Chapter 10
Framework for Utilization of Global Resources for Knowledge Creation and Application Through Flexible Organizations

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1 Introduction

When billions of single logic units are integrated and controlled, what we get is unimaginable computing power of modern day microprocessors. The power of computing comes by controlled interconnections. Similarly, every human being is a potential knowledge processor, who has capability to create and apply knowledge. If we can design systems and processes which can interconnect these human knowledge processors in a meaningful manner, then enormous capacity and capability could be created to create new knowledge and apply existing knowledge. This can change the entire spectrum of our civilization by way of providing technologies, products, and processes that will be capable of dealing with miseries like hunger, malnutrition, disease, and suffering. The concept is like fusion reaction, where in light atoms of hydrogen are fused together to release enormous energy. In a similar manner, if systems and processes could be devised to bring isolated brain power distributed across the globe, then the society tend to have a mega mind capable of churning out new knowledge at a speed beyond imagination.

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2   Knowledge Economy

Products are By-Product of Application of Knowledge: Products, services, and processes of knowledge economy are the outcome of integration of diverse knowledge elements. Every time a new knowledge gets developed somewhere in some corner of the world, a product and process becomes potent for new features which are superior to the existing levels.

Power of Collaboration and Connectedness: Knowledge resides in individuals and nurtured in communities through collaboration. Communities are forums of connected people with shared vision. There is rich to-and-fro flow of knowledge among members.

Knowledge Networking: It is the process of harnessing the knowledge at global level. The prime objective of knowledge networking is to spot potential knowledge creators at a global scale to nurture them, help them to complement, and collaborate with peers around the globe in the process of knowledge creation. Without support of effective communication and collaboration, knowledge remains fragmented in small pieces in the heads of people. In the universal population set, there are enormous potential knowledge creators spread across the globe in different national boundaries. If these talented people are spotted in their early life and carefully nurtured to their full capacities and capabilities through effective knowledge networking, they will create new knowledge. This knowledge when applied will generate new technologies, products, processes, and systems that are superior to the existing ones and will have far-reaching impacts in better utility to the society at large.

Design of Flexible Institutions for Knowledge Creation: The primary objective of organization design is to devise social institutions that mobilize human knowledge, capabilities, and resources around the globe for productive purposes with a view to improve the well-being of the society and the constituent members. The new information and communication technologies and new ideas in organizational design are providing a large number of choices for new variants of organizational forms with a lot of built-in flexibility to harness knowledge resources at global canvas. Wikipedia defines flexibility as the popular term for the ability to adapt to different circumstances. In systems theory, the flexibility of a system is related to its adaptation to a new environment or its resilience in recovering from a shock or disturbance. The flexibility in system comes when a large number of options are made available at the design stage itself.

Flexibility provides knowledge systems with possibility of increased participation and collaboration and offers higher degree of freedom of choice. The more are the options available, the more are the feasibility space and chances for more scope of innovation. The diverse supply networks involving customer-driven product development require integration of diverse knowledge in a flexible domain to enhance the speed of innovation and product launch. The ability to satisfy customer demands while responding to relentless competitive pressure requires creative and often complex approaches to manage a firm's knowledge effectively. Perhaps more
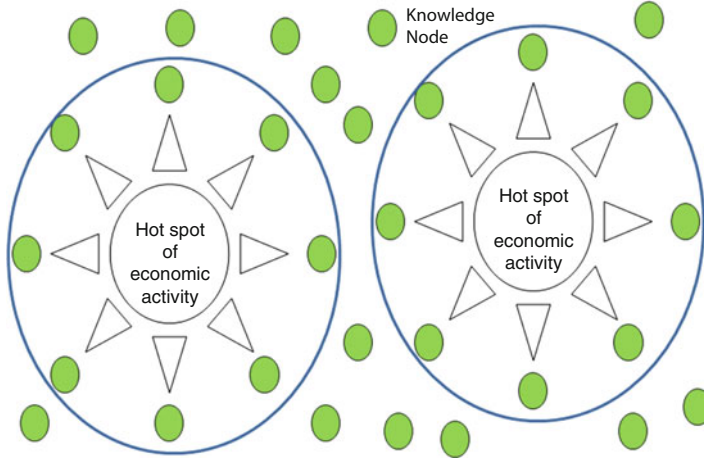
Fig. 10.1 Disconnected knowledge systems

than any other area, now there is increasing belief that a concept called globalization offers enormous opportunities to achieve major performance gains. Companies have begun to capture the benefits of globalization through global sourcing, which involves the worldwide integration of knowledge in R&D, engineering, operations, and procurement centers of a company.

The focus so far has been on disconnected knowledge systems, where different knowledge producers and users are restricted in connectivity as depicted in Fig. 10.1. In such systems, knowledge dissipation rate is very slow.

Unfortunately, capturing the benefits potentially offered by globalization is often limited by a lack of understanding concerning how to pursue this important area. To mitigate this limitation multilevel continua for the factors that are the most critical to global success are discussed to arrive at a broad framework which could set the future directions for knowledge management at global scale:

- Knowledge is a global resource which is meant for the betterment of entire universe.
- Enough opportunities exist for everyone to create new and diverse knowledge which could be converted to utility through products and processes resulting in prosperity and well-being of people who are creating it.
- World is going to face talent crunch in the pursuit of knowledge creation. The civilization is at the beginning of knowledge economy. With the creation of every new knowledge in any corner of the globe in any field opens many new fields through analysis, combination, and synthesis of existing and the newly created knowledge. The accelerated pace of knowledge creation will put the talent in short supply.
- Basic raw material (i.e., human beings) for knowledge processes is spread across the globe. It is high time now that all out efforts are put in place at global scale to

process this raw material in usable form by enhancing their basic skill sets. People located in far-flung isolated places need to be integrated with the knowledge economy. To start with, concerted efforts could be made to integrate large population with high literacy rate located in tier 2 and 3 cities to knowledge creation systems of the emerging knowledge economy.

- Principles of coexistence are the fundamental requirement for the knowledge economy. It is through coexistence and cooperation that the human race will enjoy the fruits of an exciting future which has just begun to unfold. The new future is being built on the rock solid foundations of emerging knowledge economy. The divisive forces guided by fundamentalists may put the world on war-like situation, which needs to be avoided at any cost.
- Knowledge economy puts greater responsibilities on knowledge-rich economies for equitable distribution of the fruits to the entire population. They will have to learn from the fruit-bearing trees to be more humble, more serving, and more responsible. The excessive divide between haves and have-nots will always create a threat to the peace and prosperity of the world.
- World leaders will have to work for a boundaryless world for frictionless movement of knowledge in explicit and tacit form along with physical goods. World is moving towards global integration and hence more democratization is required to listen the aspirations of different stakeholders on this mother earth.
- Open, adaptive, tolerant, and flexible mindset for co-creation with multicultural work force and different stakeholders needs to be built.
- The world over governments will have to develop processes and systems for ensuring dignity, freedom, and economic well-being of individuals.
- Global highways for frictionless movement of goods and knowledge across the globe are becoming the basic requirement to harness the fruits of knowledge economy.
- Knowledge has many dimensions like explicit and tacit and each one has to be tackled differently. Just like heat energy moves from once place to another through processes like radiation, conduction, and convection.
- Human race is facing many challenges like global warming, environmental concerns, melting of glaciers, poverty, epidemics, and fundamentalism to name a few. To tackle these problems the entire world resources (both intellectual and physical) need to be put to use. For this to happen, great minds and world leadership have to come together by forgetting petty considerations of regionalism and individual gains. This is necessary for the long-term safety, security, and prosperity of the human race.

The proposed framework as depicted in Fig. 10.2 heavily banks on high degree of collaboration and freedom of choice in terms of collaboration. It suggests a networked architecture and managerial, legal, and technology framework in place to support the same.

The broad framework mentioned above and depicted in Fig. 10.2 has been further amplified in four dimensions of people, process, technology, and performance or results and rests on the basic building blocks shown in Exhibit 10.1.
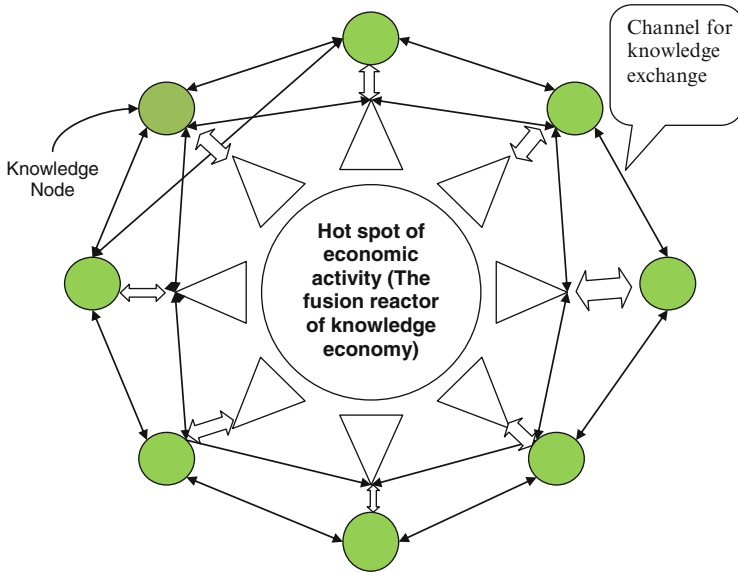
Fig. 10.2 Networked knowledge system

Exhibit 10.1   Basic Building Blocks of the Framework

- Mother Earth belongs to all of us; therefore, we all have to coexist in harmony.
- We are the trustees for future generations hence need to focus on Sustainability
- Globalization is mutual dependability for mutual good.
- The notion of boundary is in the human mind, i.e., self, family, town, state, nation, and globe.
- Boundaries are man-made so they could be altered and hence offer a freedom of choice.
- Cast, creed, and religion are invented by man for a specific purpose relevant for a specific period.
- Knowledge and skills are people centric.
- Our thought is the limiting factor of our growth.
- Raw talent is scattered around the globe in abundance. They are like stem cells to knowledge systems.
- Knowledge is nurtured through analysis, synthesis, and cross-pollination and requires deeper engagement.
- Knowledge creation and application is more of a social phenomenon.
- Products are by-product of application of knowledge.

(continued)

- Knowledge resides in individuals and nurtured in communities through collaboration.
- Communities are forums of connected people with shared vision.
- Knowledge networking is the process of harnessing the knowledge at global level.
- Knowledge is a global resource which is meant for the betterment of entire universe.
- Fruits of collective efforts are for inclusive growth and development of the society as well as individual freedom, liberty and prosperity.
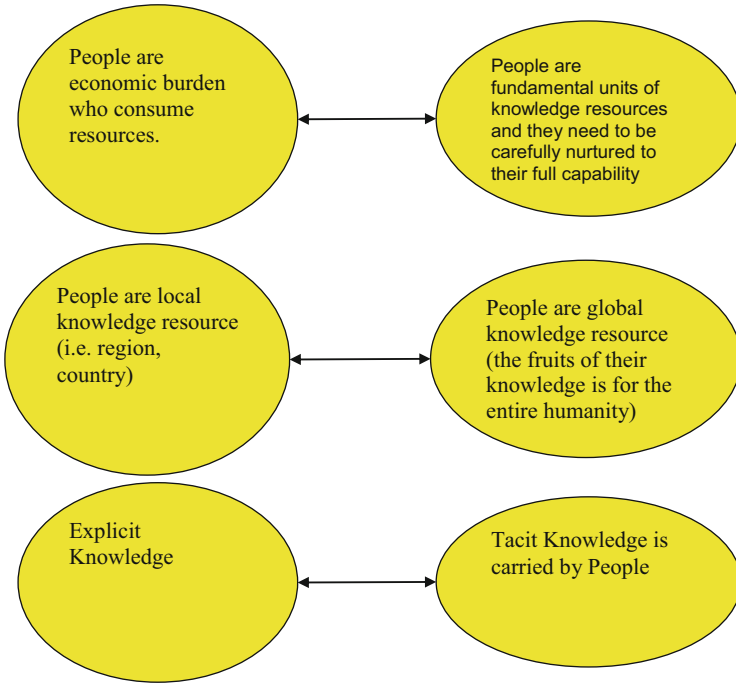
3   People Dimension of Knowledge

Getting Rid of Rigidity: The biggest challenge in knowledge management is not of technology but of mental blocks and rigidity at thought and vision level. Breaking the silos at thought and vision level is the most challenging one. The world is rigidly divided on issues like cast, creed, religion, and geographic locations. Cultural rigidities also act as a barrier in smooth flow of knowledge across the globe. The past mindset of working in isolation has to give way to collaborative working at a global scale. An infrastructure of soft issues enabling linking of minds across the globe has to be made available so that flexible teams of different age, different culture, and diverse fields can work at ease for smooth transfer of explicit and tacit knowledge. Minimum universal education to world population has to be the agenda. Figure 10.3 depicts some of the people dimensions on two extreme ends of continua.

4   Technology Dimension of Knowledge

The Challenge of Leveraging Flexibility and Connectedness: The development in the field of information and communication technology has opened vast opportunities in the field of knowledge transfer across the globe at a faster rate. The diverse fields of information and communication are converging, and time is not far off when there will be a universal device available with capabilities of phone, computer, and TV at affordable price to masses. The capabilities of this device will further improve by high-speed Internet and three-dimensional high-definition TV technologies, application of artificial intelligence tools, and connectivity through high-bandwidth networks from anywhere to anywhere. Figure 10.4 depicts some of the technology dimensions on two extreme ends of continua.

Flexible knowledge transfer networks for sharing proprietary knowledge through partnerships have to be developed. Sharing of laboratories and contract research and
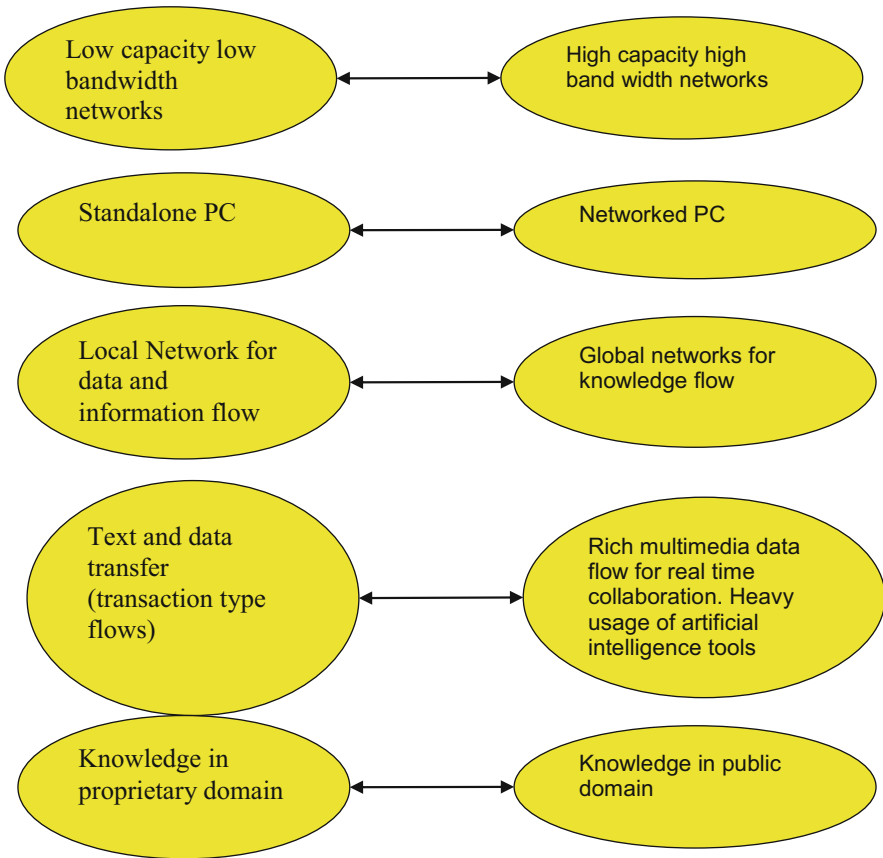
Fig. 10.3 People dimension of knowledge

development beyond national boundaries is one of the emerging area for knowledge creation and transfer. Large-scale funding from different industries and nations on consortia basis for future promising technologies is another area of focus. Large-scale participation of public and private institutions and cooperation between industry and educational and research institutes in knowledge creation also offer a big potential in knowledge creation.

5 Process Dimension of Knowledge

Flexible Networks for Knowledge Transfer: These networks allow easy entry and exit routes for knowledge creators and users. They should be plug and play type arrangements so that these networks can easily become part of a larger network. Transnational consortia for knowledge creation need to be worked out in different emerging technologies with a specific focus on free flow of man, material, and information.

Managing the Paradox of Global and Local: The biggest challenge in designing the processes in the area of knowledge management is resolving the paradox of local and global, competition and collaboration, public versus private, and

Fig. 10.4 Technology dimension of knowledge

limitations of geographic boundaries to name a few. Figure 10.5 depicts some of the process dimensions on two extreme ends of continua.

Organize Knowledge Fairs, Exhibitions, and Conferences: These arrangements provide opportunities for research, policy, and development institutes to broadcast their achievements, exhibit their research products, and market new research programs to donors, policy makers, other institutes, and potential partners. These also facilitate networking with pears and also different stakeholders. This will help in setting common research agendas, help think tanks benefit from each other's experiences, and stimulate interest in future research collaboration and the development of new programs. These will also provide a forum to share tacit knowledge through face-to-face interaction, which is otherwise difficult to transfer. For knowledge processes to be effective, two-pronged strategy for convergence of technology and convergence of mind is required.
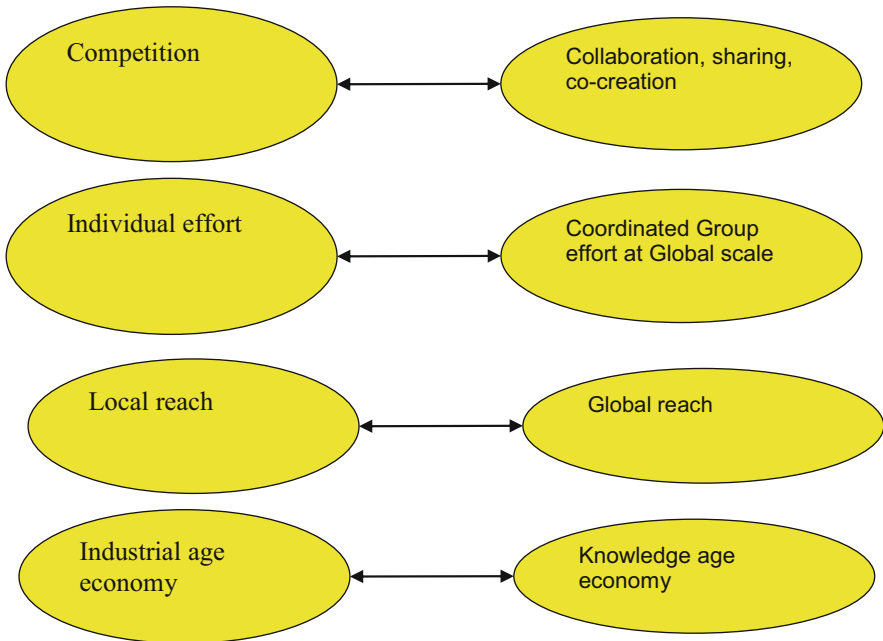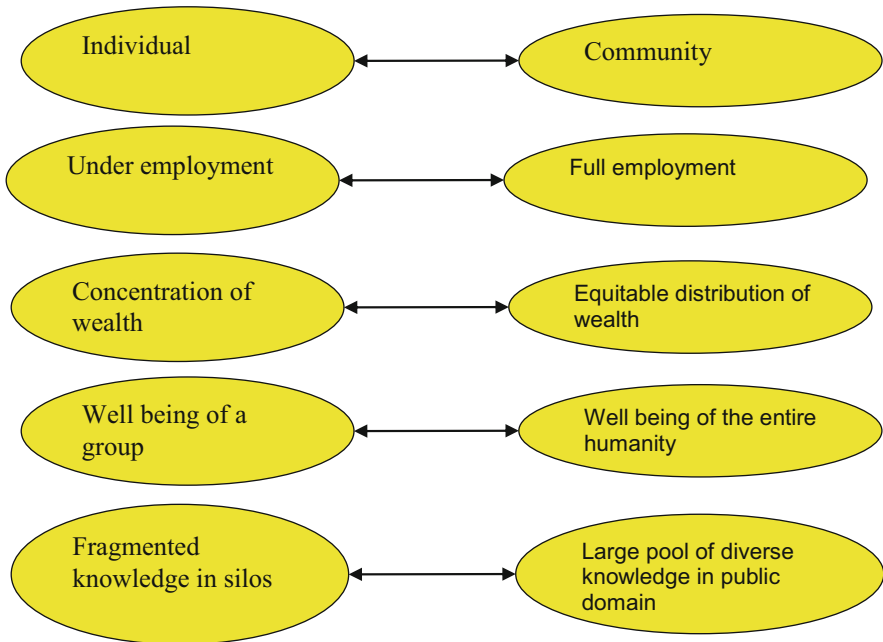
Fig. 10.5 Process dimension of knowledge

6   Performance Dimension of Knowledge

The most important issues are the sharing the benefits of global knowledge resource utilization in a just and equitable manner. It should not lead to exploitation and imbalances in the society. It is a delicate issue and requires well-thought-out consideration by different stakeholders. The outcome of the interplay of three enablers of knowledge creation will decide whether the fruits of knowledge processes are directed towards a select group or a larger community or for the entire world population. For a peaceful, progressive, and stable world, we should talk of inclusive growth. Figure 10.6 exhibits the performance dimension of knowledge.

7   Some Inspiring Success Stories

7.1   IITs in India

Indian Institutes of Technology were set up in India with state-of-the-art facilities and practices followed in best institutes abroad. These institutes attracted best talent in India through rigorous selection process and provided leading edge inputs to

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Individual  ⟷  Community

Under employment  ⟷  Full employment

Concentration of wealth  ⟷  Equitable distribution of wealth

Well being of a group  ⟷  Well being of the entire humanity

Fragmented knowledge in silos  ⟷  Large pool of diverse knowledge in public domain
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Fig. 10.6 Performance dimension of knowledge

these students with the help of faculty members having exposure to contemporary knowledge through different collaborative processes with leading technical institutes all over the world. The talent pool generated by IITs is in heavy demand world over and has become a global knowledge resource. The graduate students from IITs are recruited by companies working on cutting-edge technologies in the USA and other advanced countries. Dr. Subra Suresh an alumnus of IIT Madras has been appointed as the 13th director of the prestigious National Science Foundation (NSF) of US administration, which is a rare achievement for a person of Indian origin. Based on the success of the existing IITs, Government of India has announced to set up more such institutes in different parts of India. This initiative of government will go a long way in creating a diversified pool of knowledge. This knowledge pool will be the primary fuel for the emerging knowledge economy and will be available for the world as a whole.

7.2 The International Space Station (ISS)

It was proposed under the name of Space Station Freedom by President Reagan in 1983, 4 years after Skylab burnt up. As the cost and complexity of the station grew, NASA invited other space agencies to join it, gaining support from Russia, Japan,

Europe, Canada, and Brazil. Since 1998, when the first modules were launched, more modules and a rotating crew of astronauts and cosmonauts have ascended to low Earth orbit to live and work in outer space work with scientists on fundamental science for the benefit of humanity. China and India are likely to join this club.

7.3   Space Shuttle Columbia

Kalpana Chawla of Indian origin graduated from Tagore School, Karnal, in 1976, bachelor of science degree in aeronautical engineering from Punjab Engineering College in 1982, master of science degree in aerospace engineering from University of Texas in 1984, doctorate of philosophy in aerospace engineering from University of Colorado in 1988 was a member of crew in Space Shuttle Columbia in 2003. This again is a live example of using global talent for a global mission.

7.4   European Organization for Nuclear Research (CERN)

This is an example of scientific collaboration at global scale where government representatives of 20 European States meet regularly in the CERN Council to address research in elementary particle physics and related subjects in accordance with an international treaty. The convention bestows upon the organization's two missions, namely, the operation of laboratories and the organization and sponsoring of international cooperation in the field. CERN has the world's largest elementary particle physics laboratory and provides research infrastructure for around 8,000 scientific users from the Member States and other regions in the world including the USA, Russia, Japan, and France. High-energy physicists from India, from institutes like Tata Institute of Fundamental Research (TIFR), have been participating in experiments at CERN.

8   Broad-Based Framework

According to Hindu mythology, demons and demigods collectively worked together to churn the ocean using all their strengths and resources to get valuable outcomes like divine nectar. The moral of the story here is to identify, nurture, and use all the talent and resource spread across the world for a greater cause requiring huge resources as outlined in Fig. 10.7, which has been prepared from a picture taken from Wikipedia (http://en.wikipedia.org/wiki/File:Sagar_Manthan.jpg). The underlying principle is that collective will of collaboration and cooperation will bear the fruits of collective gains to be shared equitably among all the stakeholders. Lou Friedman, PhD from MIT, a longtime Executive Director and Cofounder of The Planetary

Fig. 10.7 Broad-based framework

Society, along with Carl Sagan and Bruce Murray shares the similar opinion that the world needs a positive, inspiring, outward-looking venture that can engage skilled personnel around the world in developing new technology. Let's back off from the national-only planning and start planning internationally.

9   Conclusion

Knowledge processes have large number of micro level dimensions under broad three heads, which can interact on many planes to provide knowledge for a select group or for the well-being of the world. The outcome of a myopic vision cannot be expected to be grand. The framework discussed above offers recipe for diverse outcomes. If full potential of potent knowledge workers across the globe is made use of, for the good of the entire world population, then outcome will be such knowledge systems, which are broad-based, long-lasting, and generating fruits for the total population of the world. The broad-based framework will reduce disguised unemployment for those who are engaged in work which is far below their intellectual capabilities. This will provide an opportunity to individuals in rural and remote areas to be part of the mainstream of knowledge creation and promote technical skills in rural communities which in turn empower them to make efficient use of local resources. The slogan for the twenty-first century should be knowledge of the people to be applied by the people for the well-being of the people following principle of one world one family with opportunities for all. One of the important tasks of governments will be to raise the intellectual capabilities of its population on a continuous basis.