# Let Internet Enable Base of the Pyramid People  To Drive Development Through Education, Innovation and Entrepreneurship

## *Abstract*

*We are living in a world of various gaps -  rich-poor gap, gap in natural resources, gap in ethnicity, gap in male-female capabilities, gap due to the computer revolution (the so called Digital Divide), the gap due to disabilities and so on.  In fact, gap is inherent in nature. This implies that even if we do our best to minimize all the gaps, because of its inherent property, some gaps will remain. We have some good control on some gaps and relatively less control on other gaps. **Digital Divide**, for example, is a gap that can be reduced to a good level when we compare it with reducing the gap between rich and poor. In general we should try to minimize all the gaps – no questions on that. But we would need to set our expectation right - that there will be some gaps no matter how well we try to minimize them as it is inherent in the system. However, by lowering it to a good level and keep on lowering it will continue to yield a better world and hence that should be our goal.  **The key to minimize these gaps is global development through Education, Entrepreneurship and Innovation.** We mainly focus on bridging the gap due to the **Digital and Language Divides**.*

*We argue that existing approaches to bridge the Digital Divide are good but not sufficient to completely bridge the Digital Divide. We then propose a practical solution to not only completely bridge the Digital Divide but also bridge the Language Divide. The real benefits of bridging the Digital Divide needs to be exploited through education with emphasis on  entrepreneurship and innovation to create valuable resources to drive economic, social and other developments. We propose that by exploiting the real benefits of bridging the Digital Divide, **a huge resource can be created using the base of the Pyramid people who can** then actively participate in driving global economy. This would not only help the base of the Pyramid people to get out of the poverty but would also help top of the Pyramid people who can effectively  use such a huge low cost resource.*

*Finally, we propose some specific policy recommendations to actively participate in Bridging the Digital Divide, reforming education with emphasis on short term and long term needs, and keeping innovation and entrepreneurship in mind to ensure sustainable long term growth leading the global economy in certain areas and reducing the rich-poor gap.*

# 1. Introduction

In this world of over 6.5 billion people, over 4 billion people are poor - 40% live in poverty, and 16% live in extreme poverty [Stiglitz2006]. Apart from inadequate income, two other issues are heavily associated with people living below the poverty line: **insecurity and powerlessness**. One World Bank report published a nice statement from a young poor woman in Jamaica that captures the sense of powerlessness: "Poverty is like living in jail, living under bondage, waiting to be free". In general, poor have few opportunities to speak out. When they speak, no one listens; when someone does listen, the reply is that nothing can be done; when they are told something can be done, nothing is ever done.

On the other side of the coin there are the rich people, much smaller in number, but they own over 80% of the world wealth!!! They enjoy all the benefits of the civilization, they control world economy, they control world business, world laws – they control almost everything except poverty. Well, not quite true through. They try to minimize poverty by donation, philanthropic works, foundations and the like. Obviously that is not enough as the poverty has been increasing for a long time now. In order to minimize rich-poor and other related gaps, we would need to ask the following key questions:
*what are the causes for such huge gaps, what are the types of gaps, can these gaps be truly bridged, if so how.*

Broadly speaking, the inequality is inherent in the mother nature. The world natural resources was not uniformly distributed when the world was created, different races were born at different part of the world getting different resources, not every human is born with same capabilities, not every human develops same level of intelligence even under "same" environment etc etc. In short, by birth we all are different - the equity is different to begin with. So, as we grew as a human race more gaps and inequities got developed. Today, we have rich-poor gap, gap in natural resources, gap in ethnicity, gap in male-female capabilities, gap due to the computer revolution (the so called Digital Divide), the gap due to disabilities and so on. This implies that even if we do our best to minimize all the gaps, because of its inherent property some gaps will remain. That is why Darwin said "only the fittest will survive".

So, should we even try to reduce all these gaps, can we really make these gaps go away? If yes, how can we do so? If not, what gaps we can really try to minimize? *These are the few key issues we will discuss in this White Paper, and propose a practical solution to "truly" bridge the Digital & Language Divides which in turn will minimize rich-poor gap by improving the economic condition which, in turn, will help improve the social, cultural and other conditions.* Our premise is that gap is an inherent property in this world. So, not all gaps can be eliminated or reduced to the same level although we should try to minimize all the gaps. For example, natural resources – a country cannot just acquire its missing natural resources. We have some good control on some gaps and relatively less control on other gaps. Digital Divide, for example, is a gap that can be reduced to a good level when we compare it with reducing gap between rich and poor.

Yes, bridging the Digital Divide, will eventually help reduce the gap between rich and poor but there are many other factors that contribute to the rich-poor gap. So, we would need to set our expectation that there will be some gaps as it is inherent in the system. **However, by lowering it to a good level and keep on lowering it will continue to yield a better world and hence that should be our goal.**

**The theme of our proposed solution has four major components**:
    a) Bridge the Digital Divide and Language Divide in a practical and effective way.
    b) Use the benefits of bridging the Digital & Language Divide to provide useful, targeted and valuable education.
    c) Focus on sustainable growth through innovation and entrepreneurship.
    d) Ensure a good model to tie (a), (b) and (c).

The bottom (also known as base) of the Pyramid people may be poor from financial standpoint, but not from intelligence standpoint. Their number is much larger and hence once we can make them to contribute**, they can become a huge resource, can not only contribute to their own economy but also to the local, regional and global economy. Such a great resource would be very valuable to top of the pyramid people many of whom are looking for investment with good return using low cost resources. Thus, it can be a good win-win situation for both rich and poor.**

**Finally,** we propose some specific policy recommendations to actively participate in Bridging the Digital Divide, reforming the education with emphasis on short term and long term needs, and keeping innovation and entrepreneurship in mind to ensure sustainable long term growth leading the global economy in certain areas.

## 2. Background
Bridging the Digital Divide to help improve education, communication, economy, social condition and all related issues have been addressed by various organizations worldwide including Governments, NGOs, United Nations (G@ID, UNESCO, UNICEF to name a few - the Millennium Development Goals (MDG), [GaidICT2007], "ICT for Education", and GeSCI (The Global e-Schools and Communities Initiatives – [Bracey2005]). The main focus of these efforts are to Bridge the Divide by providing computers, simple computers, and other special devices, focusing on local content, education, and economic development. The use of phone has also been talked about, mainly from visual access standpoint. These are very good goals and initiatives to really start making noticeable and sizeable development in the developing countries and the whole world as well. The ideas and recommendations made in this paper are, in general, along in the same line of these objectives. However, we have identified a few key issues & missing components in the current efforts and proposed a sound solution address such issues:

(a) of course the current efforts should be continued as planned to help bridge the Digital Divide. However, we argue that current **approach alone cannot truly bridge the Digital Divide** as it would take very long time before majority of the world population will get some kind of a computer. Besides, many people cannot easily learn or keep on learning new stuff to effectively use a computer.

Use of special devices (cell phone, PDA and the like) with visual access cannot also really bridge the gap because of  key limitations like difficult user interface (small screen and small keypad), the need to re-write the content with another language like Wireless Mark Up Language (WML) [there are over 2 billion websites and  re-writing them would be cost prohibitive] and not usable in an eyes busy – hands busy situation.

b) **Language Divide is another very large Divide** comparable to the Digital Divide which has not been addressed well. Over 70% of the Internet content, today is in English. So, people in non-English speaking countries are left out from the major part of the Internet which we call as Language Divide.  It is also very important to bridge this divide.

c) **Fortunately, we have a solution to "truly" bridge the Digital and Language Divides as described below.**

d) **We also emphasize on the need for "entrepreneurship" and "innovation" to have real significant impact on economic and social development with sustainable growth.**

e) **Finally, as the title implies, we propose that base of the pyramid people can be transformed into a huge resource by bridging the Digital and Language Divides, fostering education, entrepreneurship and innovation, and significantly help improve economy and social condition, thus minimizing the rich-poor gap worldwide. Thus, these people can be a key contributor and driver for the world economy.**


## 3. Details of the Proposed Solution

**3.1. Bridge the Digital Divide and Language Divide in a Practical and Effective way**
As we all know, in this Information Age, "information is money" like "time is money". The largest source of information is the Internet. Hence, it is important that everyone can access the Internet easily and economically. It is needless to mention the importance of the Internet for economic & social development, education and more. Internet is

becoming an important and essential part of everybody's life. Unfortunately, only a small fraction of population can access the Internet today mainly because of

(a) Lack of computers or computer skills. It is not easy for many people to learn (or keep on learning new features) how to use a computer.

(b) Access through a personal device is difficult, visual, and expensive - poor user interface because of the small screen and small keypad, need to re-write the website with another language like WML (wireless mark up language), difficult to navigate, and the need to buy a special device. The other existing methods (e.g. VoiceXML, SALT) use any phone and users voice but provide only very limited access as these require the content to be re-written with VoiceXML and similar languages. Some existing methods use partial automation but still require some modifications to the web site.

The rendering process with a personal device is a very cumbersome and complex process as a user tries to comprehend the total content on the page and then make a selection by seeing (or hearing) only a small part of the contents at a time. This is even more complex when a user follows a link and goes to a new unfamiliar page and tries to find the relevant content on this new page. Another key issue is navigation - even if all the websites are re-written with another language like WML, there would be too many tiny small pages that can fit on a small screen. For example, say a website has 100 pages. If it is re-written to fit on a small screen to offer all contents there would be say 1000 small pages. How a person will navigate to 1000-th page? It will be very difficult and impractical.

Personal devices are also not usable in an eyes-busy, hand-busy situation like while driving.

The key limitations of existing approaches can be summarized as:
1. not affordable by many people
2. limited availability
3. difficult to learn
4. difficult to use
5. difficult to navigate
6. not usable when mobile (eyes busy and hand busy situation)

*Thus, although the existing approaches are great and should be continued as appropriate, such approaches cannot "truly" bridge the Digital Divide. Many people would still be left out.*

**A more capable alternate approach called Voice/Audio Internet, proposed here**, makes the Internet available to everyone by using the most natural user interface, voice

and the most ubiquitous device, a simple phone without using a computer. One just talks and listens to the Internet. Voice Internet takes content from WWW and **renders** that in real time into **Short, precise, easily navigable, meaningful and pleasant to listen to audio** content that can be heard over any phone. Billions of dollars have already gone into today's Internet. The idea of Voice Internet is to use this huge investment and avoid any re-writing of the WWW contents in another language.

Accordingly, Voice Internet can readily extend the Internet to over 3 Billion people having some access to a phone today. Learning how to use Voice Internet is also much simpler.

Small screen viewing and small keypad related difficulties are avoided in Voice Internet by using voice and listening. One can use Voice Internet in an eyes-busy, hand-busy situation. There is no need to buy a special device, any phone can be used. Thus, Voice Internet overcomes **the limitations posed by existing methods.** One can surf any website, search any word(s), send /receive email and conduct e-commerce. In addition, voice portal features, such as news, weather, horoscopes and directions can be accessed. Voice Internet also supports streaming audio, thus allowing anyone to listen to Internet radios and on-line music. Voice Internet has been proven to be very useful to many elderly, visually impaired, blind, dyslexic, Digital Divide and highly mobile people.

The other key problem that is solved in Voice Internet is "how to efficiently render visual Internet content **into short, precise, easily navigable, meaningful and pleasant to listen to audio content** ". This rendering problem is a very complex problem as the Internet sites were designed with visual access in a larger screen in mind and hence the information is laid out in a manner that is attractive to our eyes but not to our ears. Making such contents attractive to our ears with easy navigation is a very complex problem. Instead of creating many tiny small pages as used in the current approaches, Voice Internet finds the desired and relevant content from the existing websites using appropriate automated rendering.

An Intelligent Agent (IA) is used to perform the automated rendering function. IA uses similar algorithms as our eyes and brain use to calculate and present the highlights or important information of a page and then select the most relevant content when traverses to the desired page. It uses Artificial Intelligence, language processing and matching algorithms in collaboration with the key information on the page itself, **like boldness font size, color, density of the contents, meaning of the word and the like** to calculate the Highlights and to determine the relevant content on the desired page.

The rendering process also easily bridges the **Language Divide** as the rendered content can also be translated into another language in real time. Thus, a person can specify a English website in local language, say Chinese, and Voice Internet will go to the English

CNN website, and in real time will convert the desired content into Chinese so that the caller will hear the CNN website in Chinese.

In fact, the "rendering" feature used in Voice Internet is the key for not only Voice Internet but also for **Wireless Internet and Voice portal**. The industry has been trying to solve this problem by re-writing a website into many small/tiny websites which, we believe, is not practical as

(a) to re-write over two billion websites with another language like WML or VoiceXML is impractical and

(b) navigation would be very difficult as there would be too many branching trees. For example, say a website has 100 pages. If it is re-written to fit on a small screen, there would be say 1000 small pages. How a person will navigate to 1000-th page? It will be very difficult and impractical.

The "rendering" feature used in Voice Internet can be readily extended to perform efficient visual rendering on a personal device (cell phone or PDA) without re-writing any website in another language. This is called a **MicroBrowser** which solves the wireless Internet problem mentioned above. This way cell phone with small screen, PDAs and similar visual devices would be able to provide Internet content in visual form or in audio form in a very easy, effective and meaningful way. Since the rendered content is already short and precise, it would easily fit on a small screen. No scrolling would be needed if a PDA is used. Thus, it is a practical solution to a huge fundamental problem which can benefit many people from the bottom (as well as from the top) of the Pyramid.

As an example of using Voice Internet, let's see how Surf The Net feature works in the Voice Internet, netECHO® offered by InternetSpeech ([www.internetspeech.com](www.internetspeech.com)), a company in California, USA. To surf Yahoo website, a user would do the following:

A, say "surf the net"
B. select Yahoo website by saying "Yahoo"
C. listen to the yahoo web content and navigate to other pages as needed and listen to the relevant content first.

In summary, Voice Internet basically overcomes all the limitations of existing approaches to access the Internet i.e.
   a.   a computer is not needed
   b.   a phone is much easier to learn
   c.   no re-writing of website (there are over 2.5 Billion websites and avoiding re-writing them would save trillions of dollars)

d. automated rendering finds desired content fast with easy navigation
e. can be used in an eyes busy hands busy situation

Thus, Voice internet "truly bridges the Digital and Language Divides", especially from the connection and computer stand points as a phone is readily available to many more people and the phone connection is already there i.e. no broadband or separate Internet connection is needed, and also no computer is needed. Moreover, it is much easier to learn how to use a phone to access and use the Internet.

Many users in US and Canada have been using the Voice Internet, netECHO® from InternetSpeech since 2003. They are mainly using it for **email, surfing, searching, listening to streaming audio and portal features like weather, Directory Assistance, Stock Quote and on-line book reading.** The users can be classified into four major groups – highly mobile, Digital Divide, Elderly and Blind. User's comments about the service and how it has impacted their life are very impressive (visit www.internetspeech.com home page for more details).

### 3.2 Use the benefits of bridging the Digital & Language Divide to Provide Useful, Targeted and Valuable Education

What's next after the Digital and Language Divides are Bridged from Connectivity Standpoint? Let's assume that together with conventional methods of using computers, PDAs, cell phones, and the proposed method of Voice Internet, the Digital and Language Divides are really bridged from connection standpoint. Now what? Well, the benefits of getting into the Internet need to be utilized properly to really help meet basic needs including food, shelter, education, communication, health, business and economy. To really bridge the Digital Divide, we would need to address the other key factors**:**
**utilize the access to information to knowledge, use knowledge to drive innovation & entrepreneurship to finally drive the development and growth.**

**Education** is a very important key element in this process. To stimulate real economic growth, "education" needs to be highly emphasized and targeted, especially with "**creativity", "productivity" and "resource" creation** in mind. Creativity will in turn **drive innovation, entrepreneurship, productivity** (and even resources – like discovering new oil reserve, alternate energy…) resulting successful business entities which in turn will create jobs and **drive economy reducing rich-poor gap**. In a nut shell, the key idea is to use the benefits of getting to the Internet to create valuable resources.

**Fostering Education:**
The importance of education has been growing since human civilization. It is the cornerstone of growth and sustainable development. Unfortunately, the education system in the developing countries, in general, is far behind than the education system in

developed countries. Many of the world's children receive no formal education or a sub-standard education. Many lack books, materials and have no or little communication with the wider world. This is also true to some extent within a rich country where some good level of Digital Divide exists in the suburb or in some races (e.g. in U.S, Native Indians do not have a good education system and they usually do not use the advanced education system that U.S has). The course curricula is based on old method of old text books and courses, lecture method using writing on blackboards, no lecture notes, limited homework mainly from the text book and the like.

So, in fostering education there are quite a few issues that would need to be changed. A few important ones are:

1. improved courses.
2. teaching / lecturing method.
3. access to library and digital information sources including, the Internet.
4. management of college / university system using computers to improve efficiency and accuracy.
5. much more frequent update of course curricula by following the same from rich education system as well ensuring that local needs are properly met.
6. introducing distance learning and associated curricula/course development
7. formal courses to teach the teachers with new courses and methods.
8. allowing students to use Internet at home to help improve their study, solving home works, writing reports and the like.
9. ensure that education is also closely related to job needs and growth
10. ensure that education encourages **entrepreneurship and innovation.**

The distance learning is growing fast in developed countries. The need for the distance learning would be even more important for the developing countries as there may not be enough number of schools in some rural areas, many cannot even afford to attend beyond primary education as it is not free in many countries. Voice Internet would be ideal for such people as most of them would not even have any computers. Distance learning is a great way for the developing countries to get exposed to the advanced courses from the developed countries. Voice Internet will enable many more people from the developing countries to enjoy such advanced courses from the developed countries.

Accessing online books is another key factor that developing countries can easily benefit from the Internet. In fact, this is an essential element to be competitive, and drive entrepreneurship and innovation.

By "education", we do not necessarily mean just formal education and degrees. Education can be as simple as training some people to do some manufacturing job very well. For example, most workers in a garment industry do not have any formal education – they just know how to do their manufacturing job well (of course, some people with

formal education are needed to manage, plan etc).  So, the education needs to be creative and targeted to meet immediate needs. Creativity also depends on the need. If a country already has lot of skilled workers and doing well in improving economy, then the country's next goal is to keep on improving what it does better (to stay ahead of competition) and also innovate to diversify to move up the overall food chain of the economy.

Thus, education needs to be well planned as creativity is needed at various steps.  And the creativity also needs to be well planned to meet specific countries need with special emphasis on immediate needs, entrepreneurship, innovation and valuable resource creation.

### 3.3 Focus on Sustainable Growth through Innovation and Entrepreneurship

A good education is a very good start. By providing education most of the citizens will help create new resource meeting some immediate needs. But there may not be enough jobs. Imagine that everyone in a country got educated with good degrees or vocational training. But if there is not enough number of jobs then it won't help much. Yes, some highly skilled people can go abroad and meet part of the demand from the International market (in fact this can be a great opportunity to tap into the international market). To really use the benefits of education, we would need **entrepreneurship and innovation** so that new business, new industry, new market can be developed, nurtured and expanded globally, thus ensuring sustainable growth.

**A Few Examples of Innovation and Entrepreneurship:**

**Grameen Bank:** A creative business idea to lend money to poor and ensure repayment by entrepreneurial ideas of the borrowers. Borrowers would need to use the money to do some business to earn enough to return the money and feed them as well. Most borrowers did not have any education but because of their creativity and efforts they became successful. Of course, original idea came from a well known economist  Nobel Laureate Muhammad Yunus who got the Nobel Peace prize in 2006.

Another good example is **software outsourcing** in India. In this case the education was more formal and targeted as the country figured out (using both local and expatriate talents) that information technology will be an important key in this information age. Hence, a very good skill set was developed by most leading institutions which was utilized properly by innovators and entrepreneurs.

Another example is the innovation and entrepreneurship driven businesses in **Silicon Valley**, California which has dramatically changed the world and world economy. This is the key reason why US has been leading so long and continue to do so for a while.  It is also important to note that no nation can continue to lead for ever – thus there are

opportunities for everyone.  So, good strategy, planning, implementation, continuous efforts, innovation and entrepreneurship for life are the key – in other words continue to thrive and compete to go to the top but with realistic goals and expectation. With such approach even a country cannot reach to number one easily, can achieve number 2 or 3 or so with  a very good economic growth.  It does not always have to be number one or two. If there are very good number of countries in position 3, 4, or 5  that should still be great.

These examples show that education, innovation, creativity, productivity and resources are keys for initiating as well as sustaining economic growth. In general, the level of innovation / creativity has more influence to the level of the economic growth. So, innovation is very key at all levels of economic development. Without innovation we would be still hunting to meet our daily food needs.  It is also important to note that despite our greatest efforts some people may not learn well, may not be innovative well and may not be capable to do many things well.  But that is o.k. as that is natural. There are needs for all types of people in the world - this is another type of pyramid (let's call it **workers pyramid**). Innovation/ creativity is also important in this pyramid.  So we would need all types of hard working trained skilled people that fit peoples capability, desire etc.

In order to make innovation and entrepreneurship more focus and effective, **a "core competency"** would need to be developed.  Not everyone can do everything. Similarly, not every country (or specific ethnic groups) can do everything or should try to do everything.  So, based on the capability, needs, growth plan, global needs and similar other factors, each country would need to define the areas it would need to focus so that it can surpass others in these areas, and thus getting a leadership position in such clearly defined areas. In general, since we are all part of globalization, we would need to keep in mind **the new technologies that will drive the world business for a long time.  A few key such technologies today are IT, Bio, Nano, Cleantech/Energy, Intelligent Systems and their combination.**  In order to develop good core competencies, **proper technologies would need to be transferred**, nurtured, used and well managed to develop new products/services that can be sold to local, regional and global markets.

### 3.4 Ensure a good Model so that all Components Work in Harmony
As already mentioned, education needs to be reformed to focus on innovation, entrepreneurship, immediate and long term needs. But just teaching entrepreneurship, business and innovation is not going to suffice as these needs to be actually practiced as well to make them really effective.  So, we would need an environment to ensure that all these can work together in harmony. We would also need to make sure that such an environment  can foster technology transfer, product and service development, business development, market capture, sustain and grow business, and these should be driven from a business stand point rather than good will, charity, ideas, or presenting papers in

seminars and trade shows. Of course doing research, presenting papers, having discussion forums are important key steps but to have a sustained long term effective and successful system, it has to be driven and supported by a profitable business model. A successful profitable business model will provide incentives to (a) technology providing entities to make the technology available, (b) technology recipient companies to get the technology, localize it and refine it to sell in the local and regional market, (c) business providing entities to outsource the services and products, (d) other participating entities in the food chain (e.g. companies or entities facilitating the technology transfer & outsourcing, research institutions, distributors, service providers, etc.). **Fig. 1** shows an example of a viable business model that shows all the key parties involved.

An important key element in entrepreneurship and innovation driven business is to have nice working environment with investors, entrepreneurs, skilled work force. The proposed business model would ensure that such an environment exists. The model should also encourage Universities and research institutions to work with it to foster entrepreneurship and innovation by teaching both **business and technologies together** (not as currently done in isolation in many universities) and help doing the related research.

In exploiting the full value of the above proposed solution**, two fundamental** things need to be realized by rich and poor. Rich needs to realize that a huge resource can be developed in poor people which can be very effectively used for global economic development with great financial returns to both rich and poor people. Poor would need to realize that their financial poorness is not a real shortcoming – it is just a temporary
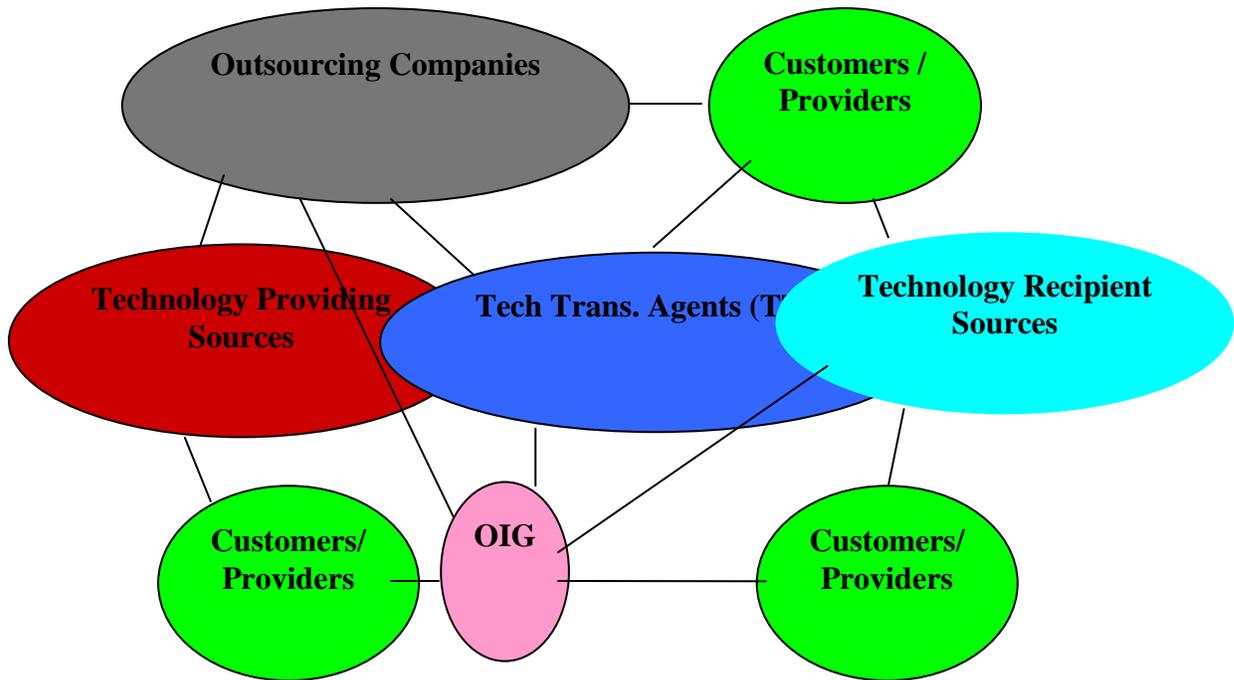
Fig. 1: An example of a viable Business Model model. Customers / Providers are the companies getting the technology first and then get outsourced business from the outsourcing companies. Customers / Providers can also develop their own innovative products and services and sell in the global market. TTA works as the main agent for the technology. OIG (Other Interested Groups) includes Investors, Govt., NGOs, Foundations, Universities, Research Institutions and Partners.

one and they can change their future by learning key things that can dramatically change their economic condition. Moreover, they can become a major global economic contributor. And Govt. would need to realize the benefits as well as Govt. would need to facilitate as appropriate so that rich can work more effectively with poor, poor can get initial boost needed **before blessed by rich.**

With real contribution through knowledge power and cheaper labor managed by knowledge power, almost any $3^{rd}$ world countries can attract investors to invest, rather than get loan from the World Bank or IMF with strong unfavorable terms. Yes, investors

will also take good part of the profit but that's normal. If with investor's money other countries can flourish, so can many other developing countries. The goal should be to continue to move up the food chain by continuing innovation. Man power should be considered as a real resource rather than as a burden.

Of course, some people would not be able to learn, go to school (too poor people). For them also there is good news. They can be taught through ICT and Internet to do something better than what they are doing now. Basically **educate and transform their brain into a huge resource.** One key goal here is to teach them what Internet is, how it can help them, especially how they can do some business with the Internet (e.g. they can create some important portals, blogs, courses etc) and teach others and make money. Or they can do an e-commerce portal, make ICT as part of many businesses, become smart in getting outsourced works etc.

*What can we expect after truly bridging the Digital and Language Divides, reforming education with focus on innovation and entrepreneurship, and providing such education to many people who are on the side on "have-nots", and then nurturing their education through good **practical business model?** Well, it should create a huge very useful skilled force that can not only help improve their own economy but also help improve the world economy. The rich can use newly developed highly skilled brains of the poor to get even richer by investing in this vast human resource. They may be poor from financial standpoint but not from intelligence standpoint. Their brains are as good as many good brains on the "have" side. Bridging the Digital Divide would provide these people more freedom, better economy and social status. More freedom will in turn make them more innovative.*

*Thus, poor people would be able to participate in and help **drive world economy**. Of course we would need to set our expectations right. The already rich (both financially and intelligence-wise) people will keep on inventing new things and get richer and it might be difficult for the new comers to catch or overcome them in many aspects. **But there is no limit to innovation. So, in turn, all will be benefited driving a new world of prosperity with much lower gap between rich and poor and with significantly increased world peace.***

## 4. Recommended Policies for Any Developing Country / Region

In this information age, information is money. Globalization, led by information (and expedited by Internet), enables anyone to participate in global information business. Globalization has spawned rapidly growing global outsourcing business. Among various types of outsourcing, information technology (IT) dominated outsourcing is growing faster than other types of outsourcing. For example, software development and service

outsourcing are growing much faster than manufacturing related outsourcing. In this regard, the contribution of software (s/w) has become the dominant factor compared to hardware (h/w). Besides, initial investment needed for s/w dominated outsourcing is much lower than h/w dominated outsourcing. Realization of a global economic system, more dependence on information itself (and hence s/w), and low initial investment needs have paved the way for 3$^{rd}$ world countries or any Any Developing Country / Region to not only participate but also do very well in such IT dominated businesses including outsourcing and "beyond outsourcing – creating new products and services".

Thus, the prospect for Any Developing Country / Region in global IT business is very good if we can come up with a good plan and execute it very well. Manufacturing outsourcing is also an important area to focus as there are almost secure manufacturing outsourcing business coming from neighboring countries like China which is moving up the food chain very fast. So, the lower level manufacturing tasks need to be outsourced which is already happening currently at a higher rate to Vietnam, for example. Any Developing Country / Region can easily be part of such outsourcing.

Since we are living in a global world and already have emphasized in entrepreneurship and innovation for sustainable long term growth, in addition to outsourcing, Any Developing Country / Region can also lead in developing new global products and services soon. **Accordingly, we would need to look at key technologies that will drive the world for several decades and choose a few that Any Developing Country / Region can really make good use of in a practical manner.**

**4.1 Key Technologies For Next Few Decades**
According to industry visionaries, the key technologies that would drive the future for next several decades are:

a) IT
b) Life Science/Biotechnology
c) Nano technology
d) Combination of above

Before determining which key technologies to choose, we need to look at key market segments that are more appropriate for Any Developing Country / Region .

**4.2 Key Market Segments for Outsourcing**
Outsourcing market segments can be classified into 3 major groups:
a) low end,
b) medium end and
c) high end.

Low end includes manufacturing, BPO (business process outsourcing), BSO (business service outsourcing), localization and professional services. Medium end includes application development, product development, and component design. High end includes Intelligent Agent (IA) and contract research.

Any Developing Country / Region needs to look into all these three key segments but with different levels of emphasis. Low end market segment is highly competitive and yields lower margin. But this segment is the key beginning step for learning and understanding outsourcing business. The medium end is less competitive, yields much higher margin and very rapidly growing. The high end is much less competitive with much higher margin, key to go beyond outsourcing but much more difficult to do. It is recommended to put much more emphasis on the medium end.

Our recommendations made below are based on these facts and assumptions. For convenience, we have classified them into three major groups. This is by no means a complete list but, we believe, it outlines all the major issues.

**4.3 Specific Recommendations Bridging the Digital Divide:**
1) Ensure that telecom and mobile operators provide low rate phone call when users call the Voice Internet service so that people can easily afford it.
2) Ensure that all Internet Café has Voice Internet
3) Ensure that all computer training centers have Voice Internet
4) Ensure that telecom and Mobile providers provide very low cost or free Voice Internet Access at Schools and Colleges
5) Encourage all NGOs to provide low cost Voice Internet

**Education**
6) Provide Voice Internet training in all computer training centers, vocational training centers and schools.
7) Develop educational policy with educational reform focusing on both short term and long term needs. It should also focus on both formal and informal (like vocational institutes, training centers of various types) education. Educational policy should also strongly emphasize on entrepreneurship and innovation, especially in the proposed "core competencies" described below.
8) Ensure that Business is part of Engineering and Science Curricula to ensure entrepreneurship. For example, BUET and other engineering universities and colleges should have a business school.
9) Develop policies and means to support e-Learning in a major way.

**Innovation, Entrepreneurship and Core Competency**

10) Develop a good marketable IT work force –  undertstand and address issues like what expertise we have, what expertise the market really needs, how we can achieve those, where we can appply the expertise Any Developing Country / Region  has now.

11) Ensure that proper technologies are efficiently transferred to develop the real expertise required by the outsourcing market.

12) Encourage and facilitate with appropeiate means to develop manufacturing expertise. Policies applied to the Garment industry can be used as a good example.

13) Develop policies to focus on long term sustainable growth using state of the art killer technologies in IT, Bio, Nano, Clean Tech, Intelliegnet Agent and their combination.

## 5.0 Conclusion

*Although various gaps are inherent in nature, many of them can be minimized to a good level. In general, the key to minimize these gaps is global development through Education, Entrepreneurship and Innovation. Gap due to the Digital Divide is a good example that can be minimized well and can have major impacts on several other gaps including rich-poor gap.*

*The existing approaches to bridge the Digital Divide are good but not sufficient to completely bridge the Digital Divide. Our proposed solution using **Voice Internet** is a practical solution to not only completely bridge the Digital Divide but also bridge the Language Divide. It is also a good solution for visual Wireless Internet access as any web content can be viewed at ease without any need to re-write today's web content in another language like WML.*

*It is very important to properly exploit the benefits of bridging the Digital Divide through education with emphasis on entrepreneurship and innovation to create valuable resources to drive economic, social and other developments. Our proposal to bridge the Digital and Language Divides, appropriate educational reform and use of entrepreneurship and innovation can create a**, huge resource using the base of the Pyramid people who can** then actively participate in driving global economy. This would not only help the base of the Pyramid people to get out of the poverty but would also help top of the Pyramid people who can effectively use such a huge low cost resource.*

*The proposed policy recommendations although not complete addresses key policy issues that can make a big difference in immediate and long term economic and social growth. If implemented properly, and with innovation and entrepreneurship in mind, Any*

*Developing Country / Region can lead global economic development in certain areas and can help reduce the rich-poor gap globally.*

***Our InternetSpeech seasoned Business, Technology and Global Policy Executives are ready to help our customers in any Country / Developing Region in fulfilling above mentioned obejctives and their goals, and in turn InternetSpeech Global Vision.***

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