into Knowledge City easily
Infrastructure	Base infrastructure to build with should be available and ease of upgradation

Factors	Explanation
Industry potential	Number of industries that can relate to tie ups and realization of market potential
Connectivity	The location must be accessible with strong connectivity
Visibility	The location must have a good brand image

The other 'soft' cultural factors that have to be taken into account are:

- *Knowledge is defined, perceived and valued as a form of wealth by the community at large*
- *The importance and contribution of knowledge workers is explicitly acknowledged*
- *The nature and role of knowledge resources are understood by the general public*
- *Priority is given to improving the knowledge infrastructure.*
- *Most members of society have access to careers in knowledge-based activities*
- *The region promotes its "centres of excellence"*
- *The region is already known for its knowledge bank*
- *Ultimately, the region is ready to move into knowledge based commerce*

We have prepared an assessment map to compare the districts in Karnataka across the hard and soft parameters to decide the best possible location for establishment of knowledge city.

Figure 14: Factor Assessment Map

Precondition for location selection	The environment facilitates knowledge based development						
	Districts	Market Linkage	Educational Ecosystem	Infrastructure	Connectivity	Industry Potential	Visibility
Bagalkot	Medium	Low	Low	Low	Low	Low	Low
Bangalore	High	High	High	High	High	High	High
Bangalore Rural	High	High	Medium	High	Medium	Medium	Medium
Belgaum	Medium	Medium	Low	Low	Low	Low	Medium
Bellary	Medium	Low	Low	Low	Low	Low	Low
Bidar	Medium	Low	Low	Low	Low	Low	Low
Bijapur	Medium	Low	Low	Low	Low	Low	Low

Precondition for location selection	The environment facilitates knowledge based development					
Chamarajanagar	Medium	Medium	Low	Low	Low	Medium
Chikkaballapura	Medium	Medium	Low	Low	Low	Low
Chikmagalur	Medium	Medium	Low	Low	Low	Medium
Chitradurga	Medium	Low	Low	Low	Low	Low
Dakshina Kannada	High	High	High	High	High	Medium
Davanagere	Medium	Low	Low	Low	Low	Low
Dharwad	High	High	Medium	High	Medium	Medium
Gadag	Medium	Low	Low	Low	Low	Low
Gulbarga	Medium	Low	Low	Low	Low	Low
Hassan	Medium	Low	Low	Low	Low	Low
Haveri	Medium	Low	Low	Low	Low	Low
Kodagu	High	High	High	Medium	Low	Medium
Kolar	Medium	Medium	Low	Low	Low	Low
Koppal	Medium	Low	Low	Low	Low	Low
Mandya	Medium	Medium	Low	Medium	Low	Medium
Mysore	High	High	High	High	High	Medium
Raichur	Medium	Low	Low	Low	Low	Low
Ramanagara	Medium	Medium	Low	Low	Low	Low
Shimoga	Medium	Medium	Low	Medium	Low	Medium
Tumkur	Medium	Medium	Medium	Low	Low	Medium
Udupi	High	High	High	High	Low	Medium
Uttara Kannada	Medium	Low	Low	Low	Low	Low
Yadgir	Medium	Low	Low	Low	Low	Low

Note: High indicates best performance in the state, moderate indicates that district is on its way to being best in class and low indicates the time required for the respective district to be the best in class is higher and not immediately possible.

Based on the assessment map, in Karnataka, the best suited place for a project of this scope and the site that will meet the criterion has to be near the capital city and the innovation hub – Bangalore.

Certain pertinent points that stand out clearly in favour of Bangalore are:

- Bangalore is an industry hub
- The education scenario being unparalleled in India
- The connectivity and infrastructure

1. Bangalore - Industrial Hub

Bangalore is one of the fastest growing cities in India and is branded as 'Silicon Valley of India' for heralding and spearheading the growth of Information Technology (IT) based industries in the country. With the birth of IT sector, Bangalore has become a magnet for attracting other service oriented industries – starting with hospitality, organized retail and health care of the highest order.

These advancements have extended into the suburbs around Bangalore, making White Field, Electronic City and Peenya communities of their own.

Bangalore is also called as 'aviation monopoly capital of India'. It accounts for a major chunk of the nation's aerospace business. World Aerospace giants such as Boeing, Airbus, Goodrich, Dynamics, Honeywell, GE Aviation and UTL have their R&D and Engineering centres.

The National Aerospace Laboratories (NAL) is also headquartered in Bangalore and is dedicated to the development of civil aviation technologies. A 1,000 acre special economic zone for the aerospace industry is being setup near the Bangalore International Airport.

Biotechnology is another rapidly expanding field in the city. Bangalore accounts for at least 97 of the approximately 240 biotechnology companies in India. Interest in Bangalore as a base for biotechnology companies stems from Karnataka's comprehensive biotechnology policy, described by the Karnataka Vision Group on Biotechnology. In 2003-2004, Biocon, headquartered in Bangalore, is the nation's leading biotechnology company and ranks 16th in the world in revenues.

Institute of Bioinformatics and Applied Biotechnology (IBAB), initiated by Biotechnology vision group, ICICI and Biocon (located at ITPL) is trying to shape revolutionary scientists in the field.

Like the software industry which initially drew most of its workforce from the local public sector engineering industries, the biotechnology industry had access to talent from the National Center of Biological Sciences (NCBS) and the Indian Institute of Science (IISc).

And Indian Biotechnology Research Organisation (IBRO) is recently under process of development to boost Biotechnology Growth in India, providing the Advanced Research and Talent pool to India from IBRO, whose mission and vision is Research and Development in Biotechnology to make India as a global leader in Biotechnology.

Bangalore also has heavy industries which include Bharat Electronics Limited, Bharat Heavy Electricals Limited (BHEL), Indian Telephone Industries (ITI), Bharat Earth Movers Limited (BEML), HMT (formerly Hindustan Machine Tools) and Hindustan Motors (HM).

Bangalore is also becoming a destination for the automotive industry. Toyota has a manufacturing plant while Daihatsu is planning on building a factory soon. Hindustan Motors also has a manufacturing facility in Bangalore as does Volvo Trucks.

In addition, Bangalore houses many small and medium scale industries in its Peenya industrial area that is touted to be one of the biggest in Asia.

2. Bangalore – Education Hub

The existing education infrastructure in terms of the institutes and the research centers have already put Bangalore a notch above rest of the metros in India. Bangalore has a range of courses to offer: from Aerospace Engineering to Agriculture, from Biotechnology to Business Management, from Law to Sociology, from Economics to Nanotechnology, the range is truly impressive.

The Bangalore University, established in 1886, provides affiliation to about 500 colleges, with a total student enrolment exceeding 300,000.

In addition, Bangalore is home to many premier institutes. The Indian Institute of Science, which was established in 1909 in Bangalore, is the premier institute for scientific research and study in India. Nationally renowned professional institutes such as the National Centre for Biological Sciences (NCBS), National Institute of Design (NID), National Institute of Fashion Technology (NIFT), National Law School of India University (NLSIU), the Indian Institute of Management, Bangalore (IIM-B), the Indian Statistical Institute and International Institute of Information Technology, Bangalore (IIIT-B) are located in Bangalore.

The city is also home to the premier mental health institution in India National Institute of Mental Health and Neuro Sciences (NIMHANS). Bangalore also has some of the best medical colleges in the country, like St. John's Medical College (SJMC) and Bangalore Medical College and Research Institute (BMCRI). The M. P. Birla Institute of Fundamental Research institute has a branch location located in Bangalore. All these institutes present already provide a platform for a knowledge city.

3. Bangalore's Infrastructure Strength

There is need for the best infrastructure services to attract the international clientele and make the site accessible.

Bangalore is served by the Bangalore International Airport which started operations from 24th May 2008. It is now the fourth busiest airport in India in terms of passenger traffic and the number of air traffic movements (ATMs).

Bangalore comes under the South Western Railway zone of the Indian Railways. Bangalore City Railway station and Yesvantpur Junction connect it to the rest of the country through the Indian Railways. The

Bangalore Rajdhani Express connects the city to New Delhi, the capital of India. Bangalore is also connected by rail to most cities in Karnataka and other major cities in India. The sprawling Rail Wheel Factory is Asia's second largest manufacturer of Wheel & Axle for Railways and headquartered in Yelahanka, Bangalore. Bangalore city is also building the metro services called Namma Metro which is aimed at ease of commuting without the travel snarls.

4.2 Service Assessment

The service offered by the knowledge city i.e. quality higher and tertiary education should look to provide the education and facilities of the highest order.

But under what broad ambits these institutes should be setup has to be analyzed before the project design. From the analysis of the successful knowledge cities, a laundry list of the institutes' classifications can be analyzed.

Table 8: Knowledge City – Institute Classification

Classification	Types of Institutes
Higher education	<ul style="list-style-type: none"> ▪ Engineering institutes ▪ Management institutes ▪ Arts and science ▪ Design institutes
Research related institutes	<ul style="list-style-type: none"> ▪ Innovation labs ▪ Incubation set-ups
Medical	<ul style="list-style-type: none"> ▪ Hospitals ▪ Traditional medicine study ▪ Diseases research
Speciality institutes	<ul style="list-style-type: none"> ▪ Design ▪ Biotechnology ▪ Mechatronics ▪ Information technology ▪ Disaster management ▪ Geosciences ▪ Leadership development
Lifestyle institutes	<ul style="list-style-type: none"> ▪ Beauty and wellness ▪ Equestrian development ▪ Linguistic studies

The institutes that have to be established near Bangalore must be in sync with the economic scenario and the local aspirations.

4.2.1 Special Institute for Biotechnology Related Research

The Biotechnology Specialization Development would focus on advanced research in the field of biotechnology with collaborations with leading international institutions, research laboratories and universities.

India is recognized as a mega bio-diversity country. Biotechnology in India offers opportunities to convert the biological resources into economic wealth and employment opportunities. Innovative products and services that draw on renewable resources bring greater efficiency into industrial processes, check environmental degradation and deliver a more bio-based economy.

In fact, India has been ranked among the top 12 biotech destinations worldwide and third largest in the Asia-Pacific region.⁸

The reason why this would be an apt component of the knowledge city near Bangalore is because of Bangalore already being a hub for biotechnology in India.

Table 9: Biotechnology Factor Advantages

Factor	Explanation	Position of Bangalore
Knowledge assets	<ul style="list-style-type: none"> ▪ Policy level thrust ▪ Available database of expertise 	<ul style="list-style-type: none"> ✓ Biotechnology is given policy thrust ✓ Bangalore is the home of the largest bio cluster in India with total revenues of over Rs 14 billion and having 158 of the 320 companies working on biotechnology in India ✓ The biotech industry is currently suffering from a lack of trained manpower and has been forced to resort to importing talent, which is proving to be a very expensive affair⁹
External environment	<ul style="list-style-type: none"> ▪ Conducive to new R & D projects ▪ Presence of biotech cluster ▪ Attract biotech entities to region 	<ul style="list-style-type: none"> ✓ Upcoming investments in electronic city suburb of Bangalore ✓ Investments and joint venture upcoming in the biotech sphere¹⁰
Human resource	<ul style="list-style-type: none"> ▪ Availability of qualified candidates 	<ul style="list-style-type: none"> ✓ The Industry is expected to touch 10 billion dollar by 2015 is likely to

⁸ Source: IBEF

⁹ Government of Karnataka, Industry Watch

¹⁰ Advantage Karnataka

Factor	Explanation	Position of Bangalore
	<ul style="list-style-type: none"> ▪ Availability of research level graduates who will add to the intellectual property 	<p>face a acute shortage of trained manpower</p> <ul style="list-style-type: none"> ✓ India produces about 8000 biotechnology graduates and the industry employs 15,000; with the deficit being made up by foreign recruitment ✓ In the next five years, the HR demand is expected to touch 60,000¹¹ ✓ Requirement of new academic structure to hone biotech expertise

Areas where specialization is required to be built¹²:

1. **Stem cell research**: the speciality area that intervenes in disease treatment process by introducing new stem cells in the damaged tissues. This research has a lot in store in treatment of several life threatening diseases. Recognizing the value of this field, the government allotted Rs 300 crores for study and there is high aspiration in the researchers to undertake study in this area.
2. **Computational biology**: Computational biology involves the development and application of data-analytical and theoretical methods, mathematical modeling and computational simulation techniques to the study of biological, behavioral, and social systems. This field is in nascent stage in India with dedicated centers in all major universities and research centers.
3. **Bioengineering**: this is the application of concepts of bioscience to solve real world problems. The best case example of bioengineering is to design useful machines studying the processes of animals. There is growing interest in bioengineering in India with it being offered as courses in institutions.
4. **Genetic engineering**: this is the study and modification of an organism's genome. This is a field that has gained popularity in India with many institutes offering the courses and higher research opportunities.
5. **Biomedical instrumentation**: Biomedical Engineering is the application of engineering principles and design concepts to medicine and biology. This field seeks to close the gap between engineering and medicine: It combines the design and problem solving skills of engineering with medical and biological sciences to improve

¹¹ Study by BioSpectrum and acknowledged by Union Biotechnology Secretary

¹² The list of specialization is indicative only

healthcare diagnosis, monitoring and therapy. This is a nascent field in India with core research work yet to kick-start.

6. **Bioinformatics:** This is the application of computer science and information technology (IT) to the field of biology and medicine. With growing number of graduates in India in IT who are looking to twin, this research has bright prospects.
7. **Green biotechnology:** This is biotechnology applied to agricultural processes. With India looking to diversify and find new stronger produce in agriculture, green biotechnology has good future for research. There are not many institutes in India that offer research facilities in this.
8. **Pharmacogenomics:** This is the branch of pharmacology which deals with the influence of genetic variation on drug response in patients by correlating gene expression or single-nucleotide polymorphisms with a drug's efficacy or toxicity. By doing so, pharmacogenomics aims to develop rational means to optimize drug therapy, with respect to the patients' genotype, to ensure maximum efficacy with minimal adverse effects. This is also in a nascent stage in India where the Department of Biotechnology is receiving research proposals to be funded.

With the Indian biotechnology sector being one of the fastest growing, if the gap in the quality of the human resource can be filled, India can be the global leader in the biotech field undertaking research in the above fields.

India is already being globally recognized as a manufacturer of economical, high-quality bulk drugs and formulations. With a well developed scientific infrastructure, India has great potential to become a leading global player in biotechnology with intellectual property also.

4.2.2 Institutes of Higher Learning

The academic might of Karnataka does not solicit specific introduction, with it being the hub for several world class institutes. But, overall there needs to a shift towards enhancing quality and honing of a scientific temper amongst the youth.

The institutes of higher learning will comprise of universities and colleges that will be a magnet for the local youth as well as attracting international students.

The market oriented education in these institutes will bridge the skill gaps and open the doors for knowledge building and skill enhancement in the state.

4.2.3 Institutes for Innovation and Incubation

The current research scenario in India is not very optimistic. Research in Indian universities can only be improved with the help of industry. In India, the percentage of turnover that industries have allocated for research is very less, worldwide two percent of industry turnover goes to research development activities. The research in India is done mostly in government laboratories or government funded

institutions that are not sustainable, this is one facet that needs to be addressed. India is said to contribute a mere 2.1 per cent in the world's scholarly publications from 1996 till date. The contributions of other nations like the US or China is far more. This is due to the following major factors:

- Curriculum that does not focus on research
- Lack of funds with the public sector to invest in high end research
- Research mainly tied to organization needs

The institutes for innovation and incubation in the knowledge city would offer state-of-art shared infrastructure services for the occupants. The resources offered by these institutes would be coupled with ecosystem provided by other elements of the knowledge city and thus would have synergetic impact on the companies setting up research and development centre. International scientists, researcher and expatriate Indians will be targeted which would substantially increase the human capital in the region.

The idea of these institutes is to nurture knowledge economy by bringing multinational corporations with know-how in sectors such as pharmaceuticals, Clinical research, Chemicals, Automotive etc. With shared resources and availability of cross functional human resource, the level of research and technology churned could far reaching impact on industrial and domestic consumer problems. The concept and activities of these institutes can be supported by development of IT-infrastructure, educational facilities and IT based industry in Karnataka.

4.3 Demand

The demand for the usage of high facility and state of the art academic infrastructure will be appealing to a certain niche segment of people. This segment will comprise of the following broad categories of stakeholders:

- Number of students across the globe who *migrate* out of their country to pursue higher education. This could be due to the want of superior infrastructure, ambience and cultural impact
- Specifically, the number of *foreign students who come to India* to pursue their higher education
- The *Indian students who go abroad* under the perception that the current system here is not up to the mark to pursue research or any other specialization
- Number of Indian students who *aspire* to go abroad

Also, in general the knowledge city will also appeal to the vast number of students who want a research oriented atmosphere.

Though the knowledge city target segment is often perceived as niche segment, the numbers will in reality reflect the changing mindset of today's youth and the global education trends.

Table 10: Demand for Knowledge City

Phenomenon (as of 2011)	Demand
Number of global students studying abroad	3,700,000
Number taking GRE in India	67,605
Number of foreign students in India	12,704
Number of Indians abroad	222,788
Number of foreign students in Karnataka	1,500

Source: IMaCS Analysis

It is not required that a single knowledge city will fulfill the demands of this target segment. But, over period of time, the establishment and functioning of one single knowledge city will serve as a case in point for more and hence this demand can be addressed.

Chapter 5: Project – Knowledge City

5.1 Project Description

The knowledge city will be a model for state-of-the-art knowledge based community development, in pursuit of advanced research, innovation, incubation and tertiary education, to catalyze the transformation to a knowledge based economy. The development will add tremendous value and bringing global recognition to the knowledge city, by invigorating the human capital to a world class level as well as acting as a catalyst in transforming the socio-economic development.

Karnataka state with its innovation oriented culture and high growth in terms of industrial infrastructure makes it the perfect location for a high end, campus style development. The presence of proposed knowledge city would have a dual-synergetic impact on the overall development of the education quality. The synergies are available because of strategic location of the knowledge city, current educational facilities, current healthcare facilities, proximity to manufacturing hub, and presence of large corporate houses in Bangalore.

Once operational, the knowledge city will act as a means to attract more national as well as multi-national companies to set-up their base in Karnataka. The conglomeration of industries will lead to the overall development of the region with larger employment avenues and world-class infrastructure (as planned).

Each element of the knowledge city as well as the overall theme adds value to the current and future plans for development of education not only in Karnataka but whole country.

5.2 Project Vision

To create a world class education ecosystem in pursuit of advanced research, innovation and education that would catalyze the transformation to knowledge based economy and make Karnataka a brand synonymous with quality education

5.3 Objectives of the Project

1. *Develop Bangalore as a destination for investments in higher education*
2. *Position the knowledge city as a centre of excellence and regional hub for learning and innovation serving the entire country*

3. *Develop key initiatives with the help of speciality institutes to bridge the talent gap in India and hone newer upcoming speciality skills*
4. *Link & develop the skills and know-how of the industry*
5. *Enhance national economic development efforts by developing a skilled and educated workforce and creating new jobs.*
6. *Build an ecosystem that is founded on synergy and creates a learning environment*

5.4 Project Components

The institutes that have to a part of the knowledge city will be under the broad ambits of:

1. Biotechnology specialization development
2. Higher and tertiary education
3. Centers for innovation and incubation

In addition to these, an ecosystem has to be created that would enable a good work life balance for all the stakeholders who would be a part of the knowledge city.

Biotechnology Specialization Development

As analyzed earlier, biotechnology is one of the strong points of Karnataka, especially Bangalore considered as the Biotech capital. A multi-level research institute that encourages rigorous research and intellectual property focused along the following sub-fields will be a key component of knowledge city:

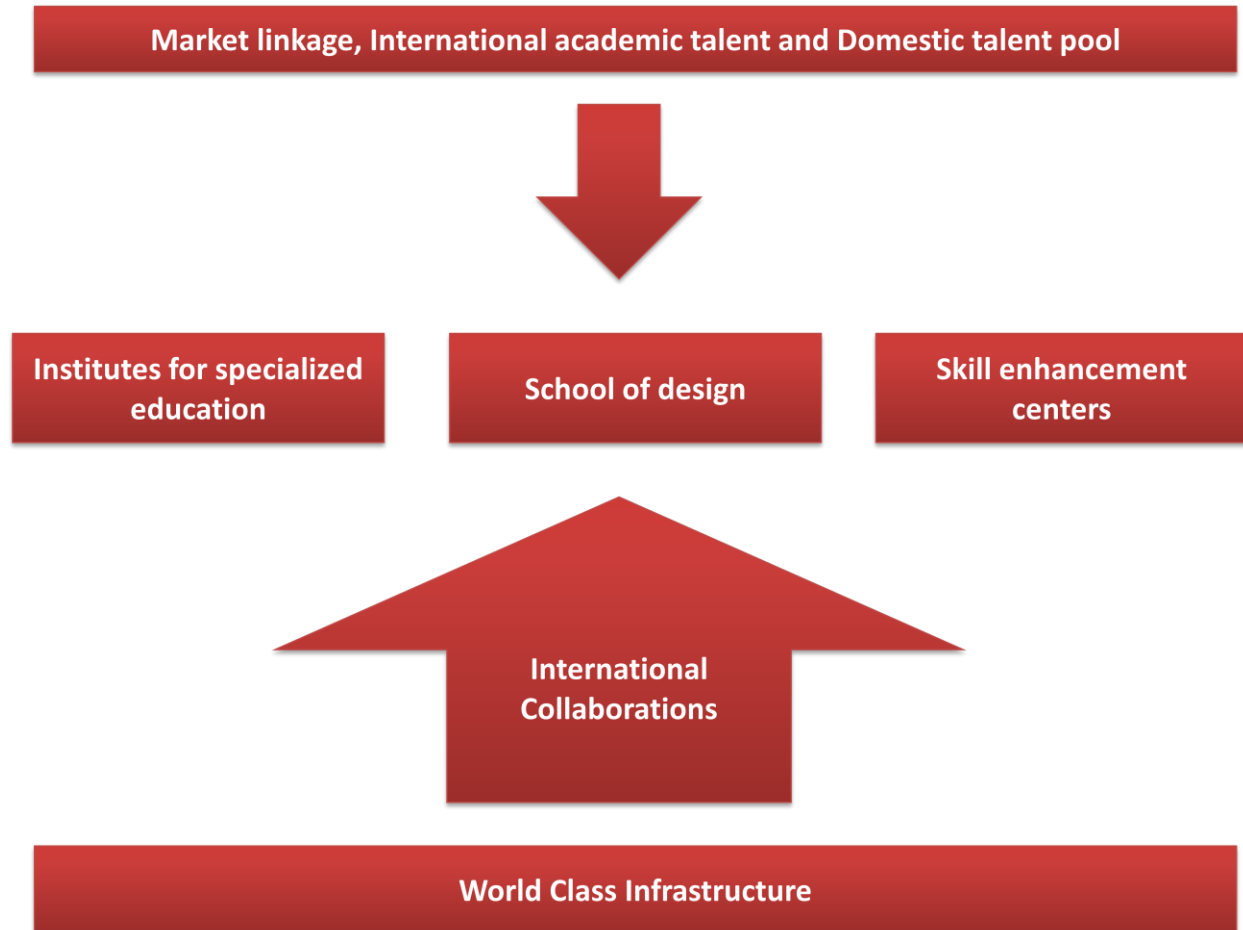
1. **Stem cell research**
2. **Computational biology**
3. **Bioengineering**
4. **Genetic engineering**
5. **Biomedical instrumentation**
6. **Bioinformatics**
7. **Green biotechnology**
8. **Pharmacogenomics**

Higher and Tertiary Education

The Higher and Tertiary education comprises of three types of institutes:

1. Institutes that are focussed towards Specialised Education
2. Institutes that are focussed at designing
3. Institutes that foster skill development

Figure 15: Representation of Higher and Tertiary Education Component



The **Universities for Specialised Education** will collaborate with leading international universities) and certification institutes to offer long term as well as short term courses. Courses will be delivered by excellent faculties from India and abroad. In addition to Indian student aspirants, the courses would also attract aspirants from South Asian countries and neighbouring countries.

The key differentiating factor would be availability of global recognised certified education, and strong research linkages with industry-academia centres. The centre will focus on application oriented courses

such as film editing, animation and graphic designing, sport journalism, quantitative finance etc which have high growth potential. Globally accepted certifications will add to the credentials of Indian workforce and will encourage multinational companies based in developed nation to outsource larger amount of critical work to emerging countries like India. Availability of leading international institutions in India would thus reduce the brain drain to some extent in the region and stimulate reverse-brain drain.

High consumer preference for innovative product designs, companies are actively scouting for qualified design professionals in the field. **The School of Design** would address the paucity of design talent in India as emphasised in the Design Policy 2007. International collaborations here will make it more attractive.

The **Institutes for Skill Enhancement** would provide an ecosystem and infrastructure for companies in and around Bangalore and other industry clusters to improve the skills of their employees. The Centre would provide companies with shared resources in terms of technology, equipment and human resource inputs from other entities residing on the knowledge city.

Also, these institutes would help in honing skills that cater to the industries according to their inherent demands.

Unique aspects in Skill Development Institutes

- a. Centre would provide shared infrastructure and technological inputs for domestic companies/corporates which do not have facilities of their own for skill enhancement facilities or do not wish to invest in infrastructure
- b. Availability of expert inputs on skill enhancement in respective sector through academic affiliation of the campus
- c. Courses offered would be certified short term courses or tailor made courses for companies/corporates

Institutes for Innovation and Incubation

The Indian research scenario needs to be given fresh impetus. The Indian government has also woken up to this fact. It has even set up the N R Murthy Committee to find ways to rejuvenate the research in India. Focusing on new, nascent fields to set-up innovation and incubation centers will be a key component of the knowledge city. These institutes should target the sectors that India and world is hoping to build expertise in, in the upcoming years. This will serve to attract the best of academic talent.

Some of the key target sectors in which institutes can be established for innovation and incubation are¹³:

- **Nanotechnology**: study at manipulation at atomic and sub-atomic level. The world is going 'nano' as many research reports suggest. Research along these lines will attract international minds.
- **Cryptography**: simply put the science of coding and information subfertage. This is gaining fast admirers in research with its immense possibilities across sciences.
- **Aerospace**: Bangalore is the aerospace capital. The research, design and manufacturing is gaining vogue over the world.
- **Neural networks and fuzzy logic**: patterning of various networks on mathematical models based on the human brain is a field that is attracting more academia.
- **Network security**: with more incidents of hacking and threats to the networks, this has become an area of research to prevent attacks.
- **Robotics**: with humanoid robots being the future and robotics market still in the growth phase this field presents tremendous opportunity for building a knowledge pool.

5.5 Interaction with select stakeholders

The knowledge city is an idea that requires interaction with stakeholders and experts who will represent the respective segment's aspirations and views.

1. Government

- Knowledge City in Bangalore is possible due to the city already being known for innovation
- The model for the knowledge city is of great importance
- This should not just be a real estate venture but should aim at knowledge creation
- It is better to conceptualize broad headers under which the knowledge city should be composed
- A factor of importance is that one of the components should be linked to the local economy to provide the impetus for the local industry
- The SWOT of the concept should be borne in mind to bring out the best possible results
- The social impact of this concept has to be evaluated
- The biggest challenge will be to create a functioning knowledge city in India

¹³ List of research areas is indicative

2. Potential Investor

- Bangalore is the right city to proceed with knowledge city investment
- It already has many research based institutes that have created brand image for it
- It is possible to break even easily, in few years, due to the high demand
- This demand also extends to corporate who want people in research
- Also, the students also want quality places to study

3. Student Community

- Prefer to study in quality institutes in India than go abroad
- The only motivation for going abroad is not the quality but also the overall education environment
- The system in India makes it difficult for twinning or to do continuous courses
- Also, the courses is rote oriented and not finding oriented
- In extreme cases, find it difficult to gain footing in companies
- If India can develop a similar knowledge city like that in Dubai, not only for Indian, many other countries' students can also learn and will give rise to cosmopolitan atmosphere
- Apart from just institutes, there should be auxiliary places also for students
- These should range from multiplexes to malls for good balance

5.6 Knowledge City Developmental Needs

A successful development and sustainable maintenance of a knowledge city requires it to be more than a real estate venture. An ecosystem that nurtures a community bent on scientific temper has to be realized. For this, there is a necessity to satisfy the needs of all the stakeholders who will be part of a knowledge based ecosystem.

There are certain bedrocks on which this knowledge city and more pertinently, the ecosystem, have to be analyzed:

- Knowledge city is designed with a clear purpose of optimizing human and intellectual capital (e.g., intellectual property, social capital, relationship capital, and intangible value) within a prescribed geographic area or context
- It is based on an economic model of abundance, as opposed to one of scarcity (i.e., classic material models based upon supply and demand). Wealth-creation solely depends upon creative ideas and infinite recipes for innovation.

- In a way, it is similar to an economic trade zone. It creates markets for intellectual capital and orchestrates the design, development and deployment of intangible assets. Working in this context facilitates the flow of robust and expanded knowledge-based commerce, trade and exchange
- It is designed to optimize creative talent and harness the untapped human capital of all participants and stakeholders. While respecting intellectual property rights, the zone simultaneously enables and enlarges the open source creative commons, where knowledge and ideas are pooled for mutual advantage.
- It also facilitates new forms of citizenship in which openness, transparency, and accountability are encouraged. Shared values, well informed decision-making, and networks across community sectors, countries and enterprises create sustainable collaborative advantage.
- Above all, there are consistent dynamics of interaction. They apply to network formations in any type of knowledge-based development: an individual, an enterprise, a group of cooperating enterprises, a knowledge cluster, city and finally a nation

Table 11: Knowledge City – Developmental Needs

Stakeholder	Developmental Need
Students	<ul style="list-style-type: none"> ▪ Housing ▪ Sporting amenities ▪ Entertainment zones ▪ Socialization spots ▪ Shopping ▪ Medical facilities
Faculty	<ul style="list-style-type: none"> ▪ Accommodation facilities ▪ Shopping ▪ Schooling for family ▪ Medical facilities ▪ Recreation facility
Visitors	<ul style="list-style-type: none"> ▪ Accessibility ▪ Hospitality facility ▪ Socialization spots
Corporates	<ul style="list-style-type: none"> ▪ Trained and employable graduates ▪ Partnership courses with Universities
Educational institutes	<ul style="list-style-type: none"> ▪ Policy and regulation ▪ Basic infrastructure support ▪ Autonomy to conduct their curriculum

5.7 Best Case Study: The Dubai Knowledge Village



The Dubai Knowledge Village Views



The Dubai Knowledge Village location – showing the amenities and plan

Dubai Knowledge Village is an educational free trade zone campus in the city of Dubai, United Arab Emirates, which provides facilities for training and learning institutions to operate with 100% foreign ownership. There are over 400 institutions operating within it, which include universities, training centers, professional centers and HR companies.

It is owned by Dubai Holding's subsidiary TECOM Investments. It was launched in September 2003. It was set up to position the Dubai Technology and Media Free Zone as a centre of excellence for learning and innovation.

It is perhaps the only successful – in terms of the quality of the institutes that have set up their campuses and the profile of the academia – knowledge city/village model in the world.

The objectives of the Dubai Knowledge Village are:

- Develop Dubai into a destination for education
- Position the Middle East as a centre of excellence for learning and innovation
- Lead, promote and facilitate the use of e-learning in education and training in the Middle East
- Develop key initiatives to bridge the talent gap in the region
- Link & develop the skills and know-how of the industry

Some of the key benefits that this knowledge city model offers are:

1. 100 per cent tax-free ownership
2. 100 per cent repatriation of capital and profits
3. No currency restrictions
4. Easy registration and licensing
5. Protection of intellectual property

Apart from the above incentives offered by the Free Zone, investors can avail benefits from various Tax treaties concerned with the avoidance of double taxation. As of 2009, the United Arab Emirates has entered into double taxation agreements with 47 countries. This network includes treaties with Armenia, Austria, Belarus, Belgium, Canada, China, Czech, Finland, France, Germany, India, Indonesia, Italy, Korea, Malaysia, Mauritius, Netherlands, New Zealand, Pakistan, Poland, Romania, Seychelles, Singapore, Spain, Thailand, Turkey and Ukraine. The UAE has also entered into a Transport Tax Treaty with India, Netherlands, Singapore, Sri Lanka, Switzerland and United States.

Table 12 Dubai Knowledge Village – Unique Features

Feature	Unique Characteristics
Legal Entities Permitted	<ol style="list-style-type: none"> 1. Free Zone Limited Liability Company 2. Branch Office of a Foreign Company 3. Branch Office of an UAE Company
Type of Licenses Issued	Commercial & Services
Shareholders	Minimum one, no maximum limit
Shares	No bearer shares will be allowed. All shares must be fully paid when allocated. No different classes of shares allowed
Presence	The shareholder has to be physically present either himself or through an attorney at the Free Zone
Taxation	There are no taxes on profits, capital gains or any other form of tax on the company levied by the government
Facilities Offered	Commercial space, Executive offices, Business centre (open office & Executive suite)
Visa Eligibility	Free lancer permit, Employee Visa and dependent visa offer depending on size of office, type of company and activity
Governing Law	Companies are subjected to the UAE law in general and for some specific function law of the Emirates of Dubai

Source: the Dubai Knowledge Village, Information memorandum on Setting up in DKV

In addition to these assistance and policy level aid offered by the UAE government, the main factor that has made the Dubai Knowledge Village successful is the large expatriate population in Dubai who prefer high education quality. Once this captive demand was met, the DKV was expanded in phases that

captured a broader market of international students who wanted education and infrastructure of the highest quality.

The proposed Knowledge Village in Karnataka should also aim for an international clientele, exploiting the national craze for quality education simultaneously.

5.8 Project Design

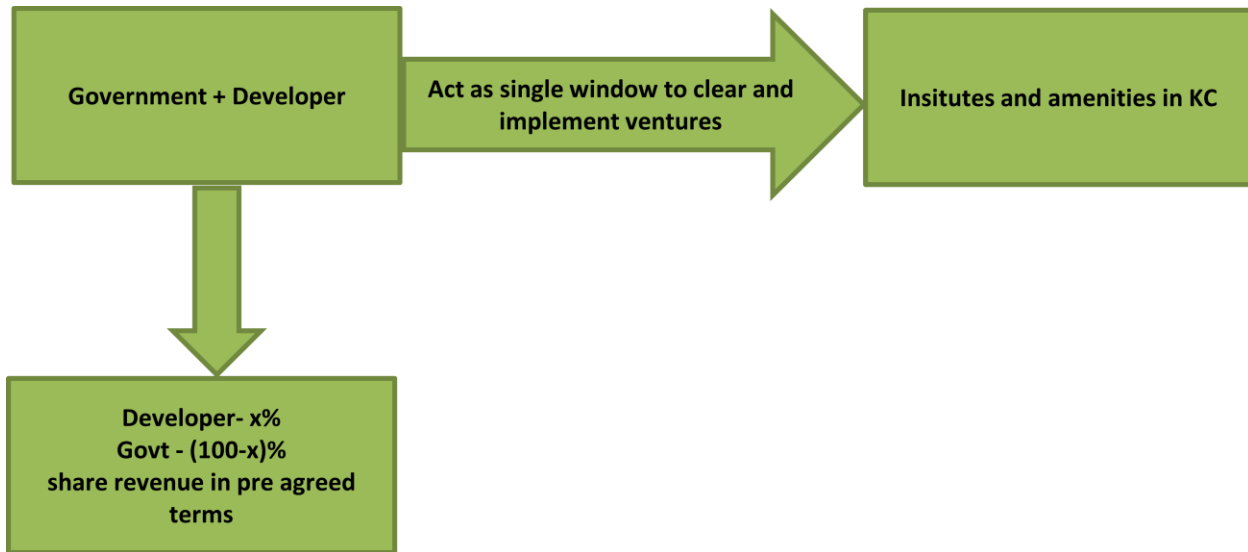
Education is a social sector where the responsibility for the provision of quality service rests with the government. But, in the case of a knowledge city, there are several factors that make it inherently suited for a PPP:

1. The world class infrastructure that needs to be established
2. The ecosystem that need to be built
3. The corporate participation required to make it successful market based model
4. Marketing efforts that need to be undertaken to establish it

Given the fact that in India, the government already has welfare spending which are very high, it becomes imperative for the private sector participation to create a successful knowledge city.

Type of Agreement

The Government and the Developer should form an entity that acts as single window to clear and implement the ventures. This entity is basically the Regulator for the knowledge city. There will be equity participation.



Role of Public Sector

1. To provide the land for the knowledge city
2. Ensuring access to water, electricity and other basic amenities required for successful functioning of knowledge city
3. Providing a conducive organizational atmosphere for the set up to operate
4. Set up a monitoring mechanism to judge the performance of the knowledge city
5. Policy and regulatory level changes to facilitate globally competitive education

Role of Private Sector

1. Constructing the required institute with state of the art infrastructure
2. Recruiting, training and retaining of human resource for the institutes
3. Adhering to the applicable laws and regulations
4. Reporting as per the expected norms of the terms of reference
5. Maintaining the infrastructure at the highest quality
6. Providing services to the government at rack rate/pre agreed rate

Revenue Model

Participants in this project will have to become equity share holders of the Special Utility Vehicle and further the promoting company will also become equity share holders in the participating companies.

Income will be generated for the private players by the following means:

1. The academic fee from the students/academicians
2. Corporates using the high end facilities available
3. The recruitment fee paid by visiting companies
4. Rental and sale of villas and apartments

Income will be generated for the public sector by the following means:

1. Availing the high end facilities at rack rate
2. Rent from lease and sale
3. Soft benefits like the enhanced brand value of the state at international forums

Chapter 6: Project Financials

6.1 Project Cost

6.1.1 Overall Cost

	Total Project cost (in Rs crores)	Total
1	Land Cost	797.02
2	Stamp duty / Registration	39.85
3	Project design cost	80.33
4	Building & Construction cost	1,761.83
5	Other construction costs (Land Prep.)	110.54
	Total Project cost	2,789.57

6.2 Tariff Revenue System and IRR

The main sources of revenue are from the rent, residential sale of the villas and apartments and the other income.

Rs. Crore	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15
Core activity															
Rental revenue	-	-	-	196.63	309.69	541.96	569.05	597.51	627.38	658.75	691.69	726.27	762.59	800.72	840.75

Rs. Crore	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15
Other income	-	-	-	26.22	41.29	72.26	75.87	79.67	83.65	87.83	92.23	96.84	101.68	106.76	112.10
Noncore activity															
Residential sale	25.05	115.86	249.51	146.15	182.80	21.32	-	-	-	-	-	-	-	-	-
Other income	0.14	0.26	0.70	0.86	1.07	1.16	1.21	1.27	1.34	1.40	1.47	1.55	1.63	1.71	1.79
Total revenue	25.19	116.13	250.21	369.86	534.85	636.69	646.14	678.45	712.37	747.99	785.39	824.66	865.89	909.19	954.64

6.3 IRR

The IRR is 18 per cent.

Rs. Crore	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15
Free cash flow for equity shareholders	(2,779.41)	97.36	225.7	324.1	473.0	551.4	558.4	587.1	617.1	648.7	681.9	716.7	753.2	791.6	6,892

Chapter 7: Statutory and Legal Framework

Some of the key regulatory aspects that have to be clarified before knowledge city on international standards has to be set up are:

1. Creation of special knowledge zone, on the lines of SEZ
2. Single point clearance for the projects
3. Establishment of foreign universities in India act
4. UGC granting autonomy to the participant institutes
5. UGC giving the approval to the knowledge city curriculum
6. Tax benefits to the member organizations
7. Approval from AICTE for technical institutes syllabus
8. FDI approval in the knowledge zone

Chapter 8: Operating Framework

8.1 Risks and Mitigation

The project involves a few risks both for the Government and also for the private developer consortium. These will occur in the two phases of the knowledge city implementation i.e. implementation phase and operation phase. These risks have been classified as High, Medium and Low.

Risk	Description	Risk Mitigating Mechanism	Risk Level
Implementation Phase			
Land Acquisition rights and access	Land identified for the construction of knowledge city has to be acquired / leased with full rights and licenses to use land	The Government of Karnataka should identify the land and facilitate the process	LOW
Ground Risk	Land identified for the construction of knowledge city has to be assessed for suitability and potential risks	The developer consortium and the government should assess the ground risk, pooling in their collective experience	LOW
Construction Cost	Construction cost might increase because of increase in raw material prices and construction delay	The developer consortium should have a proven track record of executing mega ventures and be able to complete it in time	LOW
Latent Defects	The constructed infrastructure may contain defects or malfunction because of negligence during construction	The developer consortium should have a proven track record of developing and executing large scale theme based real estate projects and should oversee the quality of construction in close co-ordination with in-house experts and external consultants	LOW
Commissioning	Delay in commencement of construction because of lack of	The consortium partner would bring expertise of knowledge based themed	MEDIUM

Risk	Description	Risk Mitigating Mechanism	Risk Level
Risk	funds, permits, and/or expertise	development. Further, the consortium should initiate discussions with various prospective partners for operationalising the various elements of knowledge city	
Financing and Re-financing Risk	Shortage of monetary liquidity	The project will be funded by mix of debt and equity, debt would be availed from commercial banks in India or abroad	MEDIUM
Interest Rate Risk	The interest rate risk refers to the risk to cash flows of a project changing because of a rise in interest rates in the future	The project has been structured with a mix of debt from term lending institutions and equity from shareholders. The debt component is, however, subject to the terms and conditions including upfront fees (if any), draw down schedule and sanction rates of lender and appraisal process.	MEDIUM
Operational Phase			
Revenue Risk	Revenue risk will be because of the fluctuation in lease rentals, inability to operationalise the elements of knowledge city in a timely manner, coupled with inability of the occupant to service the lease contract	Lease rentals will be inline with corresponding market rates, however, premium would be charged for maintenance services made available. The individual elements of the knowledge city are conceptualized and designed to ensure commercial viability on a conservative basis, in order to take care of this risk.	MEDIUM
Operations Risk	Operations risk is primarily related to the performance of	The consortium will supervise the O&M of knowledge city and will	LOW

Risk	Description	Risk Mitigating Mechanism	Risk Level
	the infrastructure and personnel operating the facilities	depute experienced professionals for the same. Further, the operations risk of operating the individual elements will be on the partners for each of the elements and not on the consortium / SPV.	
Tax Risk	Change in taxation regime	-	MEDIUM
Force Majeure	Force majeure Risk implies all the non-political circumstances and force majeure events	-	LOW
Market Risk	The concept of the knowledge city requires immense marketing both in India and abroad to enhance the visibility	Though the developer consortium will come with enough experience and brand value the concept as a whole should be marketed, afresh.	HIGH

Chapter 9: Way Ahead

The way ahead in for a successful establishment of knowledge city is dependent upon pointed and timely actions. The following can be adapted to make this mega venture successful and put Bangalore and India on the global map of education of the highest quality.

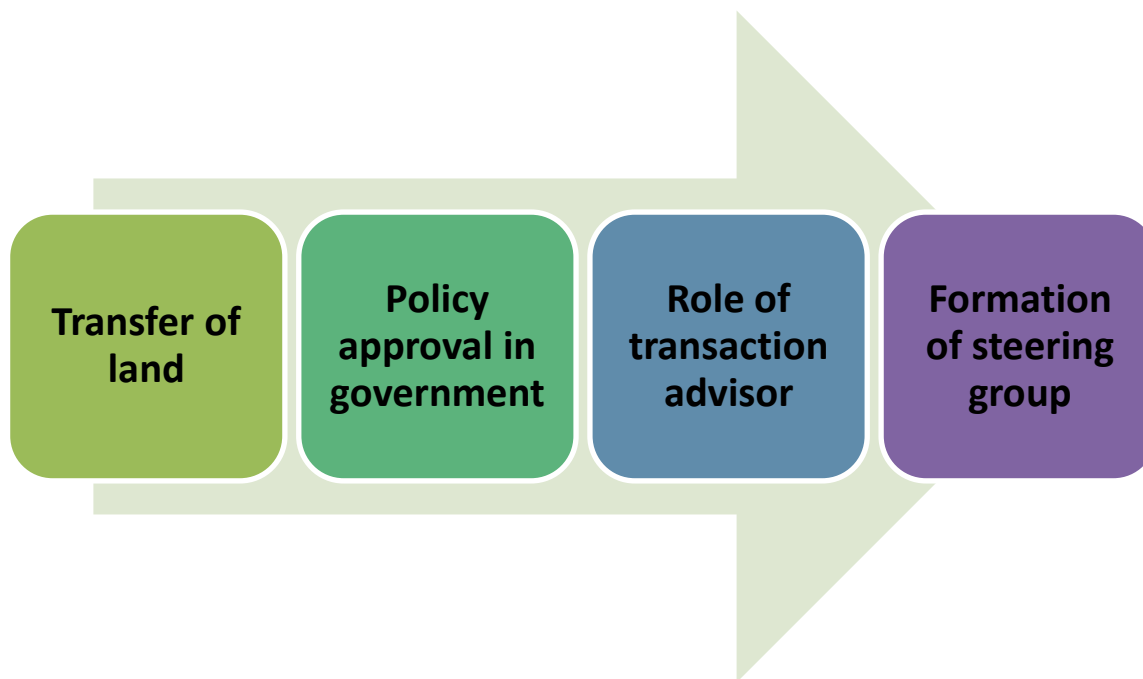


Table 13: Next Steps

Step for setting up knowledge city	Outcome
Transfer of land	The key component is the land. The land required must be quickly transferred to hasten the knowledge city development process
Policy level actions in Government	Policy level actions must be taken that sets the developer consortium on course for the establishment of knowledge city
Role of transaction advisor	The transaction advisor must be taken on board to validate the assumptions, the design and financial outlay planned
Steering Group formation	A high profile venture like the knowledge city needs formation of Steering Group – which comprises of the representatives from the government, from the highest echelons. This steering committee should work in tandem with the transaction advisor in every stage for timely approvals and clearances to propel the venture

Annexure

List of Nations in Bologna Convention

#	Country
1	Austria
2	Belgium
3	Bulgaria
4	Czech Republic
5	Denmark
6	Estonia
7	Finland
8	France
9	Germany
10	Greece
11	Hungary
12	Iceland
13	Ireland
14	Italy
15	Latvia
16	Lithuania
17	Luxemburg
18	Malta
19	Netherlands
20	Norway
21	Poland
22	Portugal
23	Romania
24	Slovakia
25	Slovenia
26	Spain
27	Sweden
28	Switzerland
29	United Kingdom
30	Croatia
31	Cyprus
32	Liechtenstein
33	Turkey
34	Albania
35	Andorra
36	Bosnia and Herzegovina
37	Holy See
38	Russia
39	Serbia

#	Country
40	Macedonia
41	Armenia
42	Azerbaijan
43	Georgia
44	Moldova
45	Ukraine
46	Montenegro
47	Kazakhstan

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