

Chapter IV

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Societal Change Through Technological Adaption

Technology is related with the life of human beings who have improvised their standard of living. The emergence of technology in different fields has some changes in the society. The development in technology alters the individual's communication, learning process and thinking. A society gets influenced or triggered when a new technology is introduced. This paves a new way for further development of the society.

The change in society occurs due to different reasons like people's contact with other culture or language; change in ecosystem; new technological adaption or technological change. For example the traditional marriage system in India can be considered. The emergence of new technologies like internet, computer, mobile phones and so on make the marriage proceedings simpler and faster. The communication between the families becomes easier. Through internet or mobile phones, it is possible to invite everyone. People watch the marriage ceremony through a video call or on an online platform from any part of the world. The traditional marriage dresses are replaced due to the influence of western countries. The technological development in using utensils and machinery items in the cooking process has resulted in variety of dishes and they save time. The emerging technologies in various fields results in adapting them according to their development, which results in the change or shift in the society.

Neal Stephenson incorporates new technology in his plots. The growth of technology brings out change initially in an individual or a group. The technological life style is replicated and is spread among the people gradually. It results in change among

the culture of the people resulting in the societal change, which refers to the change in society in which the people are the members of the society. The interference of technology in the particular field alters the field and people who use it. The novels of Neal Stephenson help to understand the technological growth in a particular field and its impact on the society – purification of harbor from chemicals, virtual reality, nanotechnology, cryptography and genetic engineering. For example if a person is seriously ill, he checks into a hospital with all the medical facilities and he accepts a ride in a vehicle; accepts to do all the medical tests; consumes the prescribed medicines; in case of emergency the body parts can be replaced by artificial organs or donor organs. Time makes people to get adapted themselves to the emerging medical technology though sometimes it has some side effects.

This chapter reveals the change in the society due to the emergence of technology in different fields. New areas can be recognized by examining the growth of technology. This chapter analyses the progress of technology and its impact on the society through Actor Network Theory.

Most of the novels of Neal Stephenson belong to the science fiction category. It depicts the development in technology in the fields like education, research, industrial sector, computer, medicine, space technology, cryptography and nanotechnology. This chapter examines the technological impacts on diverse features of social life. The select novels of Neal Stephenson *Zodiac*, *Snow Crash*, *The Diamond Age*, *Cryptonomicon* and *Seveneves* are analysed through Actor Network Theory.

Actor Network Theory was initially proposed by the French scholars Bruno Latour, Michel Callon and John Law. It is an effort to understand technological innovations and their relationship with society. This theory explains that no one acts alone. A complete product or any technological innovation does not belong to a particular person as it is the collaboration of many human and non-human participants. For example Alexander Graham Bell, who invented the telephone, did not act alone. The invention is a combination of numerous technical and non-technical elements, which are considered to be the actor-network. The theory of Actor network ponders on all surrounding factors. It explains the infrastructure of actor networks and their formation. In this theory, both humans and non-human agents are considered to be equal. This theory treats everything as an equal participant.

An actor in the Actor Network theory can be a subject or an object. It can be singular or plural. It can be human or non-human. An actor is the assemblage of actants. Every situation is referred to as a network which has an assemblage of elements that connects and affects each other. Like actors, the network is also composed of actants, which have some role to play. All the actants are considered to be an essential interacting system. An actant can be a human being or an object which provides certain action in order to attain the result. In the article, *A Brief Overview of Actor-Network Theory: Punctualization, Heterogeneous Engineering & Translation*, an actant is explained as: “An actor in ANT is a semiotic definition – an actant – that is something that acts or to which activity is granted by another ... an actant can literally be anything provided it is granted to be the source of action” (Cressman 3). An actant is responsible for an action. Whether human beings or non-human beings, it plays its role equally. For example, in the

process of making a cake pudding, each ingredient like flour, sugar, eggs and so on is considered to be an actant. The assemblage of all the actants is called an actor or the raw materials for the cake. The network or the oven or cooker, has also played an important role in baking the cake. The network is also a combination of actants like current and machinery parts of the oven. The actor and the network work together achieve a goal or a cake pudding. All the participants play an equal role in Actor Network theory.

In Actor Network theory, an invention or a product is the result of assemblage of all the actants. In Darryl Cressman's article, it is said that, everything can be considered as both actor and network. He simply says that "it is simply a matter of perspective" (Cressman 3). It can also be said that an actor can do many actions which is called heterogeneous networking. It is quoted as "reducible neither to an actor alone nor to a network. An actor-network is simultaneously an actor whose activity is networking heterogeneous elements and a network that is able to redefine and transform what it is made of" (Callon 93). Bruno Latour explains Actor-Network theory in his *Reassembling the Social: An Introduction to Actor-Network -Theory* that "It depends entirely on what you yourself allow your actors (or rather, your actants) to do. Being connected, being interconnected, or being heterogeneous is not enough. It all depends on the sort of action that is flowing from one to the other" (Latour 143). The flow of action which can be connected or interconnected with other actors; or the actors or actants can have numerous links. This flow results in certain changes.

The analysis of Stephenson's *Zodiac* through Actor Network theory gives a clear view of technological adaption and its impact on the society. It is a long-running conversation that whether people kill people or guns kill people. It is the person along

with a gun can kill other person faster than the person without a gun. It is the combination of man power and technology that make things prompter. The utilization of technology changes certain values and culture of the society. The combination of actor and the network results in analysing the progress of technological growth in a particular field and its impact among the people in the society. The actors in *Zodiac* are considered to be the industrialists and Sangamon Taylor, the protagonist. The networks are the emerging technology in the agricultural sector like artificial pesticides and herbicides; and in the research field and media. The actors act along with the network resulting in the societal change.

The technological upgradation in the agricultural sector replaces the natural fertilizers, pesticides and herbicides into artificiality. Through the usage of artificial products in the agricultural land, the farmers can save time, yield higher crops and lower labor costs but the side effects of consuming those food items are higher. The industries in the Boston harbor produce Agent Orange, a herbicide, used during the World Wars. The industrialists use advanced technological tools and chemicals to produce Agent Orange. This herbicide was used not only in the agricultural sector but also in the Vietnam War and in the World Wars by the American military. The impact of this Agent Orange is very high on the society. The protagonist of this novel, Sangamon Taylor, utilizes the advancement in the research field of Boston University to identify the reason for water pollution in the Boston harbor.

The Agent Orange has been banned in 1970s for its serious side effects. Though pesticides and herbicides are protecting crops from the pests and unwanted weeds, it has some drawbacks like toxicity towards human beings and other species who consume it. The effects of using artificial pesticides and herbicides are pictured as:

Despite beneficial results of using pesticides in agriculture and public health sector, their use also invite deleterious environmental and public health effects. Pesticides had a unique position among environmental contaminants due to their high biological activity and toxicity... They are potentially harmful to humans, animals, other living organisms, and the environment if used incorrectly. It is estimated that about 5000-20,000 people died and about 500,000 to 1 million people get poisoned every year by pesticides. At least half of the intoxicated and 75% of those who die due to pesticide is agricultural workers. The rest is being poisoned due to eating of contaminated food. (Yadav 150)

The usage of pesticide in agricultural sector as well as in public health sector brings up serious health defects. Due to its high toxic level, it receives a unique place in contamination. Many people and living organisms are getting affected by the usage of artificial pesticides and herbicides either directly or indirectly.

People working in the agricultural sector are directly poisoned while working with these artificial products. An article entitled “Pesticide Use in the Rice Bowl of Kerala: Health Costs and Policy Options” explains the health damages across the world because of the pesticide usage in the agricultural sector. This article describes the sensex of health defects due to pesticides estimated by World Health Organization and it is depicted as:

According to World Health Organization estimates, pesticide cause 30,00,000 cases of poisoning and 2,20,000 deaths annually across the globe, the majority of which reported from developing countries. These numbers, even more alarmingly, show a rising trend (WHO, 1990; DTE, 2001; Rosenstock, et al., 1991; Pimental,

1992; Kishi, et al., 1995; WRI, 1998). While indiscriminate use and unspecific handling of toxic chemicals are very common, the extent, severity and frequency of associated health problems are often unknown. (Devi 1)

Pesticide has its origin in the Sumerian period, before 4500 BC. Sumerians used sulfur to protect their crops from pests. It has been mentioned in the Rig Veda that the people used poisonous plants as pest controller. Arsenic, mercury and lead are the poisonous chemicals used as a pesticide by fifteenth century and in the nineteenth century, nicotine sulfate was used as insecticide. It has been extracted from the tobacco leaves. Two more natural pesticides pyrethrum and rotenone are used against pests in the same century. Pyrethrum was derived from the flowery part of chrysanthemums and rotenone was extracted from the roots of tropical vegetables. Arsenic based pesticides were used in America until 1950s.

Paul Hermann Muller (1899 - 1965), a Swiss chemist, has received Nobel Prize in Physiology for his discovery of insecticidal qualities and DDT in 1948. The full form of DDT is Dichlorodiphenyltrichloroethane. It is a colorless, odorless and tasteless chemical compound. It controls malaria and yellow fever. It has been used in the second half of the World War II to prevent malaria and typhus fever among the people and troops. In 1960s it is clearly viewed that it prevents many fish eating birds from reproducing. It becomes a serious threat to biodiversity.

Endosulfan, a pesticide, developed during 1950s in the United States of America, was used in agricultural sector and it is utilized to the core during 1980s and 1990s, which became a treat to human health and environment. It also resulted in affecting the useful and necessary insects in cultivation. The spraying of this pesticide also brings out

certain health defects in human beings and animals like skin irritation, weakness of nerve tissues, reproductive problems and developmental damage. Many people and children of Kasargod, a northern district in Kerala, are affected by serious health issues due to endosulfan, which was applied in the cashew plantations by Plantation Corporation of Kerala (PCK) for nearly twenty years. It gives rise to the environmental contamination and health defects. This is considered to be the largest pesticide tragedy in India. This is depicted as:

People living in more than 20 gram panchayats in Kasargod district were exposed to the insecticide endosulfan – a highly potent neurotoxin – between 1975 and 2000, when the public sector Plantation Corporation of Kerala sprayed the chemical aerially on its 12,000-acre cashew estates. Its residues spread far and wide via wind and rain, leaving a trail of destruction in the district and neighboring regions of Karnataka, killing more than 1,000 people. It poisoned more than 6,000 people. Thousands of children were born with congenital disabilities, hydrocephalus, diseases of nervous system, epilepsy, cerebral palsy, and severe physical and mental disabilities...but its impact is still being felt in Kasargod – babies continue to be born with genetic disorders and physical deformities. (Ameerudheen 1)

In 1970 Environmental Protection Agency (EPA) has been established and it amends the pesticide law in 1972. In *Silent Spring* (1962), Rachel Carson focuses on environmental problems due to pesticides. Stockholm Convention on Persistent Organic Pollutants is an international environmental treaty signed in 2001. Its aim is to prevent

the production and utilization of persistent organic pollutants, but still it is in use in some developing nations.

Neal Stephenson brings in the herbicide Agent Orange and its fictitious manufacturing company Boston Industries in his *Zodiac*. He depicts the pollution made by the company by the wastages in producing Agent Orange. Veterans Affairs' Agent Orange review explains its use in Vietnam War as:

Agent Orange was a herbicide used in Vietnam to defoliate trees and remove cover for the enemy... Various chemical herbicides were sprayed in Vietnam at different times – during different years as well as different seasons because of the variety of vegetation and environmental conditions. Agent Orange spraying missions in Vietnam were conducted from March 1965 through June 1970.

(VA Agent Orange Review 1)

Sangamon Taylor involves seriously in unplugging the toxic wastages from the industries that break the eco laws. The toughest thing is to make the people to believe the importance of eco laws which have been broken by the companies. He says that “You can’t get most people to believe how wildly the eco-laws get broken” (Stephenson, *Zodiac* 20). Taylor while riding in *Zodiac*, a high powered engine boat, along with the fisher man’s family, has found the most polluting company of the Harbor. The major production of the company is Agent Orange, which poisons Vietnam during Vietnam War. Taylor says that “The Pleshy family ran Basco – they’d founded the company – and that made them the number one polluters of Boston Harbor. The poisoners of Vietnam” (Stephenson, *Zodiac* 22). Vietnam War has taken place for nearly two decades, but the

effects of poisoning through Agent Orange are continued. Center for Food Safety has explained the impacts of using Agent Orange in Vietnam War as:

In what has been called the “largest chemical warfare operation in history”, the U.S. dumped 11 million gallons of Agent Orange (a mixture of 2, 4-D and the even more toxic 2, 4, 5T) over Vietnam from 1962 – 1971. The purposes of this chemical warfare were to destroy rice fields and rainforests to deny the Vietnamese food and cover. The Veterans Administration regards Agent Orange exposure as the cause of numerous diseases in Vietnam veterans: diabetes, neuropathy, Parkinson’s disease, heart disease, liver dysfunction, chloracne, numerous cancers, as well as birth defects in the children of exposed soldiers. Vietnamese suffer serious health problems from Agent Orange exposure, including birth defects in children and grandchildren of those exposed. (2)

The impacts of using Agent Orange are hazardous. The health defects are not short term. More than two generations have been affected due to this poison.

Taylor has shed light on explaining Agent Orange and its chemical composition. He explains the toxic chemical compounds present in it deeply. The toxic substance gets into it while manufacturing. He depicts “the bad thing about Agent Orange wasn’t the Agent Orange. It was an impurity that got into it during the manufacturing process” (Stephenson, *Zodiac* 131). He explains the similarities among the Agent Orange and PCBs. The most common toxic substance is covalent chlorine. It is a bad stuff that creates environmental contamination and its effects on living creatures and human beings are dangerous. He further adds that the chlorine in the salt is not toxic due to its ionic form. He describes both the Agent Orange and PCBs as “Evil Twin” (Stephenson, *Zodiac* 130).

Taylor, the protagonist, uses technological advancement in the research laboratory in order to find out the toxic substances found in the Boston water body and the creatures that depend upon it. He gets timely help from Tanya, his research friend. Sometimes he utilizes the research lab of Boston University to find out the toxic chemical substance in the lobsters. Taylor utilizes the technological advancement in the research field like chemical substances and advanced apparatus to find out the presence of toxic level in the living creatures of Boston Harbor. He advised the people for using Boston water and for catching fishes and lobsters due to its toxic consistency.

The industrialists are the actors, who act with the network, the emerging technology in the industrial field to produce Agent Orange. The industrialists used advanced machineries in the manufacturing sector by replacing the old transformers. The labors and the research scientists, who work in the industry, toil for the sake of industry's growth. The old transformers dumped inside the harbor were leaking PCBs which emits toxins to the living creatures. It results in contaminating natural environment. The industrialists with the help of research scientist produce microbes which eat toxins from the water. They released the microbes into the harbor without proper research. The industry manufactures Agent Orange which was used in agricultural land and in the Vietnam War by the American government. It results in demolishing nature and creating health issues in human beings and other living organisms.

Taylor, the actor, utilized the advanced technologies in the research lab, identifies the illegal activity done by the industrialists with the help of GEE members and fisher men. Taylor informed the illegal activity to media and network, in order to create an awareness among the people. He has caught a container full of toxic chemical wastes that

was kept to dump in the middle of Boston harbor water. The toxic container and the illegal activities of the Basco industries are telecasted to the people through media. The government has banned the company and instructed the responsible officials to monitor the pH level of the sewages and the chemical wastes from the industries. Thus the corporate crime which creates environmental degradation is brought to the lime light.

The spraying of artificial pesticides affects the food chain and causes severe damage to those who consume it. The nature's cycle has been changed due to the change in ecosystem. The healthy life of people gets affected due to the amalgamation of artificial toxic substance with nature. The social life of people gets altered due to health and mental defects of people. The incurable diseases upset people and disturbs their routine life. The social life of Vietnamese was disturbed due to the incurable effects of pesticide sprayed during Vietnam War. Taylor makes sense in bringing back the originality of the harbor through his research in lab to find out the toxins and to create an awareness among the people with the help of media. A man's routine social life has been changed due to industrialization and technological development. At the same time the development in technology should not interrupt the nature's cycle. Man must understand that the interruption in nature results in the interruption in social life.

Stephenson's *Snow Crash* is the second novel taken for the analysis. He has incorporated many creative technological ideas in this novel. The characters of this novel believe that they are living a realistic life instead of the virtual world. They enjoy more freedom and they have a good control over their environment. The society explained in *Snow Crash* is very different from the ancient society, which is devoid of digital technology. The people of modern period assume that they achieve higher degree of

freedom by spending their valuable time in virtual reality. Artificiality has been rooted deeply in all the fields. Human beings save time and energy due to technological adaptation. The line between the real world and the virtual world blurs due to technological interruption in the social life. Actor Network theory is applied to bring out the changes in the society due to technological advancements.

The actors of this novel are Hiro, Rife and Raven. The network is considered to be the technologies in the field of virtual reality like Metaverse and Snow Crash. The assemblage of actors with the network results in societal change. A few characters of the novel like Da5id, Librarian and Jaunita live in the virtual world most of the time. This constant lingering in the virtual world has created impacts in their life and society. An individual might feel isolated if he spends most of his time in the virtual world. When a person experiences violence in the virtual world, it can increase his aggressive behavior in the real world. The actors are the collection of actants which add some function to actor. The actants are the source of action which helps actor to perform the action. Through Actor Network theory, the growth of technology and its impact among the society are analysed.

The technological advancements in the pizza delivery system and in the virtual reality alter the social perceptions and interactions. Hiro, the protagonist and the real life sword fighter, is a talented sword fighter in Metaverse, a virtually shared 3D platform. He is also an elite hacker in the virtual world. Y.T.'s courier service may take a long time to deliver letters and parcels without her skateboard. Rife's strong desire of taking control

over the world requires technology. Ng might have given up his life without technological implantations in his body. Technology played a crucial role in the society of *Snow Crash*.

The necessity of technology to the plot is described as:

Without technology, Hiro would be nothing more than a sword-swinging hoodlum. Being a hacker gives him a sense of purpose, just as being a skater (with all the high-tech gear it entails) gives Y.T. a sense of freedom. Rife's plan to take over the world? Requires technology, and some of it's pretty fancy, like the brain-wire-grafting process that lets him control huge portions of the Raft... technology is not neutral, it's usually developed with an agenda in mind. But love it or hate it, technology is an indispensable element of the *Snow Crash* world. (Shmoop 1)

The technology has been interwoven with human life. The society without technology is impossible to imagine at the present period. The author presents *Snow Crash* fusing it with technology. Human beings become cyborgs by adapting themselves to the technological world, which alters the routine way of living.

Metaverse is an imaginary place, where people can live their virtual life. Hiro often enters into this computer-generated world by wearing his goggles and ear phones. Hence people can build their own small streets from the main street. The infrastructure of the Metaverse and the hobbies of people in it are explained as:

They can build buildings, parks, signs, as well as things that do not exist in reality, such as vast hovering overhead light shows, special neighborhoods where the rules of three-dimensional space time are ignored, and free-combat zones where people can go to hunt and kill each other. (Stephenson, *SC* 23)

Fighting each other with the sword and killing people becomes very common in Metaverse. Though it is a piece of software written by some programmer, mentally it disturbs the person who leads a stressful life's situations. In Metaverse people build parks, tall buildings and things that do not exist in reality. Whatever they see inside the Metaverse, is merely a representation of graphics. The dependency of technology and over usage of technology result in affecting the health and mind of the person. This also has an impact in the person's social life. The term Metaverse was coined by Neal Stephenson in this novel. It describes a virtual reality based platform to the digital world. It is considered to be a way of escape from the dystopian reality. After thirty years Mark Zuckerberg, co-founder of Facebook, a social media website, has changed the Facebook's name as Metaverse or Meta. It is a futuristic idea where people can live, work and play. Many other software companies are also planning their own Metaverse where people can live in the virtual world disguised as avatars.

The Cyborgs and Barbie Dolls: Feminism, popular Culture and the Posthuman Body explains that people are under the clutches of technology as:

Figurations such as Barbie function to encourage alternative understandings of the body and self as transformative, rather than bound to an established system of meaning. She is a precursor to the posthuman; a type of plastic transformer who embodies the potential for identity to be mutable and unfixed. (Toffoletti 59)

Metaverse is a place where people can desire to change their image or appearance according to their societal standard for appearance. Upgradation in transforming one's appearance is always cherished. Toffoletti explains the characters in Metaverse as avatars or Barbies in other virtual platforms which encourage the creativity of the people who

take up their roles. It is understandable that people try to escape from the framed rules of the society and to live in their own way. But people are actually trapped in the virtual world. The technology like virtual reality and augmented reality lead people closer to the completely controlled society where their privacies are snatched.

Da5id is a friend of Hiro. He is the owner of The Black Sun, a software and also a chief hacker in the technological world. Stephenson explains The Black Sun as “a much classier piece of software. In The Black Sun, avatars are not allowed to collide ... The avatars look like real people. For the most part, so do the daemon” (Stephenson, *SC* 51). In The Black Sun, the avatars are not human beings, they are merely robots. They serve imaginary drinks to the people in the form of avatars inside the Metaverse. Unlike Metaverse’s avatars, the avatars of The Black Sun could not pass through one another.

Hacking can be easily done through some pieces of software. A person’s full detail can be known through hacking. Hiro hacks the people’s details through his software called Bigboard in the Metaverse. His hacking talent has been depicted as “In the worldwide community of hackers, Hiro is a talented drifter. This is a kind of lifestyle that sounded romantic to him as recently as five years ago” (Stephenson, *SC* 20). He loves to be a hacker than a pizza delivery boy in real life. The software Bigboard is written by him and takes information from the people in the Metaverse. He collects information and sells it to CIC for money. The software and its purpose have been depicted as:

Hiro mumbles the word “Bigboard.” This is the name of a piece of software he wrote, a power tool for a CIC stringer. It digs into The Black Sun’s operating system, rifles it for information, and then throws up a flat square map in front of

his face, giving him a quick overview of who's here and whom they are talking to... He is a hacker. If he wants some information, he steals it right out of the guts of the system – gossip ex machine. (Stephenson, *SC* 51)

Stephenson explains through the character Da5id that the computer virus has power to affect not only the files in the system but also the human brain. Da5id connects ear phone to his system, when his system gets snow crashed, his brain completely gets affected. His brain is also hacked along with his system. He pictures this as “His software got poisoned. Da5id had a snow crash last night inside his head” (Stephenson, *SC* 186).

Da5id escapes from the reality and enters into the virtual world called Metaverse, where he also hacks people in order to get information. People find it difficult to accept certain rules in the real world. But in the virtual world, they can fulfill all their unfulfilled wishes. Hiro, a very skilled sword fighter, gets satisfied only after fighting and killing avatars in Metaverse. People consider the computer-generated 3Dimensional imaginary world as their own world. As a result of getting addiction or involved to the virtual world, people get serious health defects both physically and mentally like Da5id.

The technology and the life of human beings in the present period are entwined. Mankind without technology is unimaginable. In this novel, smartwheels are used in the skateboards to move according to the curbs and bumps in a faster way. It has been attached to Y.T.'s skateboard. It makes her to travel faster and deliver the courier on time. Her traveling through the smartwheels is portrayed as “Y.T. aims herself at the curb, hits it at a fast running velocity, the spokes of the smartwheels see it coming and retract in the right way so that she glides from street to lawn without a hitch”

(Stephenson, *SC* 27). During a heavy traffic, she even does Hiro's pizza delivery work to the Mafia without delay through smartwheels. The use of smartwheels in Y.T.'s skateboard is pictured as:

"Name's Y.T.," she says, shoving at the pool a few times with one foot, building up more energy. She flies out of the pool as if catapulted, and she's gone.

The smartwheels of her skateboard, many, many spokes extending and retracting to fit the shape of the ground, take her across the lawn like a pat of butter skidding across hot Teflon. (Stephenson, *SC* 17).

The technological innovation like smartwheels depicts the upgradation of the society. Certain innovations turn up the standard of the society. The development of technology depends upon the quality of people's life in the society and the way of interaction with the technology. The advancements in technology change so many things like the way of communication, interaction behavior and way of living. Y.T. makes her work faster due to smartwheels. The speed of skateboard increases when it is attached with smartwheels. Y.T.'s experience in a shop is impressive. It is explained as:

To a man on foot, stairs are hindrance. But to the smartwheels, they just look like a forty-five degree angle ramp. It's a little choppy, especially when she's down to about the second floor and is going way too fast, but it's definitely doable... then kicks the board sideways at the last minute, punches one of the toe switches, coils her legs underneath her, and jumps into the air. She flies right over his little table while the plank is rolling underneath it, and a second later she lands on it, wobbles once, gets her balance back. She's in the lobby, headed for the doors.

(Stephenson, *SC* 292-293)

Y.T. has to deliver a courier to Feds in the ninth floor of a building. The courier is from an unknown person. The building has certain rules to enter in. But Y.T. has gone inside without obeying any of their rules. Later she has been chased to arrest for her misbehavior. But Y.T. comes out of the place very faster with the help of smartwheels in her skateboard.

Rife, a well-heeled person, puts a huge amount of money in religious organisations. Later Hiro identifies that Rife is at the middle of a global conspiracy. He has been manufacturing the physical form of Snow Crash drug to control a huge population. He has also manufactured the computer virus in the form of binary digits to gain control over the information elite and the computer programmers. His interest in archaeology results in getting some Sumerian artifacts that contains instructions to programmers. His research in radio astronomy makes him to transmit virus in the form of binary code.

Rife utilizes technology as a tool to make control over the people. He hacks the program developers and hackers and brings them under his control. The misuse of technologies by Rife and David resulted in disruption. As the proverb says, "Too much of anything is good for nothing", too much use of technology or getting addicted to technology can cause certain health defects and mental sickness. After the interference of technology in people's life, the vengeance, greed and jealous get increased. It changes the life style of the people. The originality of mankind is faded in the hands of virtual reality.

The actors of the novel Rife and Raven utilize the network, virtual reality and augmented reality to gain access over the people. They have written programs and created new virus called Snow Crash to hack people and their personal computers or laptops. They have also prepared physical form of virus which is to be injected through

blood to gain control over the people. When a technology like digitalization is introduced, people started to use it to reduce their energy and time. It slowly alters their thought process and makes them to rely on it completely which turns into an addiction. Hiro, the actor, utilizes the same technology and writes an anti-virus programming code called 'Snow Scan' as an antidote for 'Snow Crash'. Stephenson brings out the harsh realities of life as people become addicted to their own inventions and they fuse themselves with the Avatars only to become half robots. Though there are some negative elements, one cannot deny the other side of the coin. It resulted in delivering certain social benefits like providing education, job opportunities and to enhance values.

The technological development in the field of virtual reality makes certain changes in the society. After the arrival of internet and virtual world, people started to live in the virtual world more than the real world. Only the physical form of a person stays in the real world. The mental state of a person is intertwined with the second world called virtual world. People believe that they have escaped from the clutches of reality and entered into virtual world to be free without any control or rules. The freedom enjoyed by the people in the virtual world is ironical. The interference of technology in society results in changes like lack of friendliness among people, abundant animosity, jealous and vengeance. Da5id and Ng are saved from death due to the advancement in technology. The society gets changed in both constructive and destructive way when the technology interferes. People have to choose the right path for a healthy and peaceful life.

The Diamond Age is the third novel taken for the study. This novel, which has a lot of interconnected stories, explores the relationship between technology and society. Stephenson highlights the impacts of technology and scientific invention and the change

that took place in man's life style. It is portrayed as "The Diamond Age by Neal Stephenson is a meditation on the operations of tricksters at different levels of society" (Robert 93). Nanotechnology is highly woven in the plot. Stephenson draws attention to the impacts of technological advancements in the usual human life. Technological upgradation in the education sector paves way for progress in the life of orphan girls and the girls who are below poverty line. The nano technological development and its impact on the social life is analysed through Actor Network theory.

The actors of this novel are Nell and Orphan girls, who act with the network Primer, to achieve their individuality. In this novel, the nanotechnological inventions like Primer and Matter Compiler help the poor people to educate themselves and to satisfy their basic needs. The way of education depicted in the novel is very relevant to the education system that prevailed during pandemic situation. Social inequalities are blurred through this technological teaching.

Hackworth has been given the assignment of designing Primer through nanotechnology for Elizabeth. It is because Lord McGraw wants her granddaughter to be educated practically so that she can gain more knowledge. It is explained as "Lord Alexander Chung-sik Finkle-McGraw was paying for Hackworth's current project, the *Young Lady's Illustrated Primer*, price was no object" (Stephenson, *DA* 50). The greedy mind of Hackworth wants to prepare a copy of the same Primer for her daughter too. His love for Fiona makes him to do this crime. He could not even sleep well because of the guilty act of his crime. This is given as "Thinking about tomorrow's crime, John Percival Hackworth slept poorly, rising three times" (Stephenson, *DA* 33). Each time when he gets up from the bed, he looks at Fiona and admires her charm. Hackworth is involved in the

project of making Primer whole heartedly. The manufacturing of Primer includes many processes with too many codes. Nanotechnology occupies a major place in this process. The creation of Primer involves help from many other hands like Dr. X and Cotton. This creation is used for so many young children to educate and empower themselves.

The invention of Primer belongs to Lord Finkle-McGraw, who wants Elizabeth, his granddaughter, to be educated not in school like other people of the society but from her house. He wants something higher than that which could teach her everything by understanding her situation and environment. This makes Hackworth to create a device for her daughter Fiona too. This is depicted as “Fiona Hackworth would be getting a copy of the Illustrated Primer too, for this had been John Percival Hackworth’s crime. . . He had generated a second, secret copy of the Primer” (Stephenson, *DA* 84). The initial motto of Lord McGraw and Hackworth is selfishness. They want their girls to be well-educated and to be empowered. However, this helps a lot of orphan girls to educate themselves later. Since these girls struggle without proper education, Primer is a boon for them.

The Primer falls in the hand of Nell through her brother Harv. He takes this Primer from Hackworth. The Primer unfortunately comes to Harv while fighting with Hackworth. Harv’s friends do not mind about the Primer which looks like a box.

The appearance of the Primer is explained as:

It was not a box at all. It was a solid thing. The top was printed with golden letters. The left edge was rounded and smooth, made of something that felt warm and soft but strong. The other edges were indented slightly, and they were cream-colored... The whole lid of the thing bent upward around a hinge on the left side,

pulling a flutter of cream-colored leaves after it. Underneath the cover was a pie of paper with a picture on it and some more letters. On the first page of the book was a picture of a little girl sitting on a bench. (Stephenson, *DA* 93-94).

The Primer narrates stories through a very fine voice. It narrates the story, clears doubts and teaches new things to its owner. The voice in Nell's Primer is the voice of Miranda. Nature of the job is explained as “a fundamental part of its job is to respond to its environment” (Stephenson, *DA* 108). Miranda is working in a theatre, where Carl Hollywood is the founder, who helps Miranda a lot. Her racting initially starts with a small story of Princess Nell and her day-by-day the conversation between Miranda and Nell through Primer increases. Nell does not know that it is a lady who is talking with her. Miranda knows that it is a little child at the opposite end, to whom she narrates the stories of Princess Nell. Not only the story, but also Miranda teaches her varieties like mathematics, reasoning and self-defense in a practical way. Sometimes Miranda would not even take rest, eat or care for her nature’s call. The nanotechnology used in the primer makes Nell to learn in a practical way. She is very much interested in learning through Primer that makes it possible to extend the learning session for a long time. She feels adventurous by learning new things through Primer. Their conversation through Primer is described as:

Within a week she was teaching this girl how to read. They’d work on letters for a while and then wander off into more stories about Princess Nell, stop in the middle for a quick practical demonstration of basic math, return to the story and then get sidetracked with an endless chain of “why this?” and “why that?” ...

A month or two into the relationship, Miranda groggily signed off from a long

Princess Nell session and was astounded to notice that she'd been going for eight hours without a break. Her throat was raw, and she hadn't been to the loo in hours. (Stephenson, *DA* 135-136)

Finkle-McGraw and Carl Hollywood are discussing the ractors of the three Primers. The holders of the three Primers are Nell, Fiona and Elizabeth. The concepts of the three Primers are the same but the person gaining knowledge through it differs. Nell is very much interested in Primer and she keeps on listening and asking doubts with the Primer. Nell grows up to be a brave and intelligent girl. Stephenson expresses that Nell "is a most promising young lady" (Stephenson, *DA* 367). Elizabeth is very stubborn, energetic and enthusiastic. She doesn't like to spend time with the Primer. Fiona is a bright girl but she is very much depressed due to her father's absence. She used to write something and sit in silence. The characters of Elizabeth and Fiona are depicted as "Elizabeth is rebellious and high-spirited and lost interest in the Primer several years ago. Fiona is bright but depressed, a classic manic-depressive artist" (Stephenson, *DA* 367). For Elizabeth's Primer, the racting, the interaction, is performed by so many performers. For Fiona, her father does most of the racting and for Nell, all the racting has been done by Miranda alone. She becomes Nell's tutor as well as a well-wisher and she is very much attached to Nell. She has motherly care for her. It is described as "she was not merely Nell's tutor. She became Nell's mother" (Stephenson, *DA* 367). The Primer is useful for the children who take interest in learning new things. The children can hesitate to ask doubts with the teacher but not with the Primer, which is very friendly and free to use.

Female infanticide is common in Han's tribe. In order to save those girl babies, Dr. X takes efforts and brings them to his large ship that has so many containers. He says that the "purpose of the operation is to save their lives" (Stephenson, *DA* 148). There are many young women in pink, blue and white dresses who take care of little girl babies according to their age. Dr. X and his team have been collecting these girl babies for the past three years. Dr. X explains to Judge Fang that "fifty thousand on this ship alone" (Stephenson, *DA* 168). Dr. X is very much worried about the education of the little girls. It is impossible to raise children when they are grown up. Proper space for playing, healthy foods and good education should be given for the children. It is quite risky to produce all those facilities within a ship for all the babies.

Dr. X requests Judge Fang that he could show mercy on these kids by understanding the importance of upbringing of small children properly. He asks Judge Fang to have some concern on them as he had for Nell for using Primer. He says that "No doubt you will exhibit the same concern for each one of these quarter of a million infants as you did for one little barbarian girl... 'These young ones must all be educated'" (Stephenson, *DA* 169-170). Education for girl children is necessary for a healthy home and nation. It is possible due to technological enhancement. Judge Fang accepted the request of Dr. X and he agreed to talk with Hackworth regarding Primer. He says that "Better to leave the book in the hands of one who could benefit from its wisdom, than to let it remain, inert, in a police warehouse" (Stephenson, *DA* 164). Hackworth has been sentenced for ten years for his illegal copy and he is ordered to produce Primer for

all those orphan kids. Education and knowledge should not remain inert. It is better to give for the beneficiaries than to remain useless. Technology bridges the world of orphan girls and education.

The orphan girls are given the Primers and they educate themselves and come up with courage. Nell, after completing her schooling, has a plan of learning programming and about ractices. She likes to find a nice husband and raise children properly. Nell comes out to face the world confidently and she gets a job as a script writer in Madame Ping's office. All these achievements are because of the technological implementation in education system. All the orphan girls hold hands together with Nell during the fight due to the new invention of software called Seed. Through this Seed the things like weapons, drugs and viruses can also be produced, which can bring destruction to the world. When Nell gets trapped in the nest of the opposing team, the orphan girls fight for her and save her. They thought of her as their role model and made her their leader. In this novel, nanotechnology has played a great role in everyday life. The invention of Primer paves way for the prosperity of too many girl children's lives. Judge Fang utters that "it is better for society that the girl is educated than that she remain ignorant" (Stephenson, *DA* 164). The enhancement in technology is appreciable when the society grows along with it.

Eileen McGinnis criticized *The Diamond Age* as "it remediates not only a particular technology but also a larger American cultural narrative about literacy" (McGinnis 480). Stephenson has used technology like Primer as a tool to bring out

education, parenting and inculcation of values. He also explains human beings and technology describes each other. In the novel, Nell's involvement in Primer transforms herself to an elite life. It is depicted as:

Nell and her primer are co-emergent – that is, the human user and the technology mutually define each other. Nell's interaction with the book not only transforms her from an uneducated and defenseless street urchin into an articulate and erudite savior of the free world (or at least of a futuristic Shanghai); it also informs the very texture and textuality of the book itself while shaping the physical world in which Nell enacts a self. (McGinnis 483)

Though Hackworth is the designer of Primer, he is not fully responsible to reach lots of young minds. According to Actor Network theory, a person cannot act alone to achieve a certain goal. Hackworth's Primer is the result of Finkle-McGraw's idea, Hackworth's selfishness, code writers, cover designers, Dr. X and Judge Fang, who are considered to be the actants. The actors Nell and the orphan girls from Han culture utilizes the Primer, the network, learnt to stand alone and showed their individuality during the fight to destroy the software 'Seed'. As a result of the fight, they have destroyed Seed and announced Nell as their leader. The technological enhancement in the education sector like Primer, eradicates female infanticide in Han culture and all the girl children are educated without any difference. Thus it has empowered women. McGinnis also describes in his article that "Nell's immersive reading of the Primer also recalls Rousseau's educational model in which a child is ostensibly removed from the society in order to give the tutor full control of the child's environment and conditioning" (485). Though Nell was lonely and she had isolated reading experience, Primer functions as

global communication network which is powerful and informational. Stephenson has explained Nell as savior figure, who rescues Neo-Victorian community of Shanghai. Education of Nell through Primer has made her to transform herself to the powerful position and the orphan girls as a part of her Mouse Army. Educating a girl child can build better families. Technological upgradation in the field of education blurs poverty, gender discrimination and inequality. Thus, Neal Stephenson portrays the increased literacy rate and decreased female infanticide in Han culture due to the usage of Primer. He also reveals that the empowerment of women happens with education through the character Nell.

Cryptonomicon is the fourth novel taken for the analysis of this chapter. This novel explains the detailed concepts of cryptography used during the Second World War. The code breaking techniques used by the allied forces during the Second World War and in 1990s makes the plot. The novel presents the detailed description of cryptography along with Mathematics and Physics.

The development in technology like cryptography makes a huge difference in communication system. World War II is the initial stage in the development of cryptography. Mathematicians and cryptographers take huge effort to break the opponent's codes. It becomes contrast in 1990s, which is the period of internet boom, where people all over the world start to communicate through internet. Hacking culture has stepped into the digitalized world during this period. Collecting information from third party without the knowledge of first party through internet begins during this era. This advancement in cryptography and its impact on the society is analysed through the Actor Network Theory.

The Actor Network Theory helps people to understand the technological difference in both the periods of the World War II and 1990s. The actor of the novel is Randy Waterhouse. The network is cryptography. Randy's friends Avi, Amy and Doug Shaftoe and Amy's father helped Randy in identifying the treasure and cracking its code. In the modern period, the data are encrypted and decrypted using mathematical algorithms and secret keys. Through Actor Network theory, the digitalized communication system, where the messages are encrypted and decrypted; and its impact on the society are explored.

Keijo Ruohonen, professor of Mathematics, explains the methods of encryption and decryption of messages. He explains that the central mathematical background is necessary for the understanding of modern data encryption. He explains the process of encrypting the message as:

Encryption of a message means the information in it is hidden so that anyone who's reading the message, can't understand any of it. unless he/she can break the encryption. A original plain message is called plaintext and an encrypted one cryptotext. When encrypting you need to have a so-called key, a usually quite complicated parameter that you can use to change the encryption. If the encrypting message remains unchanged for a long time, the probability of breaking the encryption will in practice increase substantially. Naturally different users need to have their own keys, too. (Ruohonen 1)

A message with hidden information is called as encrypted message. The reader could not read or understand the message unless the code of the message has been broken. The encrypted message is called as cryptotext. Key is necessary for encrypting a

message. The users can have their own keys for encrypting the message. The receiving message is called decrypted message. The information hacker should have the keys of both the encrypted and decrypted messages. Ruohonen in his Foreword of *Mathematical Cryptology* explains various powerful encrypting methods that have been discussed in Neal Stephenson's *Cryptonomicon*. He talks about Stephenson's *Cryptonomicon*, where the methodology of cryptography used during the Second World War is well depicted. He says that the combination of Mathematics and Cryptography are old but it has given a powerful result during the Second World War. His Foreword in *Mathematical Cryptology* is given as:

Though the union of mathematics and cryptology is old, it really came to the fore in connection with the powerful encrypting methods used during the Second World War and their subsequent breaking. Being generally interesting, the story is told in several (partly) fictive books meant for the general audience. (Ruohonen iii)

Avi and Randy, the characters of 1990s, are found with their laptops, seeking for the information about the treasure, which was buried under the water during the Second World War. They both walk out of Randy's house. Randy climbs upon the roof of his car along with his laptop. He has a very good laptop with a twelve volt adapter. His laptop has installed software which could identify every packet passing his laptop. A packet is a tiny portion of a bigger message. When a message or data is sent, initially it will be divided into packets and it will be recombined in the receiving device. Randy talks about the diameter of the earth and the height of the radio tower. His radio adapter manages to connect with the pocket radio network. His encrypted messages are described as:

Randy opens a terminal window and types telnet laundry.org and in a few seconds bang! He gets a login prompt. Randy now has another look at the animated window, and notes with approval that the info-bolts have been replaced with gouts of question marks. This means that his computer has recognized laundry.org as a S/WAN machine – running the Secure Wide Area Network protocol – which means that every packet going back and forth between Randy’s laptop and laundry.org is encrypted. Definitely good idea when you are about to do something illegal over the radio. (Stephenson, *Cryptonomicon* 851-852)

He further explains encrypting communications between two computers.

He makes laundry.org as an anonymous service. When the packets pass through this laundry.org to another computer, the information is identified first so that if a person intercepts any of those pockets, it is impossible to know the origin of the message. At the end of this novel, Stephenson has given encryption algorithm for a better understanding.

For encrypting and decrypting the messages and the techniques used to hide the id of the user proves that an advanced method is used in cryptography. The novel covers the modern hacking culture like cryptography and cyberpunk politics. The plot has immersed in the historical touch focusing on the roots of cyber culture in the information battles against Germany during the World War II. The progress of technology has been identified from World War II to the modern period. The technological development and its advancement in the field of cryptography and cyber culture have resulted in the cultural change in society. Stephenson has brought out both the Second World War and the crypto system. The enhancement in cryptography results in safer communication and also sometimes results in data breach.

Randy Waterhouse joined with Avi, his companion in old role playing game, in a new startup business. His startup includes providing non-real time video messages and created data haven called The Crypt. Randy and Amy, his business partner came to know about the treasure which was hidden under the ocean during World War II while doing a survey for their cable work. Randy and his partners plan to create digital currency which is backed by gold bars. The treasure was identified and taken by Randy and his partners by decrypting the code Arethusia. Randy decided to spend his part of money in holocaust education for children.

Thus, Randy, the actor with the help of actants like Avi, Amy, John Cantrell and Tom utilized cryptography, the network, to decrypt the message in order to identify the treasure. Though Randy was arrested for false charges, he has broken the code for the treasure and sent it to his friends. Though he has the intention of earning more money, he has the soft corner for the people which results in spending his gold treasure for free education of children affected in holocaust. The technology is getting advanced like advanced cryptography which results in shaping the society by producing a secured method of communication.

Seveneves is the fifth novel taken to explore the role of science and technology. In this novel, Stephenson posits space technology and biogenetic engineering in the daily life of mankind. He portrays science and technology as a lifesaving tool in the novel. The technological advancements in the fields like space technology, robotics, genetics, medical science, computer science and so on made human habitation possible even after five thousand years of the earth's destruction.

The new invention in genetic engineering like parthenogenesis makes human race to regenerate from the destruction. Scientists, researchers, lab technicians, politicians, physicians and so many well-wishers worked in building a space station to save the human race. Recreating human race again is the desperate effort of seveneves from the huge destruction. The society has a glimpse of hope to save human race from the destruction. This is analysed through Actor Network Theory.

Through Actor Network theory, the impact of science and technological development in the society is explored. The seveneves, the seven women who were the only living beings in the space station, are considered to be the actors. The network is parthenogenesis, an asexual reproduction. Seveneves, applied the technological concept of automictic parthenogenesis and utilized the technologies of genetic lab in the space to rebuild human race.

Stephenson depicts the apocalyptic events due to the disintegration of moon and the power of technology to overcome it. The incidents in this novel can be taken as a warning to the human society for exploiting the Earth. Stephenson shows the supremacy of science and technology by making human beings to survive after the disastrous incident. Seveneves, through the advanced equipment in genetic laboratory, can control the characters and genetically modify their own offspring.

After the hard rain, the entire earth has been destroyed. It is the will power that works along with technology to reestablish the Earth. Ty, descendent of Eve Dinah, has depicted the members survival after their struggles as:

Preferred to believe that there was a purpose to the universe. Until the moon blew up, they had theories. After Zero, the theories all seemed kind of stupid. Fairy tales for coddled children. No one thought about the big picture for a few thousand years. We were all scrambling to survive. Like ants when their nest has been destroyed. On those rare occasions when we thought about the big picture, it wasn't really that big – Red versus Blue or what have you. There was surprisingly little thinking about the Agent. Where it came from. Whether it was a natural or artificial, or even divine. (Stephenson, *Seveneves* 859)

Ty explains that until the moon has not been destroyed, there are theories regarding moon. The education system has taught about the space technology but those days of survival in space are not even imagined by anyone else. People in space, after the destruction of Earth, feel like ants whose nest has been destroyed. The emotional state of the people cannot be defined easily. He feels that this miracle of survival after so many years of Earth's destruction has happened with full of surprise. This can be natural or artificial or divine power.

There are three billion people living on the Earth's orbit after five thousand years. They divide themselves into seven different races, which is further split into two groups, red and blue. The cold war always happens between the two groups. People are working to terraform Earth, to rebuild Earth with breathable atmosphere and life-sustaining conditions. Science and technology has helped them a lot to survive in space and in terraforming Earth to make it habitual again. When they are working on rejuvenating Earth, they came to know that there are two more races living on the Earth; Diggers, who are living beneath the Earth and Pingers, who are living in submarines under the ocean.

The Pingers have used the same technological ideas which are used in space to survive. The underwater ark in the submarine was created by Ivy's fiancé secretly with the background images of the selfies sent by Ivy to him. Through technological advancements and its adaption mankind has risen productively even after the destruction of Earth. Initially, the poor application and smaller error in using the technological devices and improper way of applying the technology, creates a big catastrophe and loss of technological resources in space. Later people handled it effectively by learning its proper usage. During terraforming, the space dwellers met Diggers, who are living underground. They looked different in appearance and their eyes had gone pale due to the darkness in their caves. Stephenson portrayed the appearance of Diggers through the eyes of Spacers as:

To the Spacers, the Diggers were familiar looking from old videos: they were rootstock humans such as populated the epic. Genetically they were homogeneous. They were white people with blond or red hair, and eyes that seemed to have gone pale in the darkness of their caves. Their skin was fair by nature, but freckled by exposure to the aboveground sun... since it could be guessed from their reactions that they had seen little or nothing of the spacers.

(Stephenson, *Seveneves* 752)

Stephenson has picturized the life on Earth before it gets destroyed, life of thousands of human beings on space seeking for survival and to rebuild human race, hope of determination in the eyes of seveneves to recreate human race with technology and the life of mankind after five thousand years of survival. People on Earth initially don't have any plan or awareness on their future in space. Later they learnt, relearnt and improvised

themselves in order to survive in space. Like spacers, the diggers and pingers have survived with the technological advancements. Their physical appearance and their way of living differ according to their environment. The pingers, when they came out of the water, breathed loudly and deeply for a while, “apparently reoxygenating, but then settled down to a more normal respiration” (Stephenson, *Seveneves* 851).

People from the space are longing to live on Earth. Kath Two, one of the descendants of Moira utters that “Not to kill the animals that the human races had gone to so much trouble to invent and import” (Stephenson, *Seveneves* 571). When Kath Two came to Earth along with the other representatives of six races, she notices “From here she could see nearly half of the ten thousand or so habitats in the ring. Far to the East, just above the horizon, was an especially big dot of light, like a clasp on a necklace. That would be the colossal structure of the Eye, currently stationed above the Atlantic” (Stephenson, *Seveneves* 573). People in space are living an artificial life for nearly five thousand years. This might also have resulted in change in their brain and people have to be ready to live a life with nature. Stephenson further expresses Kath Two’s opinion on living in space and coming back to Earth as:

She thought about the fact that the brains of humans – or of any large animals, really – had evolved to live in environment like this, and to be nourished by such complex stimuli. For five thousand years people of the human races had been living without that kind of nourishment. They had tried to stimulate it with computers. They had built habitats large enough to support lakes and forests.

But nature simulated was not nature. She wondered if humans' brains had changed during that time, and if they were now ready for what they had set in motion on New Earth. (Stephenson, *Seveneves* 572)

Thus, according to Actor Network theory, *seveneves*, the actors, worked with the concept of genetic engineering, 'parthenogenesis' to rebuild the human community. Human population in space has increased tremendously after five thousand years. The only aim of the spacers to rejuvenate the Earth made them to travel to Earth and to involve in terraforming with the backups of the other living creatures that they had with them in space. While involving in terraforming, they met both Diggers and Pingers, who have also survived from the huge destruction. Science and technology plays an important role for their survival. People from nine races got united and a new life has been started on Earth. Thus, *Seveneves* narrates the survival of mankind after a huge catastrophe and rejuvenation of Earth with the technological assistance.

In all the five novels of Neal Stephenson, the actors, Taylor, Hiro, Nell, Randy and *Seveneves* work with the network: media, virtual reality, Primer, cryptography and parthenogenesis respectively to attain their goals. In *Zodiac*, the Basco industry was banned due to its illegal dumping of toxic chemical wastes in Boston harbor. The government took necessary steps to clean the water like passing Clean Water Act and establishing sewage recycling plants. In *Snow Crash*, Stephenson has created an awareness on hacking culture and online games of the digitalized society. The protagonist Hiro has invented an anti-virus, 'Snowscan' to prevent the virus 'Snow Crash', which has the power to hack the human brain. In *The Diamond Age*, Stephenson has brought out the future digitalized education system. The advancement implemented in education system like Primer, the

cyber book, eradicates illiteracy and female infanticide in Han culture. In the novel, education was provided to all the girl children effectively through Primer. It results in creating a strong and determined young women community. In *Cryptonomicon*, Stephenson has described the events of World War II and the initial stage of encryption and decryption method. Later this method was changed into modern programming system. This cryptography has employed a great role in the privacy of sending and receiving messages. Randy, who has broken the code for golden treasure, has utilized the gold coins for free education by converting it into digital currency. In *Seveneves*, Stephenson has used the concept of futurization, where people struggled a lot for survival. Technology played a key role to rebuild human community and to rejuvenate the Earth after five thousand years. Thus science and technology act as a shaping tool of the society in *Zodiac*, the harbour water is cleaned and purified; in *Snow Crash*, an antivirus Snowscan prevented humanity from the deadly virus; in *The Diamond Age*, female infanticide is prevented and the production of cheap intoxicating drugs through seed project is stopped; in *Cryptonomicon*, the golden treasure is found out through cryptology; and in *Seveneves*, human race is repopulated on the earth after five thousand years.