

# Beyond Human Boundaries: Variations of Human Transformation in Science Fiction

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**Abstract**—Science Fiction is a literary genre of technological changes in human and his life; and is full of imaginative and futuristic concepts and ideas. One of the most significant aspects of Science Fiction is human transformation. This paper will present, firstly, an overview on the history of Science Fiction and some of the most significant sci-fi stories, and will also explore the elements of human transformation in them. Later, it will explain the term of transhumanism as a movement which follows several transformation goals to reach immortality and superiority of human through advanced technology. Next, the views by a number of prominent transhumanists will be outlined and discussed. Finally, three main steps of transhumanism, namely transhuman, posthuman, and cyborg, will be described in details through notable scholars' views in which transhuman will be defined as a transcended version of human, posthuman as a less or non-biological being, and cyborg as a machine human. In total, this is a conceptual paper on an emerging trend in literary theory development which aims to engage critically in an overview of the transformative process of human by technology in Science Fiction beyond its current status.

**Index Terms**—science fiction, transformation, transhumanism, transhuman, posthuman, cyborg

## I. INTRODUCTION

Science Fiction with a simple definition consists of 'science' with the same current meaning of science and 'fiction' that is about written stories in literature about people and events. The term Science Fiction (henceforth SF) was used for the first time by Luxembourgish-American Hugo Gernsback (1884-1967) in 1926 to present a pioneering new fiction that was known as an interesting romance genre intertwined with different scientific facts and predictive views (p.3). More precisely, the history of SF dates back to centuries before that, at least, to *Utopia* (1516) by British writer Thomas More (1478-1535) for depicting a fictional utopia, or even *Gulliver's Travels* (1726) by Irish writer Jonathan Swift (1667-1745), which has scientific facts of the protagonist's adventures in fictional places. Nevertheless, Sherryl Vint (2014) believes that the most influential nominee for the first SF is *Frankenstein* (1818) by British writer Mary Shelley (1797-1851), which gives her readers the boundaries of scientific comprehension and relationship between human and the created beings (3). Its theme about the creation of a monster has been one of the fundamental themes in SF. Besides Shelley, other predecessors of SF in the 19<sup>th</sup>, such as American writer Edgar Allan Poe (1809-1849) for "The Unparalleled Adventure of One Hans Pfaall" (1935); French writer Jules Verne (1828-1905) for *Journey to the Center of the Earth* (1864) and *From Earth to the Moon* (1865); and British writer H. G. Wells (1866-1946) for *The Time Machine* (1895), *The Island of Doctor Moreau* (1896), *The Invisible Man* (1897), and *The War of the Worlds* (1898), which are all known as the earliest SF works.

Although the earliest SF works were created decades before the 20<sup>th</sup> century, its term became common at the beginning of the 20<sup>th</sup> century. Indeed, progressing technology has shaped human lives extensively and intimately. To Vint, although SF does not always foretell the future as is expected, this literary genre can be viewed as a mythical language which plays a key role in building the future through utopian and dystopian stories. Therefore, SF is a way to visualise and to experience a reality "that is itself askew and not merely a particular configuration of settings, plots, and images" (Vint, 2014, p.6). Moreover, it is a way to change the way for examining a text, to change the general understanding of the borders of SF and is also a connection to other literary genres. Vint believes that it is necessary to consider this genre as a set of connected texts, motifs, and themes (Vint, 2014, p.14). Accordingly, this genre is difficult to define because of its broad range of themes and subgenres. In general, it deals with different scientific and visionary terms, such as time travel, extraterrestrial life, space colonisation, singularity, virtual reality, robotic life, transformation,

superhumanization, among others. Clearly, SF has been mostly defined based on different possibilities of future and worlds. Sometimes, it is included under the broad category of 'Speculative Fiction' which is made up of imagination than reality. There are different kinds of elements in SF; for example

- a specific time in the future when humans live in space,
- a future time when people live in virtual environments,
- characters from future human evolution as cyborgs, superhumans, humanoids, androids, and artificial intelligent robots,
- futuristic principles different from our current physical laws, such as black holes, teleportation, travel between universes, living in different dimensions, and time travel, and
- unseen systems in society, such as utopian, dystopian, and post-apocalyptic.

Moreover, SF has two different categories, namely hard SF and soft SF. Hard SF is characterised by highlighting the more technical and scientific details including physics, chemistry, and astronomy, among others. Among the famous hard SF novels are American writer Michael Crichton's *Jurassic Park* (1990), American writer Nancy Kress's *Beggars in Spain* (1993), Australian writer Greg Egan's *Schild's Ladder* (2002), and American writer Andy Weir's *The Martian* (2011). On the other hand, soft SF is a category with less realistic technological elements, and more social sciences about anthropology, psychology, sociology, and political science, among others. Some of the most noteworthy soft SF novels are *The Demolished Man* (1953) by American writer Alfred Bester, *Fahrenheit 451* (1953) by American writer Ray Bradbury, and *The Left Hand of Darkness* (1969) and *The Dispossessed* (1974) by American writer Ursula K. Le Guin. SF is also categorised into different subgenres that can be included under hard and soft SF, such as alternate history, cyberpunk, apocalypse, post-apocalypse, utopia, dystopia, space opera, and climate fiction for instance.

## II. HUMAN TRANSFORMATION IN SCIENCE FICTION

We always have had many dreams in our life in which transcendence may be one of the most debated wishes for every one of us which may end in a way to gain immortality and to remove human vulnerabilities. Transformation of human is a way that may result in his/her transcendence while SF is a genre dealing with different imaginative themes with futuristic settings and technological life. A general insight into SF presents the increasing interests of writers who create fictions about transformation with different angles of technology in human life.

Shelley's *Frankenstein* in 1818 is mixed with the Gothic elements and SF. In this story, Victor Frankenstein assembles a composite human-like creature from stolen body parts and brings it to life – a monster suffering from isolation and loneliness which turns into a murderous avenger of his creator. American writer Edward Bellamy (1850-1898) created *Dr. Heidenhoff's Process* in 1880 that depicts the progressing of a mechanical method to eliminate troublesome memories from people's brains to return their optimism about life. In 1886, British writer Robert Louis Stevenson (1850-1894) wrote a notable SF work entitled *The Strange Case of Dr. Jekyll and Mr. Hyde* (1886). It shows Stevenson's idea on how personalities can transform a man into good and an evil person by a medical serum. Ten years later, in 1896, British writer H. G. Wells (1866-1946) published his shocking *The Island of Doctor Moreau* (1896) that is about a man who lives in an island and creates human-like hybrid animals. This story illustrates philosophical and ethical themes, such as morality, identity, pain, and cruelty in beings smarter than human.

After the Second World War, from 1960 onwards, the themes of human transformation merged in the world of SF, through human cloning, genetic engineering, artificial intelligence and cyborg body, and transformation took form as an evolutionary process. For example, American writer A.E. Vogt (1912-2000) in his novel *Slan* (1946) shows a future where humans aggressively subdue higher-than-human mutants. In such story, human evolves into mutants which are higher than humans. Four years later, Russian-American writer Isaac Asimov (1920-1992) in his *I, Robot* (1950) depicts the idea of self-aware robots and their legal equality with humans. In 1953, British writer Arthur C. Clarke (1917-2008) in his *Childhood's End* (1953) shows the possibility of human evolution to superhuman. Later, in the same year, American writer Theodore Sturgeon (1918-1985) wrote *More Than Human* which shows six people with strange powers who mix their abilities together in order to act as one superhuman. In this step of human evolution, Sturgeon investigates different issues of power, morality and individuality.

As another example, *Cyborg* (1970) by American writer Martine Caidin (1927-1997) has been an influence for many SF stories and movies so far. It is about obtaining perfection through technology for a man named Steve Austin that, when his shattered body is assembled, he turns into a higher than human who is a fatal unstoppable weapon without human emotion. This is an apocalyptic kind of transformation. In this decade, there is another notable work emerged that is *Man Plus* (1976) by American writer Frederik Pohl (1919-2013) which illustrates a same future where advanced biological engineering transforms Roger, the main character, into a machine-like weaponised monster to survive on the planet Mars. This scenario is the most primitive aim of turning in to cyborg which was stated in 1960 by Manfred Clynes and Nathan Kline that refers to becoming enhanced in order to be able to survive in an extraterrestrial universe. Next is the work *He, She and It* (1993) by American writer Marge Piercy (b. 1936) which shows an extraordinary cyborg man who works like a weapon. Last but not least, a posthuman SF entitled *The Bohr Maker* (1995) written by American writer Linda Nagata (b. 1960) which is about a man who wants to survive through a nanotech device to illegally rewrite his genetic code and turn into a posthuman to gain immortality.

All the above-mentioned SF works illustrate future human transformation in which life is intertwined with advanced technology. As seen in all of them, there is a diversity of changes in them as a style to express readers' feelings about their future. Such changes might be in human ability to live better, to control his/her world, or even in his understanding of it. Most science fictional stories are usually different from our present human life only because of these changes in different level of advanced technologies. Therefore, needless to say, SF in 21<sup>st</sup> century progress in terms of its evolution since the 19<sup>th</sup> century and 20<sup>th</sup> century. So doubtlessly, transformations in the present century's SF are more progressed than SF in the previous centuries'; since technological advances in these centuries are not the same. In the next section, we will present an overview on the transhumanism movement that has had many impacts on modern SF and the transforming of characters into transhuman, posthuman, and cyborg.

### III. TRANSHUMANISM: MOVEMENT TO UPGRADE

Transhumanism or "evolutionary humanism" was coined by British biologist Julian Huxley (1887-1975), brother of Aldous Huxley (1894-1963), the writer of *Brave New World* (1932), in 1957. This is a movement which follows a wish to gain immortality and superiority as its primary goals, but it still has been obscure. One of the most renowned transhumanists who has answered to such ambiguities is Swedish philosopher Nick Bostrom (b. 1973) who has been always looking for the secret of immortality. Bostrom (2005a) suggests that the quest for immortality has been rooted in the Epic of Gilgamesh in the quest for the Elixir of Life to cure all diseases, to stop aging and death, and to grant immortality. Some people have tried the path of technology and science in finding medical solutions for superlongevity while in the far past, tried to find the Fountain of Youth. So this is a very old wish continuing to the present time when such ideas have entered the realm of SF and a social movement like transhumanism. Bostrom and other transhumanists believe that, finally, we should be uploaded to a machine or virtual world to prevent vulnerabilities of our bodies; in that case, we will be a new being called posthuman that originates from man who has left behind biology and has experienced some basic technological alterations.

What about human capacities? Reaching new capacities for humans had always been an ancient desire. As Bostrom (2005a) states, humans have always been seeking to extend the boundaries of existence socially, geographically, or intellectually. Some people always seek solutions for the limitations of human life. Some thinkers, such as German philosopher Friedrich Nietzsche (1844-1900), believe that the best way may be to surpass human boundaries and to go further to transform and even transcend. To him, what is great in man is that he is a bridge and not an end, and man is something that shall be overcome, and the time has come for man to set himself a goal, and to plant the seed of his highest hope. In this relation, Nietzsche coins the term of 'overman' which is not "technological transformation "but rather a kind of soaring personal growth and cultural refinement in exceptional individuals" (Bostrom, 2005a).

Bostrom also argues that enhancing human nature will increase dignity because it is upgradable through using of advanced science and other effective methods (2005b) and such enhancements allow humans to legally transform themselves and their nature in line with their values and individual goals (ibid). To him, this is one of the main reasons that we have to support transhumanism. In addition, Bostrom postulates that transhumanism does not expect us to give preference future human forms, such as transhumans (mainly biologic and partially implant or machine) and posthumans (most or full machine body), over human beings. This is because humans are able to overcome many of their biological limitations and cross their borders. What Bostrom means here is that there are some limitations that are unfeasible to pass, but humans can envision such enhancements at least.

In relation to the arguments above, technological enhancements are dreams that humans can pursue to the end, even if they cannot reach some of them. Bostrom (2005a) puts forward this view that there are some dangers concerning becoming transhuman or posthuman, where, by being aware of them, we will be more ready for the future. For example, some people think that human clone, as a sort of transhuman, would be so peculiar, irrational, and immoral. Yet some transhumanists such as Bostrom thinks that cloning is both an achievable and desirable way to reach immortality and to defeat death. No doubt every human likes to push aging and death back, like the transhumanists' dream, but we should ask ourselves this question: which values might be lost in return? In this regard, Bostrom (2005b) defines "intrinsic valuable" in which both the society – that allows people to choose enhancement and longevity – and the people who receive them are in a better condition. He suggests that, through human enhancement, our future society will have potentialities to present an evolution in human with new abilities which result in longevity and superhumanity, and this enhancement can originate from human transformation. According to Bostrom, these aims are much more significant that even parents should have full permission to choose enhancement for their children in the near future:

Transhumanists believe that human enhancement technologies should be made widely available, that individuals should have broad discretion over which of these technologies to apply to themselves, and the parents should normally have the right to choose enhancements for their children-to-be" (2005b, p.1)

Concerning parents' decision to transform and enhance their children, in SF, the best-selling British writer Peter James (b. 1948), has written a novel entitled *Perfect People* (2011) that shows the nightmarish decision of a young couple to have a child with superior abilities through genetic engineering. However, it calls into question: how reassured are we that such transformations and enhancements are not going to lead to an apocalypse for human being? In answering this question, Bostrom states that despite the fact that there are some dangers that should be predicted and avoided, these technologies will give "enormous potential for deeply valuable and humanly beneficial uses" (2005b,

p.2). He adds that, when we take control of our biological evolution, we are able to prevent “some of the inequality-increasing tendencies of enhancement technology with social policies” through the structure of transhumanism (ibid).

In addition, Bostrom brings forth this view that transhumanists recognise how human nature is a ‘work-in-progress’ where its current features are not the end of its evolutionary process. To him, our natural evolution does not exist in enough time to increase life length, and to go beyond the physical and temporal borders of the mind. In this case, by means of science and technology, we shall finally succeed to evolve by technology to turn to posthumans, beings with greater abilities than our current abilities (2005a). In general, transhumanists believe that the physical and mental capabilities through this movement result in one goal that is immortality as a virtual embodiment of consciousness. This virtual embodiment of consciousness originates from a common belief between transhumanists in which humans have close relationship with artificial intelligence, and also have free choice to elect their desirable body. They believe that humans deserve to gain such advanced gifts, so it is worth trying it. Transhumanists present a thought-provoking and debatable program in which they offer intriguing aspects of somebody’s view concerning a good life, and the nature of both individuals and minds.

Now, another question that should be answered is whether humans deserve to gain such transformation or not. Ray Kurzweil (2005), the futurist and transhumanist, believes that “being human means being part of a civilization that seeks to extend its boundaries” (p.250). He suggests that humans are already going beyond their biological boundaries through technological tools to redesign or transform and enhance it. To him, a whole idea for different species to be transcended is a ‘biological concept’ and what they should do is to enhance their biology (p.250). He disagrees with mainstream views that radical enhancement takes us beyond our humanity. Therefore, we firstly should know our humane capacities. Moreover, in his view, the future will be surely a postbiological future:

The transbiological phase will involve nonbiological intelligence deeply integrated with biological intelligence. ... The transbiological era will ultimately give way to the postbiological era, but it is to be hoped that our values will remain influential. (Kurzweil, p.284)

This postbiological future is when humans have created a cutting-edge technological environment where they, as biological species, are not able to live sufficiently. Therefore, they see the organic bodies which are not updated and are no longer in harmony with the new environment. Consequently, humans reach an evolutionary endpoint where they must update and transform the organic bodies. This is one of the important issues in SF stories which challenge readers’ minds concerning human transformation. One of the key elements of transhumanism in SF stories is the depiction of transhuman characters. In the next section, the concept of transhuman will be explained.

#### IV. TRANSHUMAN: STEP OF TRANSCENDENCE

As argued earlier, human enhancement is a wish that springs from humankind’s earliest dream for eternal life and superhuman abilities, and, to achieve enhancement, transformation is a tempting desire for human to obtain it. To Julian Huxley,

Up till now human life has generally been, as Hobbes described it, ‘nasty, brutish and short’; the great majority of human beings (if they have not already died young) have been afflicted with misery... The human species can, if it wishes, transcend itself – not just sporadically, an individual here in one way, an individual there in another way, but in its entirety, as humanity. (as cited in Livingstone, p.209)

After Huxley, one of the first transhumanists who foreshadowed the term transhuman was the Iranian-American transhumanist philosopher F.M. Esfandiary (1930-2000), later known as FM-2030. He presented a hypothesis on “new concepts of the Human” because of new technologies and modern lifestyles and used the term “transhuman”, or in his terminology as “transitional human”, to present a number of related ideas in which transhuman was defined as a transition from human to posthuman (1973). Esfandiary established an evolutionary connection from transhuman to posthuman because of “technology usage, cultural values, and lifestyles”. Consequently, one sign that he considered as the feature of transhuman included using prostheses and implants to become healthier and stronger than human like bionics.

One year later, Esfandiary states that, in order to transcend more quickly to higher levels of evolution, human must surpass the limitations of traditional ideologies. He brought up the question of whether modern technology and genetic engineering might lead to dehumanising and upsetting of nature balance or not. Although anti-transhumanists warn that technology and whole society are machinating the modern humans, where they highlight the “programmed individual depersonalized mechanical” (1973), Esfandiary, however, believed that we are “helpless robots manipulated by environment” than by technology, because we are unable to stop natural disasters. In addition, we have no control over our body, for example it is impossible for us to stop sleeping, drinking, and breathing, for instance.

Stelarc (b. 1946) with his previous name called Stelios Arcadiou, a Cypriot-Australian transhuman activist, is one of those who attempt to transform and enhance the capabilities of his own body (1991). As a transhuman with real bionic (partly machine mostly biologic) body, he believes that our human body is “obsolete” and is neither highly competent nor in a really lasting form. It is vulnerable to disease and is condemned to a definite and undeniable death. It can survive only a few weeks without food, some days without water and a few minutes without oxygen. Therefore, he believes that we must replace our organs and abandon our weak body and this abandonment is called body obsolescence. Stelarc adds, “It is no longer a matter of perpetuating the human species by *reproduction*, but of enhancing the

individual by *redesigning*". This means that our natural body needs to be redesigned by medical instruments, prosthetics, and mechanical limbs. Here, a challenging question is raised about the reaction of the body, the person, and the society to such redesigning or becoming transhuman. A notable literary example is Shelly's *Frankenstein* in which the monster is a manmade being that is part biological and part mechanical. However, the monster is not considered as transhuman creation, but also subhuman, but this new being could have new abilities along with possessing a weird and grotesque form in the eyes of the human society.

To relieve such anxieties, Joanna Zylinska (2002) states that the new body in transhuman can be defined only by the feature of its alteration and its relevance to the natural body. So, it is completely relevant to "the biological 'psycho-body' for its identity" (p.134). To her, Stelarc's body is enhanced mechanically through "hardware prostheses such as his Third Hand and Virtual Arm, Extra Ear, and Exoskeleton, a six-legged ... walking machine". Nevertheless, his body is "suspended" – neither human nor post-human that also called "Phantom Body" (Zylinska, p.136). Thus, Zylinska identifies Stelarc's body as a phantom body, but Stelarc maintains that our fear about becoming such bionic humans and cyborgs is similar to our fear of turning into zombies. This means that our anxiety about this transformation is because of confronting with an apocalyptic science fictional being that is progressively computerised and automated.

#### V. POSTHUMAN: LEAVING BIOLOGY BEHIND

Technology is one of the features of human and his life since human body is itself consisted of biological technology which works together systematically. Brain function is the simplest example showing an intricate technology in bodies which control the whole body. There are many other aspects of technology in our body whose secrets are still being discovered by scientists, and it clearly shows that human body is a highly-advanced machine. Due to such characteristics which a human body has, transhumanists are optimist of making a future in which humans re transformed and transcended, just like what SF writers depict in the stories. German philosopher Martin Heidegger (1889-1976) states that "technology is therefore no mere means. Technology is a way of revealing. If we give heed to this, then another whole realm for the essence of technology will open itself up to us" (as cited in Kaplan, p.39). Almost all humans have a common desire to stay healthy and live for eternity. Humans have always been seeking for the extension of their health span to remain healthy and to have long life. Thus, it is not an awful desire to become healthier, smarter, and stronger as well as to upgrade our talents to become more intelligent and more skilled. In fact, as noted before, transhumanists believe that the best tool to achieve these desires is technology as this movement aims to reach a destination called posthuman.

Posthuman is often described as a concept in post-anthropocentrism where it is "post" to the notion of the human. It is a philosophy in which an appropriate way of departure is provided that allows humans to envision posthuman future beyond the boundaries of their imaginations. Posthuman is an existing process of different outlooks which has flourished due to the current effort to redefine human and its features. Based on transhumanism, posthuman offers a very rich debate on the impact of technological advances in the transcending of human capacity. The postmodern literary critic Katherine Hayles (1999) believes that becoming posthuman is much more than having prosthetic devices implanted in our biologic body (p.246). She postulates that the posthuman contains four prominent assumptions as follows:

First, the posthuman view privileges informational pattern over material instantiation, so that embodiment in a biological substrate is seen as an accident of history rather than an inevitability of life. Second, the posthuman view considers consciousness, regarded as the seat of human identity ... Third, the posthuman view thinks of the body as the original prosthesis we all learn to manipulate, so that extending or replacing the body with other prostheses becomes a continuation of a process that began before we were born. Fourth, and the most important, by these and other means, the posthuman view configures human being so that it can be seamlessly articulated with intelligent machines. (Hayles, pp. 2-3)

Therefore, Hayles believes that the replacement of the human body with mechanical limbs (that is the process of cyborgisation) can be a sort of posthuman; however, that is not all. For her, the main principle of the posthuman is the rapture between human mind or the 'software' and the physical form or the 'hardware' which both increase terror and pleasure (p.283). Concerning those who are fearful of the apocalyptic aspects of posthuman, she states,

Although some current versions of the posthuman point toward the antihuman and the apocalyptic, we can craft others that will be conducive to the long-range survival of humans and of the other life-forms, biological and artificial, with whom we share the planet and ourselves. (p.291)

As one who defends posthuman values, Bostrom (2002) believes that we redesign ourselves through using advanced technology to become posthumans (p.108). He is of the opinion that the posthuman, as a new being, at least has one of the following posthuman capacities: health span, cognition, and emotion. Health span is one of the posthuman capacities to stay completely healthy, active, and useful, both bodily and intellectually. Cognition includes mental capacities, such as memory, empirical thinking, and attention. On top of that, emotion is one of the posthuman capacities to enjoy life and to reflect properly on life conditions and others (Bostrom, 2006). He proposes that the capacity of emotion is much more superior than anything that current humans can achieve through advanced technology.

To defend the posthuman process, British transhumanist Robert Pepperell (1963- ) is another one who believes that posthuman is not about the end of human, but an end for a 'man-centered' world which will happen in no time (p.171).

He also believes that posthuman is an evolution of life, a way which is not limited to genetics, rather technological existence. In general, Pepperell views posthuman as how humans live, and how humans manage their using of the environment, living beings and even each other. Posthuman concerns things to be explored and questions to be asked (p.171). These are good reasons, to him, that we can consider posthumanity not only for the future, but also the present time.

Nonetheless, there are a number of opponents to this idea such as Elaine Graham (2002 a, b) who highlights various representations of the posthuman in the form of monster-like beings in SF which are transformed by technology, such as Frankenstein's monster, or Doctor Jekyll in the two prominent SF novels discussed earlier. Such stories regarding the biological transformation or even the rise of machines are often filled with fear and insecurity of humanity that results from the dream of living with machines or cyborgs. Asimov's *I, Robot*, for instance, is a good Science Fictional example on the process of the intertwining of humans with machines where intelligent robots are used against humanity. To Graham, such SF creatures might be a real threat to future humanity. As another example, in *Frankenstein*, there is a human-created monster that is both biological and mechanical. Interestingly, the monster becomes a frightening ghoul when it is branded as an outcast from the human society. Therefore, its monstrosity is because of human inattention and unawareness, not due to its creation. This is, in fact, a process similar to cyborgisation of the biologic body which is one of the main elements of transhumanism in SF stories that we will explain about it in the next section.

## VI. CYBORG: INTERVING OF BIOLOGY AND MACHINE

In the world of SF, all humans, machines, and intelligent robots resemble each other. In both the 20<sup>th</sup> and 21<sup>st</sup> centuries, within the context of modernism, various SF writers illustrate characters and technological creations which cause doubts about the boundaries between human and machine. After that, in the postmodernism era, the cyborg appears as a figure of the machine-man in literature. Consequently, the postmodern cyborg mirrors an increased concern about blurring of the differences between human and machine in both fiction and movie.

More specifically, it is about half of a century ago that cyborgs, as half-human, half-machine beings, have been particularly connected with SF stories. According to Samuel Dokko (2007), in this genre, the merging of organic and inorganic forms builds a "cognitive being". In SF stories, scientists play God by creating incredible technological and scientific enhancements to make human beings greater than normal humans through the cyborgisation process. Dokko views cyborg as the intertwined creation of flesh and machine which can have unbelievable power and speed. He describes these cyborgs are "medical cyborgs", because many of them are equipped with mechanical devices and implantations to overcome their weakness and illness. To Dokko, this collaboration between medicine and technology for creating the medical cyborgs is a great goal to upgrade and restore our biological processes.

It was Donna Haraway who popularised cyborg as a term, for the first time, which means a fusion of organism and machine (*Simians, Cyborgs, and Women* 1990, p.1). Cyborg, to her, is the creation of a new feminist identity for women because she is of the opinion that women are already cyborgs through their relationship with machines in their working environment. Haraway predicts that by the late 20<sup>th</sup> century, "we are all chimeras, theorized and fabricated hybrids of machine and organism; in short, we are cyborgs" (*Simians, Cyborgs, and Women* 1990, p.150). While the conceptions of cyborgs in SF are mostly identified through her definition, she also defines cyborgs through its implications on identity.

In addition, Haraway explains the utopian aspect of cyborg culture as human upgrading which has drawn many scholars' attention to itself. However, a great mass of technological advances, such as atomic bombs, shows a contradiction in her utopian view about this fusion. Concerning medical features of cyborgs, she states that cutting-edge advances in medicine are full of cyborgs (*Simians, Cyborgs, and Women* 1990, p.165) and, for Haraway, a cyborg, as both literal and figural definition, is defined according to its hybridity which embodies both reality and fiction:

The cyborg is a creature in a post-gender world. ... The cyborg is resolutely committed to partiality, irony, intimacy, and perversity. It is oppositional, utopian, and completely without innocence. ... Unlike the hopes of Frankenstein's monster, the cyborg does not expect its father to save it through a restoration of the garden ... [I]t is not made of mud and cannot dream of returning to dust. ... The main trouble with cyborgs, of course, is that they are the illegitimate offspring of militarism and patriarchal capitalism, not to mention state socialism. But illegitimate offspring are often exceedingly unfaithful to their origins. (1990, pp.150-152)

In her book *The Haraway Reader* (2004), Haraway describes a cyborg "as a fiction mapping our social and bodily reality and [also] as an imaginative resource suggesting some very fruitful couplings" (p.8). She emphasises that, since the 17<sup>th</sup> century to date, "machines could be alive like humans, and our flesh could be mechanised". This relationship between machine and flesh are obsolete and machines can be used as prosthetic devices in our body like a friend (p.178). There are different science fictional samples about friendship and hostility of machines with humans discussed earlier. Also, Haraway presents our flesh bodies as "maps of power and identity". So, with such features, a cyborg body can never be innocent, and we should accept the responsibility for it and its boundaries (p.180). As for these boundaries, Ray Kurzweil predicts that, in not-too-distant future, we will have machine intelligence which leads to an intertwining of power in both human brain and computer (Bukatman, 1993, p.286). This is a way in which the boundary between the biological and the mechanical will be erased. It also allows humans to upgrade their bodies with every kind of limitation that they have. Therefore, we will have a modified updated body that is very close to a cyborg's. *Do Androids Dream of*

*Electric Sheep?* (1968) by American prolific writer Philip K. Dick (1928-1982) is one example in which the boundary between the real (the biological human) and the non-real (the machine) is erased to the extent that robot servants are so identical to humans. Kurzweil adds:

We are becoming cyborgs. We are rapidly growing more intimate with our technology... Soon, we'll routinely put [computers and machines] inside our bodies and brains. Ultimately we will become more non-biological than biological. (cited in Bukatman, p.286)

To Kurzweil, transferring human minds into machines will lead to an unbelievable evolution of humans as an immortal machine called 'robosapiens' which is an advanced cyborg. Robosapien can be a kind of posthuman and a great cinematic example for that is "Chappie" (2015) – which portrays a mechanised police force that is a prototype artificial intelligence mimicking human behaviors and emotions. From a similar perspective, Chris Hables Gray (2000) views the enhanced cyborg as the one in which technologies are applied to make the cyborg much superior than the human in a particular realm: "a better soldier, a better lover, a superhero, but that does not necessarily mean that their masculinity is enhanced" (p.278). Such cyborgs are usually used in military programs like the cyborg soldiers in the Hollywood motion picture "Universal Soldier" (1992), or "Robocop" (1987) which is about a superhuman cyborg policeman. In total, Gray describes four classes for cyborgs – the first class is cyborgs that can be restorative which means that they can restore their lost functions and replace their lost organs and limbs. The second class is cyborgs that "can be normalizing" where they can restore some creatures to similar normality. The third one is the cyborgs that can be vaguely "reconfiguring, creating posthuman creatures equal to but different from humans, like what one is now when interacting with other creatures in cyberspace". Finally, the last class is cyborgs which can be upgraded for most military and industrial aims (Cavallaro, p.45). For the last class, Gray in his *Postmodern War*, clarifies that the military will soon be confronted with more intertwining of man and machine that is a cyborg soldier who merges machine-like strength with a redesigned human intellect to be included under weapons (Cavallaro, p.196.):

As soldiers become more like cyborgs, their gender identity becomes blurred. Cyborgs in general can be either masculine or feminine, although they are often more cyborg than either. Military cyborgs, on the other hand, are still pretty masculine. Since soldiers are also techs, the new masculine identity of soldiers is around mechanization, fixing machines, and working with machines, instead of traditional masculine identity of physical force, easy access to violence, and the direct subjugation of other men and all women. (Cavallaro, p.175)

Finally, Gray highlights the militarisation of cyborgs in order to use them as soldiers in wars. This idea is indeed similar to the notion of "Rampaging Cyborgs" by Daniel Dinello in SF which is about the intertwining of mechanical device and biological organism to produce advanced weapons (Dinello, pp.11-12). Another example is *Robocalypse* (2011) by American writer Daniel H. Wilson (b. 1978) which is the most recent SF novel with similar themes where rampaging cyborgs are super-intelligent and self-aware robots are shown as advanced weapons against humanity.

## VII. CONCLUSION

Many SF novels present transformations with different angles of technology in human life. SF in 21<sup>st</sup> century has changed compared to the 19<sup>th</sup> century and the 20<sup>th</sup> century because of the progress of technology from 200 years ago until now. Consequently, different kinds of transformations in SF in the current are more depicted as more advanced than in the previous centuries' SF. In particular, transhumanism, as one of the social and technological movements that have had influences in the 20<sup>th</sup> and 21<sup>th</sup> centuries SFs, aims to exemplify immortality and superiority of the human being through fiction. This movement is not only popularised by different philosophers, but also by many SF writers through their stories. In these stories, human transformation through technology is demonstrated as the best and achievable way to reach this aim.

Bostrom proposes that transforming, and after that, upgrading human nature will improve dignity because human nature is an upgradable 'work-in-progress'. He defines "intrinsic valuable" in which both the people and the society are in a better situation, and future humans will have an evolution with new abilities through enhancement that leads to superhumanity. In line with Bostrom, Kurzweil suggests that we have already crossed our biological borders through technology and opines that the future of human beings is that of a postbiological future where human beings faces an evolutionary endpoint where their biologic bodies are not in harmony with the new environment and thus must be upgraded. Therefore, humans must step into a stage called transhuman that Esfandiary defines as transitional human. To feel better, this transitional status, according to Stelarc, means that the human body should be abandoned or redesigned by mechanical organs and limbs because it is vulnerable and cannot survive for a very long time in order to achieve the goal of immortality. Consequently, he presents the term body obsolescence in which the body is no longer used biologically. However, some anxieties will be created where Zylinska suggests that the body in transhumans is defined by the elements of its transformation and its relation to the natural body.

Another step discussed earlier in this paper is posthuman, which is an evolutionary process where the biological parts are mostly abandoned and the person's consciousness is scanned and uploaded onto a computer system or an intelligent android. Hayles believes that posthuman is the rapture between our mind (software) and the physical form (hardware). From a different angle, Bostrom suggests that humans must redesign themselves through technology if they want to transform into posthumans with new capacities such as health span and longevity. In line with Hayles, Pepperell believes that posthuman is not an end for humanity, but for a man-centered world. Moreover, he is of the view that it is

an evolution of life about the things to be explored and the questions to be asked. Also, concerning cyborgs as the third step brought in this paper, it is a process of replacing body limbs with mechanical substitutes. Haraway proposes that cyborg is the creation of a new feminist identity, especially for women who are already cyborgs in her eyes. To her, it is a creature of a post-gender universe that is not made of mud and will not die, and also “illegitimate offspring of militarism and patriarchal capitalism”. She further illustrates her view by building on its implications on identity. In contrast, Dokko believes that cyborgs in SF is the merging of organic (flesh) and inorganic (machine) created by scientists who play God to overcome human’s weakness, vulnerability, and illness.

More similarly to posthuman concept, Kurzweil postulates that uploading human minds into machines will end in the evolution of humans and result in an entity called ‘robosapiens’ which is an advanced cyborg. As for advanced cyborgs, Gray views it as one of the cyborgs in which technologies are used to make them superior than ordinary humans that can be better soldiers and usually used in military programs. This is similar to rampaging cyborgs that Dinello has defined for such weaponised cyborgs. To conclude, as SF is a genre full of real and non-real scientific terms and ideas, this paper has attempted to provide a general overview on human transformation via technology followed by a debate on the transhumanism movement in order to elucidate three future forms of human beings, namely posthuman, transhuman, and cyborg. In this way, this paper has engaged critically with the most important views postulated by related notable scholars to authenticate this summary: from transcending to transformation, from work-in-progress to redesigning of humans, from biologic to mechanic bodies, from obsolete body to virtual life, and from immortal bodies to weaponised cyborgs.

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