WHITE PAPER

THE FOURTH INDUSTRIAL REVOLUTION – CYBERSPACE MENTAL WELLBEING: HARNESSING SCIENCE & TECHNOLOGY FOR HUMANITY

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About GFCyber

Global Foundation for Cyber Studies and Research is an independent, non-profit and non-partisan policy research think tank for Cybersecurity studies, located in the Washington D.C, USA.

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Introduction

In the fourth industrial revolution, where almost the entire world is connected through the internet, mental health plays a great role. The National Center for Health Statistics noted a suicide-rate increase of some 35 percent between 1999 and 2018, with the rate growing approximately 2 percent a year since 2006. Suicide is now the tenth-leading cause of death in the United States. Depression increases suicide risk—about 60 percent of people who die by suicide have had a mood disorder. The Health Care Cost Institute's 2018 report disclosed that per-person spending on mental health admissions increased 33 percent between 2014 and 2018, while outpatient spending on psychiatry grew 43 percent. Between 2007 and 2017, the percentage of medical claims associated with behavioral health (both mental illnesses and addictions) more than doubled. According to WHO, currently there are 970 million worldwide suffering from mental health disease worldwide and it is predicted to grow and will be the main cause of disease by 2029.

Cyberspace, driven by information systems and the Internet, is changing our world in unprecedented ways by facilitating economic development and creating innovative ways for people to communicate, engage, negotiate, and collaborate with one another. There is almost no aspect of human endeavour that has not been domesticated in the realm of cyberspace. Personal and societal changes are brought on by cyberspace. The number of human events that have shifted from actual, face-to-face meetings to interactions facilitated by remote, distant connectivity has increased dramatically, changing human behaviour, goals, governance, parenting, and so on. The wellbeing of cyberspace, like public health, has an effect on about every area of contemporary culture. Businesses, governments, and societies would be unable to survive if critical elements of the cyberspace system are compromised or lost (Hinduja & Patchin, 2010). Failures in cyberspace health may have a huge impact on a nation's strength.

In this paper, we discuss

1) What is cyberspace, cyberspace mental health and why is it so important?
2) Addressing the societal landscape
3) Understanding our mind, brain and body
4) How can we harness science and technology for humanity?
5) Call for action – framework for a healthy cyberspace mental landscape

Part 1: What is Cyber Space?

Cyberspace is a global domain within the environment of information that consists of an interdependent network of information systems frames including the Internet, computer systems, telecommunications networks, embedded processors and controllers for the broad range of participants in daily lives (Strate, 2009). It allows users to share data, interact, exchange ideas, play games, involve in discussions or social platforms, and other activities. The term “Cyberspace” was first used by William Gibson in his book “Neuromancer” in 1984 (Benedikt, 1991).

There are two divisions of cyberspace. The first division is the virtual reality like a 3-D cyberspatial environment in which individuals can enter and move through cooperating with both the processors and other human beings, as portrayed in films like The Lawnmower Man and Disclosure. The second spurs are that cyberspace has the slightly less dramatic, but more practical, world of networks of computers linked via cables and routers which enable humans to connect, store and exchange data with each other. Internets is the largest cyberspace source used for email, data transfer, bulletin boards, newsgroups, and remote computer access, and now even more of a household name courtesy of the World Wide Web, which allows simple stress-free navigation of the network. It includes not only the links between computers but also the browser and email software which communicates data and other electronic storage technologies (Martin Dodge, 2003).

Behavioural Aspects of cyberspace and long-term repercussions

The impact of cyberspace on society is unquestionable. It has provided a medium for immediate communication, business, and collaboration between individuals and organizations all over the world. As cyberspace has grown so vast, unfortunately there are a variety of cyber-attacks associated with it. Cyber-attacks are explained as events which aim to conciliate the integrity, privacy, confidentiality, secrecy, or availability of a technical or socio-technical system. These attacks range from hacking and denial-of-services to redemption ware and spyware infections and can distress everyone from the community to the critical national organization of a country (Maria Bada, 2020).

There are two key areas of impact which aim to consider and offer a synopsis of research and thinking; ***social and psychological*** *(emotional and behavioral)* ***impacts.*** The social impact of cyber-attacks refers to aspects such as the social disturbance instigated in people’s daily lives, and prevalent issues such as anxiety, stress nervousness, or self-reliance in cyber technology. On the other hand, the mental and psychological impact can be cognizant by social impact and can comprise of more subjective aspects such as anxiety, burden, anger, violence, depression, and so on of the individual (Patti M. Valkenburg, 2017).

Beliefs form a significant module of this investigation because a user’s response to security usually and motivation to apply security mechanisms if given the chance be contingent on their beliefs about: the supposed severity of an event, the vulnerability to the danger, the apparent self-efficacy, and the cost as well as efficacy of preventative behaviors (Camp, 2012). These factors make it problematic to stimulate protective cybersecurity behaviors and to calculate public social and psychological responses to a cyber-attack. This can be any form of attack ranging from existing threats to new concern such as Artificial Intelligence (Peter Trim, 2016). Another element of significance is fear related to crime and

cyber events. Fears of crime can apt people to change their behavior. At the level of the individual, people generally respond to the fear of crime by adopting protective or avoidance behavior. Phobophobia – the psychological fear of fears can lead to pressure, anxiety, stress, and persistent public fear of crime and danger, regardless of the actual presence of such fear (Nadiya Kostyuk).

Definition of Cyber Mental Health

Cyber Mental Health is a group of disorders considered by the obsession with the Internet, including the social networking sites which has increased stress, anxiety when off-line, hiding or lying about the extent of online use, and damage to real-life functioning. The addictive usage of the Internet leads to social isolation, depression, anxiety, familial discord, divorce, academic failure, financial debt, and job loss. There is a term called “Cyberpsychology” which is the field of study relating to the way people contact through computers or digital devices and the emotional effects that practice has on the brain. Cyberpsychology is also denoted as internet psychology or web psychology.

Understanding cyberspace mental health landscape

Researchers can learn from the health and aviation industries since they have extensive work in the discipline of cyberspace mental health. Human factors are the discipline that works to enhance the relationship between humans and technology. The behavioral aspects of cyber-security are becoming a vigorous area to examine (Michael A. Goodrich, 2008). The capricious nature of human behavior and actions make human a significant element and enabler of the level of cybersecurity. The psychological qualities of cyberspace determine how the individual behaves; it is the person's psychological temperament and personality type that also forms his lifestyle in digital world. Machine and human interrelate to create cyberspace because youngsters are venturing out onto the internet, it is significant to understand how the particular character and evolving features of adolescents affects what they do there. The emotion of people shapes how they react to cyberspace whether they are old or young which psychologists call “transfer reactions”. Cyberspace can damage mental health, and that people with psychological problems tend to use it as an escape or to vent their frustrations on online others (Buchanan, 2016).

Mental health can have a serious impact on industry professionals and even affect cyberspace practices. Depression, burnout, anxiety, stress, and even suicide are becoming more common among cyber-space professionals. Though, that is not to say that office stress is unique to this industry. In contrast, many other workers in various fields of work face forceful pressure daily but depression is the main cause of disability in the world, following heart disease. Secondly, there is a major labor shortage when it comes to the cyber workspace. Moreover, those engaged in it face immense pressure and strict deadlines in trying to cover the duties of many unfilled cybersecurity positions. As reported in a survey by the Enterprise Strategy Group and the Information Systems Security Association of 343 cybersecurity officials found that almost 40 percent of them said that the skills shortage was causing high rates of burnout and staff turnover (Cowen Forssell, 2019).

Additional Health issues

Work stress is often the cause of health issues. It can greatly exacerbate existing medical conditions and lead to chronic disorders. Stress can increase the frequency of varicose veins and weakens blood circulation. It can rapidly increase blood pressure, which strains the walls of your veins. After a time of prolonged stress, such as that experienced by cyberspace professionals, the problem can grow severe.

This is but one of the many side effects of work-related stress that cyberspace professionals are vulnerable to. Heightened stress can also lead to severe mental health issues, which can have dire consequences (Bendelow, 2009).

Suicide Risk

In fact, mentally ill people are one of the groups most at risk for suicide. As stated by Jeffrey W. Swanson, Ph.D., “the connection between those struggling with mental illness is strong enough to characterize as tangled. These verdicts are tremendously relevant to the field of cyberspace, where mental health problems are progressively common. In an article, Jay Radcliffe of Boston Scientific, known for hacking devices, states that, “In the past year I know several people in the cyber security community have taken their own lives.” Radcliffe himself struggled with melancholy and decided to open up about his brawl with mental illness at Black Hat USA. This decision came from an understanding that many in the cyber security field confronted alike issues that are often ignored. “It’s a sad thing, and somewhat I feel responsible to talk about,” says Radcliffe (Sridhar Ramamoorti, 2013).

Effects

The unaddressed mental health issues can also have grave implications when it comes to the actual practice of cyberspace mental health issues. In an article published on Info Security, Patrick Putman writes that “Cyber security professionals and criminal hackers only differ due to their state of mind. Both cyber professionals and hackers have the ability to manipulate their target what separates the good guys from the bad is their mental health” (Singer, 2006). As stated by Putman, “What separates the good from the bad more than anything is empathy? It stops professional hackers and social engineers from crossing the line”, Stress, depression, and anxiety can all lead to erratic urges and can be manifest in different forms. They used to justify extreme behavior like stealing data or destroying systems (Citron, 2009).

There is a lot of evidence pointing to the rising examples and occurrences of mental illness among cybersecurity professionals. Overseeing these facts is not a choice, and doing so can lead to grave outcomes. While staying ahead of cybercrime is essential, it is only thinkable to do so in a stable and healthy work environment. The first step is to concede and acknowledge the prevalence of mental health issues in the cybersecurity environment. Only then can we spread cyberspace awareness to improve the situation. During the past 10 years, online social networking sites such as Facebook, Twitter, MySpace, Instagram, snap chat and so on have caused significant changes in the way people communicate and interact and some of these changes affect normal aspects of human behavior and cause psychiatric disorders (Encycloedia in Cybercrime, 2008).

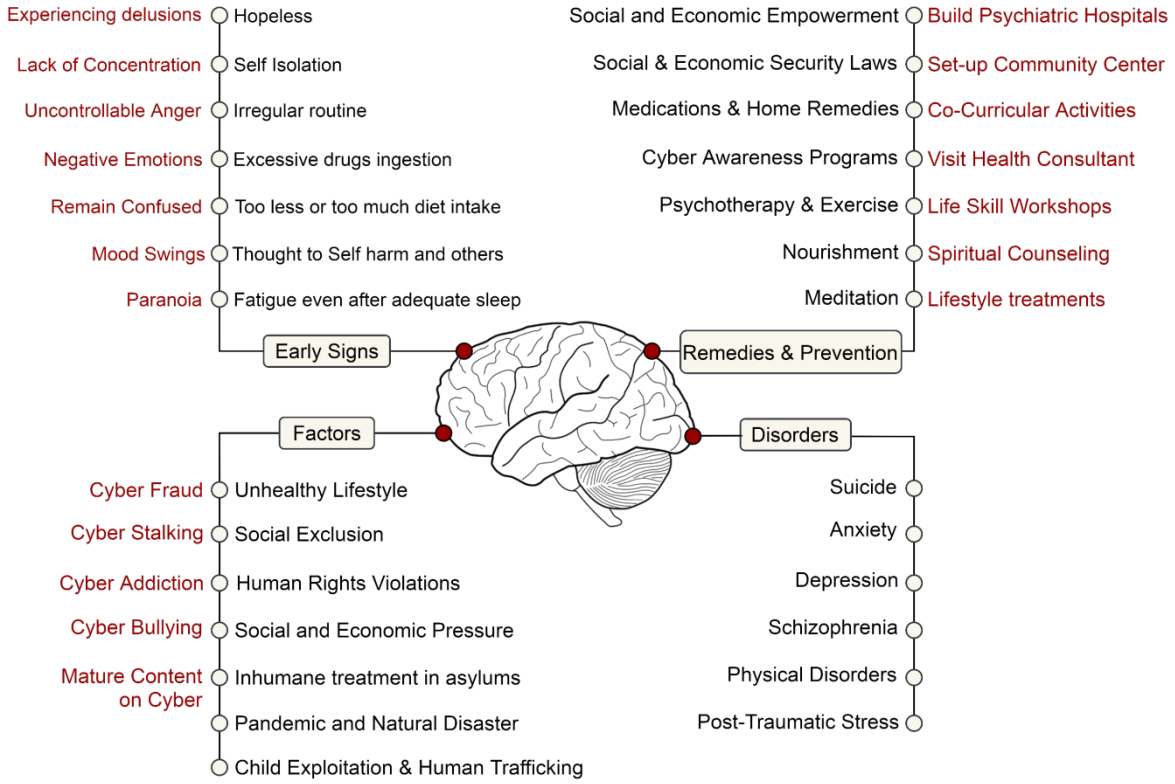
Part 2: Addressing the Societal Landscape

The cognition, behavior, and emotions of human beings are reliant upon physical and mental wellness. Mental wellness is a state wherein a person can command the brain to perform particular actions, respond aptly to sad and humorous circumstances, and knows the do's and don'ts (Stewart-Brown, 1998). Individuals can attain prolonged physical wellness by bathing, wearing clean clothes, maintaining hygiene, doing exercises, whereas spending quality time with dear ones, meditation, and laughter can preserve mental health. Despite care, an individual's physical and psychic health may deteriorate due to one or more determinants affecting everyday life, relationships, and productivity (Ohrnberger, Fichera, & Sutton, 2017). The physical health problems (e.g., abnormal blood pressure and diabetes) are identifiable; hence timely medications and other remedies can limit the damage and fatalities. Contrarily, it is challenging to diagnose mental health issues (e.g., anxiety, depression), resulting in delayed psychological aid and incurable harm to the patient (Malla, Joober, & Garcia, 2015). Mental health illness could happen to anyone irrespective of age, sex, lifestyle, and ethnicity.

In the early 1700, people had a belief that Karma curses the person with a mental sickness as a result of evil deeds. Consequently, these unfortunate humans were left abandoned on the roads without access to essential commodities required for a living. Dorothea Dix led a massive 'mental hygiene movement' in 1840 to promote mental wellness (Modak, Sarkar, & Sagar, 2016). His movement got global attention and support, thus forcing the governments to set up psychiatric medical institutions to treat mental health disorders. However, many under-developed and developing nations are still incapable of providing a good livelihood and treatment to mentally impaired patients. Resultantly, these stranded humans become the prime target of organ trafficking gangs, flesh traders, and beggar mafia (Yea, 2010). Besides, the local hooligans abduct these psychologically challenged individuals and trade them for lifelong slavery.

According to World Health Organization (WHO), approximately 970 million people worldwide suffer from mental health disorders (Ritchie & Roser, 2018). As per the prediction, mental sickness would be the worldwide leading cause of diseases by 2029. The probable reasons behind the declining mental health conditions could be insufficient diet intake, social and economic pressure, human rights violations, cyber sexual harassment, cyberbullying, and many more. In addition, biological factors, including genetic variations, could also be a potential cause of psychiatric disorders. Mental health infirmity could result in anxiety, depression, suicide, schizophrenia, post-traumatic stress disorder (PTSD), and many more (Jenkins, Ahmad, McDaid, & Atun, 2011). Some mental illnesses are curable, but only a few get access to those treatments; the majority remain isolated due to remote living, asymptomatic, limited resources, and a lot more. Moreover, psychiatric hospitals have a bad reputation as the staff behaves inhumanely with the patients. Nobody shows empathy to them, thus making their health conditions worsen.

The Cyberspace Mental Landscape



Decoding the correlation: Psychological illness due to Cyberspace

Cyberspace is a blessing to the community if used fairly and legitimately; otherwise, a curse. A few threats to mental health due to Cyberspace are discussed as follows:

Cyber Addiction

The Fourth Industrial Revolution (4IR) brings the potential contribution of cyber technologies in human development but also technological hazards like Computer or Internet Addiction that threatens the mental health and integrity of individuals. (Connolly, 2021) A research in 2005 titled as “Review on the Research in Internet Addiction”, Chien Chou, Linda Condron and John C. Belland notes that “Although there is no standardized definition of Internet addiction, there is acknowledgement among researchers that the phenomenon does exist.” (Chou, Condron, & Belland, 2005: 368-388) More generally, the Internet Addiction Disorder (IAD) is defined as the “uncontrollable desire to use internet, leading to an acute nervousness and aggression in the event of deprivation and progressive deterioration of social life.” (Masih & Rajkumar, 2019: 1) For instance, Griffiths suggest that the “excessive use of the Internet may not be problematic in most cases but the limited case study evidence suggests that for some individuals, excessive Internet use is a real addiction and of genuine concern.” (Griffiths, 1998: 73) The multidisciplinary nature of the phenomenon makes it the focus of sociology, law, ethics, science, and psychology and therefore, it has attracted scholarly research of a wider scope.

IAD is now becoming a growing problem of mental health in adolescents throughout the world. The availability and use of internet has increased exponentially in the academic as well as in the social domains over the past two decades. Since the onset of the internet as the modern communication and information tool, a number of studies have examined internet addiction in the young students and adolescents. Young developed an Internet Addiction Diagnostic Questionnaire which a set of eight questions determining the internet addicts. Young finds that internet addicts spent around 39 hours/week using internet compared to the non-addicts using it only for 5 hours. (Ngai, 2007: 223) Similarly, Chen and Hsiao noted that out of the all individuals examined, 54 percent of the internet addicts spent around 20-25 hours per week online which is thrice the amount of time spent by the non-addicts. (Chen, 2000)

A wider number of reserachers find the IAD as a serious mental health disorder which is identified by the lack of patience, increased isolationit attitude, emotional disturbances, changing behavioral patterns, and detrioration of the individual's social relationship and enaggement activities.

A study in southern Taiwan which examined the family function, gender life satosfaction, mental health, self-esteem, and other interactive activities found that adolesecents addicted to the internet develops low self-esteem, lower self-image, and reduced social activities. (Masih & Rajkumar, 2019: 2-3) It further added that such IAD addicts could also develop media multi-tasking which is visibly a sign of anxiety and mental depression. Similar findings were reported by another study in which 250 students from, the Isfahan University were examined through a cross-sectional study. (Alavi & et. al, 2011) The results indicated that the extensive use of internet causes patriarchic symptoms among the students such as depression, aggression, somatization, sensitivity, psychosis, paronoia, and phobias.

Internet addiction is evidently becoming a source of mental depression and has an adverse impact over the behavioral patterns, espceially of the young and adolescents.

Cyber Stalking

The nexus between cyberspace and stalking is a new phenomenon: however, it's rapidly becoming a huge source of concern among people of all age groups irrespective of gender. The new era of digitalization and the creation of digital societies have opened new dimensions to the technological power which connects people virtually throughout the globe. At the same, unlimited connectivity has paved a way for novel criminal practices which transcend territorial boundaries, time zones, and gender that seeks to target the majority of the population: Cyber-stalking.

Since it's an emerging cybercrime, no universally agreed definition of it exists and likewise, the literature available on it is limited. Some experts have defined cyberstalking as the "use of internet/technology to consistently annoy, prey upon, harass, threaten, create fear, attack and verbally abuse the intended targets by using sophisticated tactics." (UNODC, 2015) The perpetrators engage in tactics such as repeatedly emailing, constantly messaging or calling, or using digital and electronic methods to verbally abuse the individual or the individual's families, friends, or partner. Also, utilizing cyberspace and technologies such as placing tracking devices in the car to vigorously stalk, monitor, and keep a check on the activities of the intended target. (Southworth, Finn, Dawson, Fraser, & Tucker, 2007)

Victims can be a target of indirect cyberstalking which includes offenders damaging the electronic devices through malware, recurring attempts to steal the personal data, making fake social accounts of

the target and posting their information on the online media, and leaving countless comments on their posts to gain the attention of their intended target. Moreover, the offenders join all Facebook groups and other online groups and communities the target is a part of and even stalks the movements and digital activities of everyone who is acquainted with the target.

The obsessive behavior of the offender associated with cyberstalking gives birth to a criminal level of harassment, fear, and intimidation in the hearts of the victims. It generates serious threats to the safety and mental well-being of the victim as their privacy and peace of mind are compromised which raises the level of anxiety in the victims for the unseen behavior and activity of the stalker. They vary from traditional stalking as cyberstalking relies on digital and electronic devices to intimidate and stalk its victims.

A significant tool used by cyberstalkers is, Stalkerware which is monitoring software used to stalk the potential target without their consent. It is commercial legal spyware that gathers and creates databases of the entire user's actions on their phones, laptops such as messages, pictures, videos, emails, and so on. (Harkin, Molnar, & Vowles, 2019) Shockingly, many spyware software allows the offenders to access the microphone, cameras, and GPS as they violate the policies of the Google play store and all the data is public and is easily viewed by the server as well. A researcher, Cian Heasley revealed that the server of a stalkerware, 'MobiiSpy' was public and contained more than 95,000 photos, videos, recordings, which were the most intimate ones (Bicchierai, 2019).

Pretexting is another tactic used by the offenders in which they gather information about their target while claiming to be an official member of the government or a legitimate place. Similarly, they send emails through a webpage 'www.payback.com' which hides their email addresses and they can remain anonymous (Bocij, 2005).

Evidence reveals that cyberstalkers tend to be mostly male and victims are mostly women (Reno, 1999). Women stalkers do exist but they are more inclined to stalk their ex-boyfriends/girlfriends rather than strangers; however, men show more characteristics of being violent (Purcell, Pathé, & Mullen, 2001). According to research, it revealed that victims of cyberstalking were1.6% African Americans, 61% Caucasian, and 3.9% Asian, and most of the women were between ages 18-30 (McFarlane & Bocij, 2003). A study published by the Pew Research Center in 2014 concluded that 7% of the men being cyber stalked fall under the age bracket of 18-24 (Sammons & Cross, 2017)

While observing the cyberstalking trends at a national level in the US, 1,006,970 women and 370,000 men are annually stalked according to the survey conducted by National Intimate Partner and Sexual Violence. It also concluded that 66.2% of female victims were stalked by an ex-partner and around 40% of men were stalked by an ex-partner. Likewise, both genders experience unwanted calls, messages, and voice notes by cyberstalkers, 75.9% for men and 78.8% for women. (Michele & Kathleen, 2011).

Cyber Bullying

The social setting of bullying has changed with the emergence of cyber technology. Unlike traditional face-to-face victimization, the use of modern technology such as internet is growingly becoming a major playground for bullying. Cyber Bullying is the "willful and repeated harm inflicted through the use of computers, cell phone, and other electronic devices" that leads to the anxiety and mental depression of the victims (Hinduja & Patchin, 2014; 2). It has emerged as the undesirable product of the youth

aggression and the advancement in the communication technology which allows social interactions possible even without any physical face-offs. What makes it more severe than the traditional bullying is the fact that the bullying ground accompanies the individual 24/7, which means that an individual can be bullied even in one's personal spaces like bed room, bathroom, family gatherings, on vacations, or the likewise as cyber bullying does not require physical interaction but only access to the smart phone or computer with an internet.

A study by Carrie-Anne Myers and Helen Cowie defines cyber bullying in terms broad number of cyber practices including "spreading rumors, ridiculing and/or demeaning another person, casting aspirations on the grounds of race, disability, gender, religion or sexual orientation; seeking revenge or deliberately embarrassing a person by posting intimate photos or videos about them without their consent; accessing another's social networking profiles with malicious intent and socially excluding a person from a social network or gaming site" (Myers & Cowie, 2019; 2). It also finds that cyber bullying has long-term psychological impact over the self-esteem and mental and behavioral development of an individual. Schenk and Fremouw examines the cyberbullying among college students in Turkey and finds that the college student victims or cyber bullying are more likely to suffer from anxiety, depression, academic disruption, and psychosomatic complaints than the non-bullied individuals (Schenk & Fremouw, 2012; 24).

The most dominant platforms used for the cyber bullying includes emails, chat rooms, mobile phone cameras, picture messages, instant messaging apps, blogs, and other social media websites.

A study conducted on cyber bullying finds that the most common sites used for cyber bullying includes emails as 21%, chat rooms 20%, mobile smart phones 19%, social networking sites 20%, twitter 6%, the MSM Messenger 12%, and other networking sites included 8% (Notar, Padgett, & Roden, 2013; 2).

Cyber Fraud

With the growing number of cyber criminals who are conducting cybercrimes facilitated by sophisticated technologies such as Artificial Intelligence (AI), cloud computing, Internet of Things (IoT) etc., we are witnessing a rapid shift in the fraud landscape owning to the intangible dimension of the cyberspace with complete disrespect for jurisdictional boundaries, gigantic traffic volumes, enormous potential for anonymity, economic efficiency and extreme mobility of data. According to the analysis of Global Online Payment Fraud Detection Market report 2021 ("Online Payment Fraud Detection Market Size with Covid-19 Impact", 2021), global online payment fraud market is estimated to be a whopping 18.6 billion dollars by 2029. This boost is due to the skyrocketing in incidences of cyber fraud payments and transactions with the target market as telecom, retail & consumer packaged goods, real estate and others. By landscape, it has its far reaching effects all over the world from Asia Pacific to North America.

It is estimated that there will be more than 6 billion internet users by 2022 ("Humans on The Internet will triple from 2015 to 2022 and hit 6 billion", 2019), which means more data and a growing number of devices connected to the internet, such as machines, sensors, appliances, cameras etc. resulting in more than 75% of the world's population vulnerable to cybercrimes. On the contrary we know nothing about the percentage of coexisting population of internet users who are cyber criminals that are engaged in creating unimaginable havoc in the cyberspace. Their crimes are increasing at an alarming rate as these notorious cyber criminals have been successful in penetrating into the lawless digital world

where police, laws and cyber security firewalls have proved to be ineffective and incapable in restricting, controlling or persecuting them.

Since technology and society are transient in nature, tools available to cyber criminals are evolving and in perpetual development due to which they are extremely adaptable in taking advantage of new cyber fraud opportunities that stemmed during the covid-19 pandemic such as the WHO phishing scam, wherein cyber criminals were sending fraudulent emails with malicious links or attachments to people impersonating themselves to be government officials so as to steal their sensitive information and download malware in their devices. 'Phishing' is the most commonly used tactic to conduct cyber fraud. According to experts (Phishing and Fraud Report, 2020), there has been a 220% increase in phishing incidents during the pandemic as its main drivers were people working from home with less or no awareness, confusion and anxiety among the people with respect to lockdown rules, fake cures/safety measures of covid-19, extensive e-commerce transactions & digital payments and others. They used novel ways such as hosting their phishing on reputable brand pages and misrepresenting themselves through imitation websites of brands/governmental organisations in order to conduct theft of credentials and ultimately, financial fraud. Teenagers, working professionals and senior citizens are easy targets that fall prey to phishing because it is lucrative and unsuspecting in nature.

Another frequent cyber fraud victimizing people is 'Gift Scam' which is a social media cybercrime, wherein the cybercriminal dupes people on basis of a relationship of trust and companionship. They lure the victim by communicating with them over a period of 5-6 months and claiming they are sending some expensive gift such as a watch, necklace, purse etc. however later informing the victim that it's stuck with the customs at the airport for which they have to pay duty equivalent to millions of dollar that they innocently to deposit in a fake account, and duped. Such instances ("Facebook contact dupes 60-year-old of ₹4 crore in gift-stuck-at-airport scam", 2021) are commonly recorded amongst young to elderly women and men.

Adult Content Online

Entertainment is the biggest industry available today in cyber and internet domains. This is evident from the fact that the audience of the video services are on exponential rise in almost every part of the world. However, the technological ease and appeal of entertainment content among the masses has also allowed greater access of individuals to the adult or sexual content on the internet. The advent of internet and communication technology makes the sexual and pornographic content readily available to men, women, and children that adversely affect their mental health and influence their behavioral patterns. Such a growing access to the adult content is made available by the easily accessible pornographic sites which delivers sexual content to the consumers irrespective of the age or gender considerations.

According to a report of the Standing Committee of Health to the Canadian House of Commons, previously the sexual or pornographic content was available only through videos, magazines, and books; however today, different specific pornographic sites have been created by companies like the MindGeek which can synonymously be accessed by individual's of every age on a simple click (Report: Canadian House of Common, 2021; 6). For instance, companies like the MindGeek created three top pornographic sites which has attracted around 100 million visitors and received around 488 million views only in 24 hours (Dines, 2017; 1115).

Youth mostly in the school age or college are primarily the most affected consumers of the sexual content. This is because around 90% of youth between 12 to 18 years of age have uninterrupted access to the internet. Also, the fact that these sites do not ask for any identification, credit card, or age group, they are easily available and accessed by even school age children which has a negative impact over their mental wellness, social and academic standing, as well as the sexual development of the individuals. Michele L. Ybarra and Kimberly J. Mitchell collected data from the Youth Internet Safety Survey of children and adolescents between age 10-17 and found that a vast majority of some 87% of the youth are reported to be looking for the pornographic content online are either 14 or older (Ybarra & Mitchel, 2005; 479). Additionally in terms of gender, the findings suggests that among the self-identified pornographic content seekers are more likely to be males as only 5% of the reported youth included females (Ybarra & Mitchel, 2005).

Online social media platform provide yet another important ecosystem as accessible source for the adult content. The research conducted by Mauro Coletto et al, on the role of social media network in the production and consumption of adult content finds that the producers of adult content are predominantly men which increase with the increase in age (Coletto & al, 2017; 2). In terms of consumption, the age distribution suggest that consumption of adult content increases until it reaches its peak at the age between 40-45, while for females, the rate of consumption increase only in their young age. Overall, both males and females see a greater consumption of the pornographic content by the age of 25 on the social media networks.

Dr Edger Pacheco and Neil Melhuish conducted a study on the awareness of parents on the access of their children to the online adult content and find out that 1 in every 5 parents believe that their children are in one way or the other exposed to the sexually explicated content through the internet and such an healthy exposure keeps on increasing with the age as it is mostly dominant among the young boys (Pacheco & Melhuish, 2018; 1). Interestingly the study finds that around 39% of the parents remained silent despite knowledge on their children having access to such content, 22% expressed anger while another 10% ignored the situation (Pacheco & Melhuish, 2018; 6). In addition to this, the topmost concern of the parents making 59% of others also includes the fact that their children shares nudes' images or videos of themselves with other people. The researchers find out that the fact that parents feel reluctant in addressing their children about such a growing access to the pornographic content because they feel embarrassed discussing it with their children (Pacheco & Melhuish, 2018; 8).

Therefore, with the increase in the usage of internet and easy access to the pornographic and adult content, more research is required to prevent damage as the impact of greater exposure to the online adult content hampers the healthy development and mental health of children and adolescents.

Computer Vision Syndrome

With prolonged use of electronic devices many different vision-related problems are arising which are collectively termed as 'computer vision syndrome' (Randolph, 2017). The vision-related problems experienced by users vary according to the extent to which people spend time on digital devices. Mostly, digital eyestrain is common in children and teenagers in European states due to the increasing use of the internet and technology (Smahel, Wright, & Cernikova, 2015). The causes are poor lighting, screen glares/ radiation, poor distance, irregular posture, and poor eyesight.

Evidence suggests that internet users around the world have skyrocketed to 4.66 billion globally in January 2021 (Johnson, 2021). The region with maximum internet users is Asia, with 2.5 billion users, and Europe at second with 728 million users. Among which China has the highest internet users around 854 million users and India falling second with 569 million users. These statics reflects that billions of people are using digital screens via mobile devices and laptops, etc. throughout the day which is directly proportional to the rise of physical disorders linked with excessive use of the internet.

The common symptoms of computer vision syndrome are:-

Eyestrain: The extensive use of digital screens causes discomfort and irritation of the eyes. 19% of the students in Southeast Asia experience eye strain due to excessive internet usage and online gaming (Balhara, Mahapatra, Sharma, & Bhargava, 2018).

Headaches: Eyes get overworked and as a result the muscles of the eye contract which triggers a headache. These eye strain headaches cause pain behind the eyes as well. In Italy children (3-10 years old), experience severe headaches and dizziness due to internet consumption (Rechichi, De Mojà, & Aragona, 2017).

Blurred vision: The vision gets blurred due to eyestrain and headaches.

Dry eyes: While using digital devices for a long time, people forget to blink which causes eye dry syndrome.

Neck/Shoulder/Back pain: The research has revealed that since the 1900s-2000s, there has been a significant increase in neck-shoulder pain and lower back pain with a rise in technology usage, especially in teenagers. 15-30% of the teenagers suffer from neck pain and 1-15% suffers from lower back pain weekly. The neck pain symptoms result from high or low screen position, high screen position also cause shoulder pain, and back pain and neck pain due to the position of keyboard/mouse (Hakala, Rimpelä, Saarni, & Salminen, 2006).

High BP: One of the leading causes of high blood pressure in stressful situations. The body produces hormones that cause the blood pressure to rise by making the heart pump faster and blood vessels to narrow down. Chronic stress or stressful situation can be due to economic issues, loss of job, the stress of exams, work environment, and so on.

Migraine: Migraine is an extreme headache on one side of the head that can last for hours and even days. A person experiencing migraines also faces other symptoms such as nausea and vomiting. Stress at home and in the office, lack of sleep, shoulder and back pain, overload of work, etc. can act as a trigger.

Carpal Tunnel Syndrome: Carpal Tunnel Syndrome is a disease that affects hand movement due to compression of the median nerve at the wrist. It causes burning in the middle finger, and thumb due to consecutive hand motions and wrists while using mobile and computers. It is more common in computer operators around the world (Bhanderi, Mishra, Parikh, & Sharma, 2017).

Insomnia: The prolonged use of the internet disrupts the sleep cycle of the users. It shows a deep link between internet addicts and insomnia. A study revealed that 9.8% of young students in the US

experience insomnia, 9.1% in 20-29 years old, and 12-13% in college-going youngsters (Younes et al., 2016).

Weight loss/gain: The excessive use of the internet is directly related to a low level of physical activities which affects sleep quality as well. It leads to obesity in people, especially teenagers. Sitting in front of computers and eating all day with minimum physical activities leads to weight gain. In the US, 47.8% of teenagers who were internet addicts were obese (Eliacik et al., 2016). In China, increased internet usage was linked with binge eating (Tao, 2013). Lastly, higher internet usage is related to more eating disorders in females than males (Canan, 2015).

Humanity at Stake

Inhumane treatment in asylums

Leaving everything behind and moving from one place to another helplessly to begin a new life is a challenge for the asylum seekers. An asylum seeker is an individual who leaves their homes, enters another country and applies for asylum another country. Moreover, they may have escaped their country due to war or different elements hurting them or their family. In addition, whenever they take asylum they have restricted rights in the nation of asylum. In many countries they are not permitted to work and medical care is restricted. In the European Union, the individuals who presently can't seem to be conceded official status as outsiders are still inside the asylum cycle have some limited rights to medical care facilities. For example, in Germany, under the Asylum Seekers Benefits Act, asylum seekers are out of necessity and are restricted to medical aid, immunizations, pregnancy and child labor. Asylum seekers face the need to neglect their health when confronted with the German population as a whole. Furthermore, the personal satisfaction of asylum seekers and deportees is deeply associated with the emotional well-being status. The presence of mental disorders such as anxiety or Post-Traumatic Stress Disorder (PTSD) is largely due to the limited space and resettlement of nations.

At the end of 2020 approximately 82.4 million individuals were persuasively displaced across the world ("The truth about asylum", 2021). Of these, 26.4 million were outsiders, while 48 million were displaced internally. Moreover, in developing countries, almost 86% refuges are living in their neighboring countries. Every year thousands of people migrate from one country to another for asylum but are unaware of the future challenges that will be faced across the border. Most countries do not accept refuges, try to send them back to their home countries, while most of them behave inhumanely, i.e, some countries detain them for many years. Moreover, the inhuman treatment that asylum seeker are being subjected to at detention centers are horrifying ("Refugee settlement", 2021). Refugees are being deprived of food, water, blankets, clean clothes and basic medical care. Most children face challenges due to homelessness and war, which affects their mental health. Figure 1 shows the challenges asylum seekers face in host country.

At the end of 2020 approximately 82.4 million individuals were persuasively displaced across the world ("The truth about asylum, 2021").

Figure 1. Challenges faced by asylum seekers

Social Exclusion

Social exclusion defines the social marginalization, limited opportunities, and lack of resources for a socially, sexually, ethnically, or religious minority in a state. These social stigmatizations result in social isolation, lack of support, discriminatory policies, lack of job opportunities which eventually throws the group into a financial crisis, low self-esteem, and social alienation (Payne, 2011). Social exclusion can ultimately harm the mental and physical health of the groups as they feel insecure and alone in society. Along with social exclusion and poor living standards, these groups often find themselves affected by both variables that further leads to devastating outcomes.

Social alienation on a societal (lack of support, discrimination) and governmental level (limited resources, limited jobs, housing) is linked with the poor well-being of a person and he is more vulnerable to mental health issues such as depression, anxiety, and stress. People in such groups such as women and old age people are more common to experience social exclusion. In Australia, 22% of the teenagers have experienced social exclusions, 5.3% experienced a medium level of social exclusion, and 1.1% has experienced high levels of social exclusion (Australia's health 2018, 2018).

Moreover, the lack of finances can further worsen the symptoms of mental health especially if the person finds himself socially excluded. Likewise, poverty is another key element that is linked with social exclusions due to lack of opportunities, discriminatory policies which negatively impact the mental health of a person. Research reveals that poor mental health in socially excluded groups can lead to suicides due to unemployment and lack of capital (Morgan, Burns, Fitzpatrick, Pinfold, & Priebe, 2007).

Human Rights Violations

For the peace and security in the world, its protection is an important factor which is also one of the major reasons of the United Nations Charter. Therefore, the violence and conflicts destabilize the sustainable development. Moreover, the core reasons of violence and conflicts in the world are the human rights violations which, as a result, continuously bring about more violations of human rights. Thus, counter-defence forces have been created in the process of ensuring and advancing human rights, while rights-based approaches to deal with co-ordination and security have taken this capability to manageable co-ordination efforts. Similarly, human rights normalizing systems provide a strong basis for resolving issues of real concern within nations or between people, whenever there is no proper

check and balance, it may lead to struggle. Human Rights data and inquiry is a tool for early notice and early designated activity that has not yet been used to its full potential.

In addition, by the state, the violation can be carried out intentionally or also appear when the state continuously neglect to prevent the violation ("What are human rights violations?" 2021). Therefore, when the state take part in human rights violation, for which different performers can be included such as police, investigators, government authorities and judges etc. Violation can be inherently physically brutal, for example, the right to a reasonable start may be overlooked, where physical violence is not involved. The second type of human rights violation occurs when there is a conflict in society between individuals and groups. For example, the United States failed to protect Afro-Americans when persecution constantly occurs in the country.

In India, the religious minorities are facing challenges as the government failed to protect them. Even some of the BJP leaders publicly support such crimes in India and encourage more violence in future (Human Rights Watch, 2018). Even children, women are facing sexual violence in the country but there is no accountability. Moreover, the UNHCR first ever report highlights the human rights violation in Kashmir by Indian soldiers but the report was dismissed by the Indian government. Table 1 provides the age group and gender of human rights violation in different countries.

Table 1. Human Rights Violation

Country	Gender	Age
US	Male/ Female	All age groups
UK	-	-
China	Female	-
Korea	Male/ Female	All age groups
India	Male/ Female	All age groups
Singapore	Male	Under 21 years of age
Africa	Female, Children	5 to 14 years of children

Child exploitation and human trafficking

Across the world, there are hundreds of illegal businesses operating as a front for human trafficking and exploitation. The whereabouts of human trafficking are hidden that exist in major cities, it can be seen that children are at risk because the majority of them are close to schools. Child exploitation is basically refers to the utilization of children for another person's benefit, which frequently results in the detrimental treatment of the child. Such activities are unfavorable to a child's physical or psychological wellness. Figure 2 shows the consequences of child exploitation.

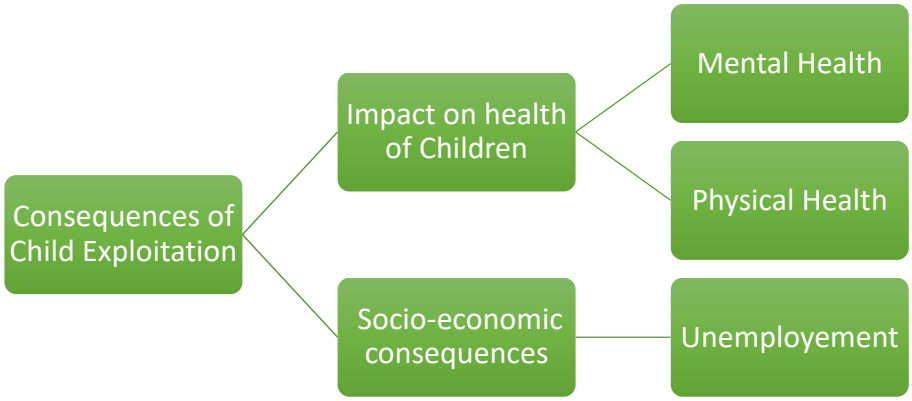


Figure 2. Consequences of Child Exploitation

The scale of the problem of child exploitation is rarely discussed. In addition, there are several reasons behind Child exploitation which include online threats, excessive use of social apps, staying in isolation, and economic issues. Child exploitation isn't restricted to child work, child prostitution, yet it additionally incorporates child dealing, or the removal of organs (Malby, Jesrani, Banuelos, Holterhof & Hahn, 2015). There are many forms of child exploitation i.e., Figure 3 highlights three forms of exploitation.

Figure 3. Forms of Child Exploitation

Child Sexual Exploitation: Child sexual exploitation occurs when people sexually exploit young people using their power which is due to differences in age, gender, intellect, strength, money, or other resources (Commercial Sexual Exploitation and Trafficking of Children in a nutshell, 2015). Sexual exploitation includes sexual touch, child prostitution, and child trafficking. Additionally, the challenge of dealing with child sexual exploitation is that children may not understand that constrained sex is rape.

Economic Exploitation: Economic exploitation is the possibility of a specific advantage or benefit through the creation, dissemination, and utilization of labor and products. Moreover, the economic exploitation of child is an affront to mankind. A huge number of children work in perilous conditions that undermine their wellbeing, and security. At present, the number of children working is a lot higher than a people think. Moreover, an expected 250 to 304 million kids between the ages of 5 and 17 are engaged with economic movement. (Khakshour, Ajilian Abbasi, Sayedi, and Saeidi, 2015).

Child Criminal Exploitation: Criminal exploitation of children is the misuse and trapping of children and controlling them for wrongdoing. Child criminal exploitation takes place when an individual takes benefit of a child by forcing it. As a result, there are a number of children involved in the drug trade, mobile phone snatching, and so on.

Age Group: Both boys and girls of aged 1 to18 years were victims of child trafficking, whether for labor, sex, or organ dealing. According to the statistics, in 2019, in US 158,946 children were abused ("Child abuse in the U.S.: distribution by age of victim 2019", 2021). In Sub-Saharan Africa, 29% of children are occupied in child labor ("Child labor", 2021). Correspondingly, in the Middle East and also in North Africa, 5 percent of children are doing risky work. Likewise, Table 2 shows the age group of children who are victims of child trafficking.

Table 2. Age group of Victims of Child Trafficking

Country	Age
US	2 to 5 years
Sub – Saharan Africa	5 to 17 years
Middle east and North Africa	5 to 17 years

Geographical Regions: It cannot be underestimated that there has been a decrease of around 33% of child laborers since 2000 however the improvement so far is slow. Globally, almost one out of 10 children are involved in child labor, and an estimated 152 million children, including 64 million girls and 88 million boys are estimated to be in child labor ("Child labor and exploitation", 2016). According to UNICEF, in South Asia, 12% of children aged (5-14) years out of 41 million are involved in child labor.

In 2020, approximately 1.3 thousand cases of child abuse were investigated in Singapore, indicating an increase in the number of cases in 2015 ("Singapore: total number of child abuse cases 2020", 2021). In 2019 in the United States, about 11,677 victims of child abuse were reported. In 2021, almost 38% of child labor has decreased but 152 million child laborers are still facing challenges. In Africa, almost 72 million children are involved in child labor, in Asia and the pacific 62 million are involved ("International Year for the Elimination of Child Labour", 2021). In India, according to the census 2011, 10.1 million child laborers work including 5.6 million boys and 4.5 million girls.

Gender: In all regions, boys and girls are equally involved in child labor. According to statistics, in 2019, by gender, about 316,972 boys were abused in the United States. Africa has the highest CSA prevalence rate of boys (<18 years) 19.3% for girls and Australia has 21.5%. Likewise, Asia has the lowest rate that is 11.2% for girls and 4.1% for boys (Poddar & Mukherjee, 2020). Similarly, Table 3 shows the Child Sexual Abuse Prevalence rate for both male and female.

Table 3. Child Sexual Abuse (CSA) Prevalence rate

Male	Female
3 % to 17%	8% to 31%

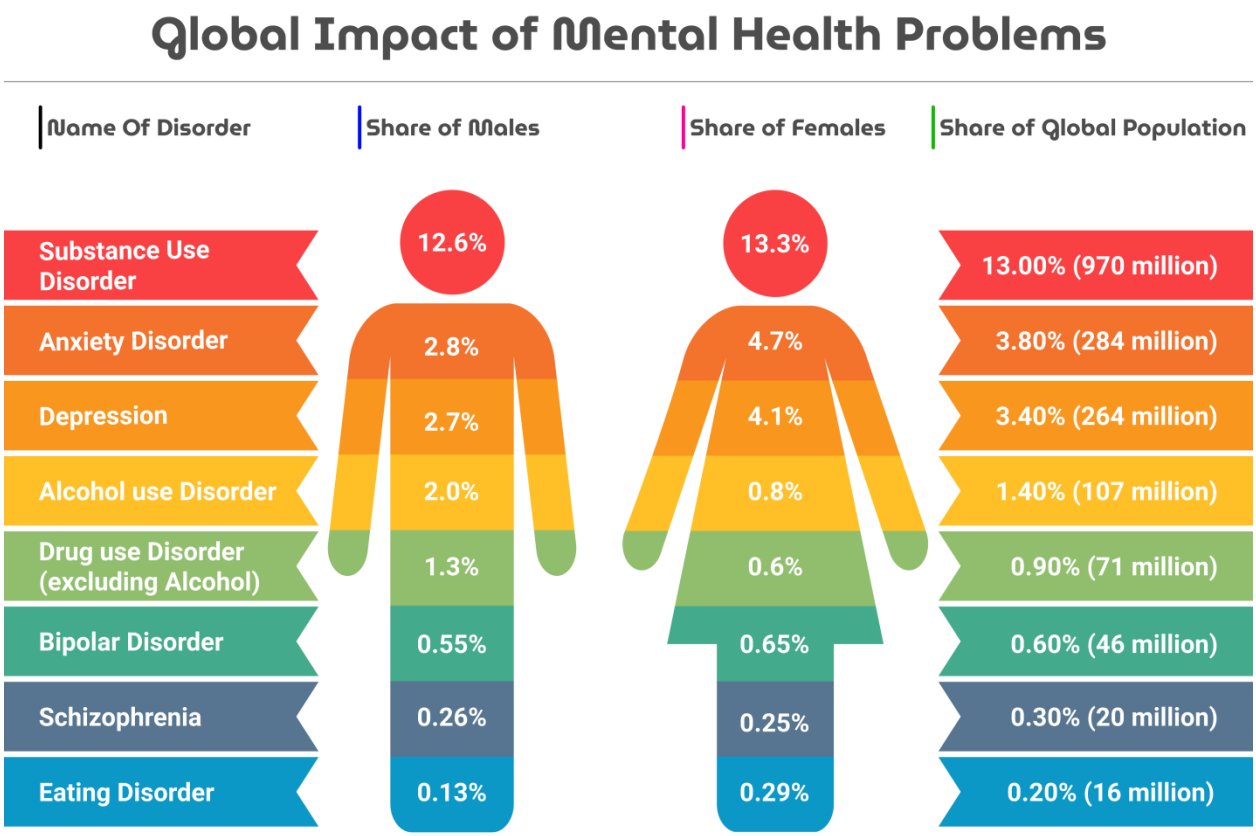


Figure 4. Global Impact of Mental Health Problems

Mental disorder is considered as a major disease and remains a silent killer because most cases go undiagnosed or untreated. Each day, majority of the people experiencing mental health issues across the globe. Specific groups, like female and individuals living in poverty are excessively influenced by mental disorders. Moreover, Figure 4 clearly illustrates the situation of disorders that majority of the human populace are suffering due to various disorders such as schizophrenia, eating disorder etc. Furthermore, out of all disorders, Substance uses disorder and anxiety disorder affecting maximum populace than other disorders and the specific reason of Substance use disorder is still not known by researchers. Likewise, emotional stress, depression can be all factors behind it. Similarly, the statistics also show that women suffer more than men, because of the gender discrimination, gender-based violence and insecure employment.

Depression

In recent decades, depression symptoms have been on the rise globally especially in times of COVID-19. It is one of the most neglected parts of health; it may be due to lagging policy changes. The impacts of depression can be enduring and can significantly influence an individual's capacity to work. Moreover, it is a common mental disorder that has significant consequences such as it impacts on patient's health, quality of life, and contentment with medical care, but the dominance of these conditions differ significantly between already published studies (Wang et al., 2017). Therefore, worldwide, it is the main reason for disability and also a major provider to the burden of the disease.

Major Factors of Depression: Depression is the consequence of an intricate interaction of social, mental, and organic variables. Individuals who have carried on with negative life occasions are likely to be depressed. It can prompt more pressure, insecurity and deteriorate the individual's life circumstance and depression itself. In addition, there are several factors behind the development of depression; i.e., Figure 5 illustrates the major factors of depression. According to researchers, there are a wide range of reasons for depression that are not generally preventable. Moreover, it is assessed that 10 to 15% of general population will come across clinical depression in the course of their life (Schimelpfening, 2020). The World Health Organization gauges that 5% of men and 9% of women experience the ill effects of depression every year. Similarly, depression is more common in females than male (Abdul Razzak, Harbi & Ahli, 2019).

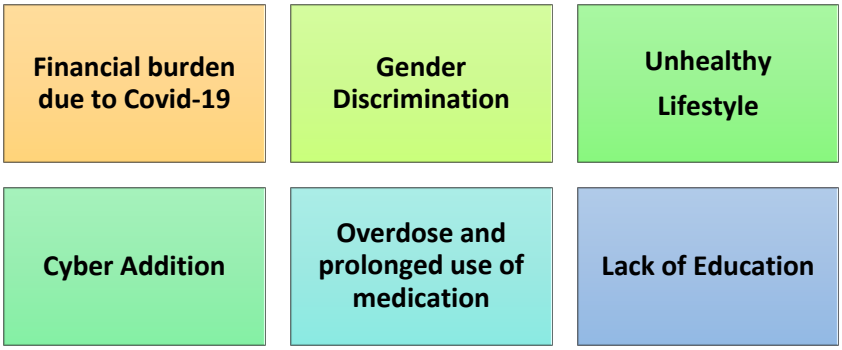


Figure 5. Factors of Depression

Impact of Depression: Depression and related mental illness can profoundly affect all parts of life, including school execution, usefulness at work, and the capacity to take an interest in the public arena. Similarly, figure 6 shows the symptoms of depression. The study likewise shows a solid connection among depression and health, including tuberculosis and illness related to heart. Moreover, it can also influences individuals in all nations, young, old and even women are more depressed than men.

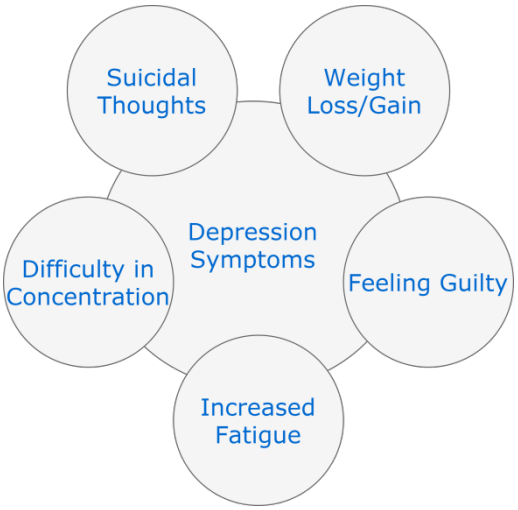


Figure 6. Depression Symptoms

Depression rate around the world: Depression is a typical mental illness influencing more than 264 million individuals around the world ("Depression", 2021). It is described by relentless sorrow and lack of interest or happiness in past beneficial or pleasant activities. Similarly, Fatigue and low concentration on work are common. Likewise, a state's culture can significantly influence the mental health of its population and also the availability of mental health treatment services. For example, although the depression rate in Japan is relatively low, suicide rates among children and teens ages (10-19) are high ("Depression Rates by Country 2021", 2021). This is possibly due to the pressure to perform well in school and work.

In 2019, the depression rate in the United States among the age group 18-29 (21.0%) was higher than those aged 25-64. Adults facing severe symptoms of depression and women are more likely than men to experience relentless signs of depression (A. Villarroel & P. Terlizzi, 2020).

According to World Health Organization (WHO), in India, 13-15 years of age group children are suffering from depression ("One in four Indian children in 13-15 age group suffers from depression", 2017). Besides, the suicide rate lies in the age group of 15-29 years. Similarly, in South Korea, people aged 65 and over suffer from 17.8% to 27.9% due to illiteracy and poverty (Park et al., 2012).

In 2020, 16.7 suicides per 100,000 inhabitants were reported in Japan ("Japan: suicide rate 2020", 2021). It can be linked with depression that may be due to the economic situation during the lockdown. In Japan, middle-aged men are at high risk. In ONS analysis in the UK, the depressive signs raised from 9.7% to 19.2% in 2020 ("Rate of depression in Great Britain doubled during COVID-19 pandemic", 2020). Adults of age group 16-39 years including the disabled were found to experience depression during a pandemic i.e., Table 4 shows the depression rate within age groups. Likewise, figure 7 illustrates depression rate by countries.

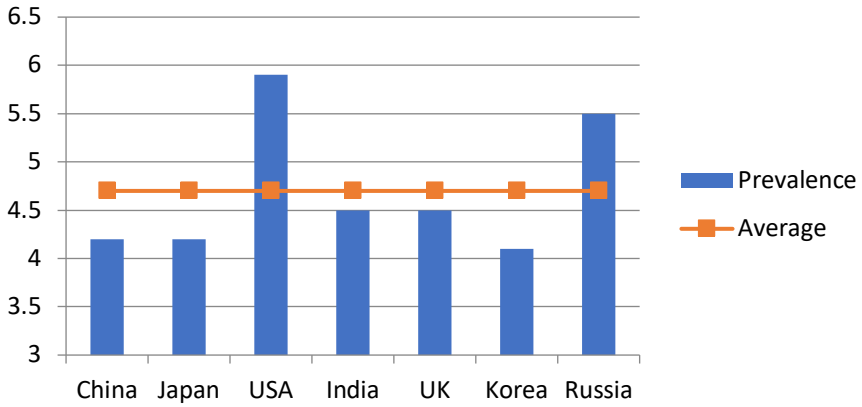


Figure 7. Depression Rate by Country 2021 (Data Source: Global Health Estimates)

Table 4. Depression rate within Age groups

Country	Age Groups
India	13-15
USA	18-29
UK	16-39
Japan	20-60
Singapore	18- 34

Africa	18-25
Korea	65-above

Suicide

While the terms self-harm and suicide are used interchangeably, the two terms have distinct meanings. Self-harm alludes to non-suicidal self-injury disorder (NSSID) and suicide refers to a deliberate intent to end one's life. According to Edwin Shneidman, world's prominent suicidologist, suicide is referred to as "complicated, multidimensional, conscious and unconscious choice of the best possible practical solution to a perceived problem, dilemma, impasse, crisis, or desperation" (Shneidman, 1993). Thus, suicide is a clear warning that a person is undergoing immense mental or emotional distress. However, the understanding and reasons for suicide have differed through time, antiquity and across cultures. This is to say that self-harm and suicide have been present in high profiled roles throughout ancient history. For instance, an early Greek historical figure, Empedocies committed suicide by jumping into the Sicilian volcano Mount Etna. Similarly, in today's world suicide rates have been on a continuous rise.

Suicide became the 10th main cause of death in the US. Research alludes that approximately 130 Americans commit suicide resulting in one suicide death every 11 minutes. Moreover, the highest suicide rates in the US are reported in Whites, American Indians, and Alaska Natives. Also, extracting the suicide rates from 1999-2017 extrapolates that suicide among males is four times more than their female counterparts; 79% of the suicides are committed by men in the US ("Suicide Statistics and Facts – SAVE", n.d.) In the African hemisphere, suicide rates are also plunging: television personalities, Shoki Mogapa and Jabulani Tsambo "HHP", committed suicide; khensani Maseko, an activist and Rhodes student, committed suicide; Nishume Siwundla, a 27-year old rising star and house vocalist, committed suicide in 2019.

Moreover, in Wales and England, "5,691 suicides were registered with an average rate of 11 deaths per 100,000 populations ("Suicide Rate By Country 2021", 2021). Moreover, the data depicts that "males aged 45 to 49 years had the highest age-specific suicide rate (25.5 deaths per 100,000 males); for females, the age group with the highest rate was 50 to 54 years at 7.4 deaths per 100,000 populations" (ibid). Also, suicide is one of the trending reasons of death in China. However, in China most suicide victims are women in comparison to the Western hemisphere where men are more prone to suicide. Also, citizens residing in rural China are "five times more likely to commit suicide than people in cities" because of "lack of mental healthcare, the stigma associated with mental illnesses, such as schizophrenia, poverty, and poor education" ("Suicide Rate By Country 2021", 2021). However, it is pertinent to apprehend that the accurate statistics are not easily available for public consumption due to strict regulations by the Chinese government.

Lesotho, with an estimated population of 2.2 million, one fifth of people suffer from various mental illnesses (Partners in health, 2018). It is among countries with the highest suicide rate. Similarly, the data presented by the World Health Organization (WHO) portrays that "the suicide rate in South Korea is the fifth highest in the world" ("Suicide Rate By Country 2021", 2021). The highest suicide rate is found in elderly Korean citizens because of the system which makes old parents dependent on their children to bear the financial expenses. Thus, "many older adults commit suicide, so they do not feel like they are a financial burden on their families" (ibid).

Risk factors: Certain population groups are at a disproportionately high risk of experiencing mental health illnesses. These include girls, boys, men, women, youth, migrants, and people with undisclosed mental health disorders. Similarly, the relationship between suicide and various mental health disorders such as depression, drugs, impulsive behaviour, and alcohol abuse is well recognized in advanced countries. Due to the magnitude of psychological strain that comes with stress, financial hardships, unstable relationships coupled with political, environmental, technological, and social factors, suicide ratios are increasing proportionally.

Economic Recession: Various studies have analyzed the correlation between suicide rates and economic depression. The studies postulated that economic downfall is correlated with an upsurge in suicide, especially for working men. According to statistics, “in the recent Global Financial Crisis (GFC) of 2008, suicide rates increased by 4.2% in 27 European countries and by 6.4% in 18 American countries, with more marked increases noted for men” (Bastiampillai, 2020).

Mental health: The people with mental health illnesses are more susceptible to commit suicide. In 2002, Bertolote and Fleischmann, provided a systematic analysis on suicide reports. According to them, “98% of those who died by suicide had a diagnosable mental disorder” (Ritchie et al, 2015). Thus, mental illnesses must be taken seriously in order to prevent suicide.

Schizophrenia

In 1911 a Swiss psychiatrist, Eugen Bleuler, used the term "schizophrenia." Bleuler used this name to highlight the mental chaos/fall-out thinking characteristic of individuals with the disorder. His expression was not meant to suggest the literal idea of a split or multiple personality disorder. However, this confusion has become a common denominator instead of a deep-rooted myth concerning Schizophrenia that continues today. There was no differentiation between Schizophrenia and other mental health disorders, much of which was understood as being supernatural in origin, caused by dark magic, spirits that escaped from the spirit world, consequences of sin, or any other spiritual circumstance.

As the comprehension of Schizophrenia became more apparent, it gave birth to the theories of its origin. Gregory Bateson and colleagues presented the "double bind" theory in the middle of 1950. This theory proposed that Schizophrenia was influenced by unpleasant parenting, specifically where parents clearly said one thing and then contradicted that thing with implicit unconscious messages of opposite content. For example, parents might praise their children but treat them poorly. This theory has been largely discredited and discarded for lack of convincing scientific evidence. However, the idea that stressful life events (such as having crazy parents can play a role in causing Schizophrenia and continues to be significant in modern "diathesis-stress" models of Schizophrenia (Historical and Contemporary Understandings of Schizophrenia," 2021)

Age and gender differences: Early detection and treatment of Schizophrenia present an opportunity for successful recovery. Knowledge about early warning signs is essential to prevent Schizophrenia. The symptoms of Schizophrenia vary according to age. Even though men and women have roughly similar rates of Schizophrenia, they tend to develop the condition at slightly different ages. Gender differences in Schizophrenia allude females develop Schizophrenia at a later stage, with the second peak post-menopause. Men have a higher rate of developing Schizophrenia; prevalence does not differ. The peak age of onset of Schizophrenia is 15 – 25 years in men and 20 – 30 years in women. It is often led to a prodromal phase of vague symptoms, some strange behaviors, and a decrease in functioning at school, work, and interpersonal or intercultural communication.

Social and technological factors: Some women experience frequent sexual assault, cybersexual harassment, cyberstalking, socioeconomic disadvantage, and provide more care for dependents. While

men usually develop the illness at age 18-25, symptoms start early to mid-20s. In women, symptoms show in the late 20s.

Risk factors: Comprehension of the cause of Schizophrenia continues to be explored. However, certain factors are associated with Schizophrenia that increases the risk of developing or triggering it, including:

- Having a family history of Schizophrenia.
- Pregnancy complications, such as malnutrition or exposure to toxins or viruses that may impact brain development.
- Alcohol and drug abuse.
- Talking mind-altering (psychoactive), psychotropic drugs during teen years and young adulthood complications.

Untreated, Schizophrenia has a negative impact on a person's daily tasks and interactions, & responsibilities. The negative impact schizophrenia can be caused due to the following factors, but not limited to,

- Suicide, suicide attempts, and thoughts of suicide.
- Anxiety disorders and obsessive-compulsive disorder (OCD).
- Depression.
- Abuse of alcohol or other drugs, including nicotine.
- Inability to work or attend school.
- Financial problems and homelessness.
- Victimized, including cybercrimes.
- Traditional, cultural, and spiritual strain

Post Traumatic Stress Disorder

PTSD is a mental health issue that is developed after experiencing a traumatic event or a frightening situation can lead to severe anxiety, panic attacks, nightmares, and flashbacks which may affect the daily life of a person. It can result in issues in work life and relationships as well. Some of the terrifying events leading to PTSD are accidents, rape, physical assault, living in a war, domestic abuse, child abuse, a tragic loss in life such as losing a baby, and stressful situations such as an unhealthy work environment (NHS UK, 2021).

In the US, around 31% of women rape victims developed PTSD and 11% of them still live with those symptoms (Kilpatrick, 2000). A study conducted in Canada concluded that 27.8% of teenage girls suffering from child sexual abuse develop symptoms of PTSD and 14.9% of teenage boys develop symptoms of PTSD (Hébert, Lavoie, & Blais, 2014).

Moreover, PTSD can also be triggered due to the experience of traumatic, frightening, troublesome situations through cyberspace such as cyberstalking, cyber-harassment, cyberbullying, etc. Cyberstalking can have a drastic psychological impact on the mental health of an individual. Many survivors are reported to develop PTSD because of severe anxiety, fear, and intimidation at the hands of their perpetrators (Short & Linford, 2014).

Similarly, cyberbullying is becoming increasingly common and the victims of this criminal offense are mostly children and teenagers. Cyberbullying triggers PTSD in the victim which leads to suicidal tendencies. A study in the UK concluded that more than 35% of the teenagers who were cyberbullied showed symptoms of PTSD (Mateu et al., 2020).

Unhealthy Lifestyle

Human beings are noblest of all creations on this planet. We can hegemonize all life forms with our staunch and prodigious way of thinking. A sound mind with a sound body can be the influential one for such a feat. It is beautifully quoted by Winston Churchill that, *''Healthy citizens are the greatest asset any country can have"*. In this world of celerity and adulteration, it is very difficult to maintain a healthy lifestyle. According to a survey done by WHO, 60% of factors related to human beings' health and standard of life are directly or indirectly dependent on lifestyle (Farhud, 2015). Many issues to ponder upon like *diseases related to metabolism, cardio-vascular diseases, violence etc.* can be caused by following a totally unhealthy lifestyle. *"Health is a state of complete mental, social and physical well-being, not merely the absence of disease or infirmity"* – WHO.

India might be a third world country in terms of socio-economic development but in terms of lifestyle leading to influence our health. Morbidity profile is similar to first world nations which is thing to worry about. According to CSE (Centre for science and environment), about 61 % of all mortality in India is related to style of living or non-communicable diseases. It is estimated that 1.73 million new cancer cases caused by tobacco, alcohol and diet change are likely to be occurred each year in this current decade. According to same study, every 12th Indian is diabetic, every third kid in Delhi has problematic lungs and heart diseases cause a death count of 2.7 million (Tabish, 2017). As per a research by WHO, there are four main risks for non-communicable diseases, "alcohol, tobacco, intake of poor diet and less physical activity".

In this world full of haste and waste major changes have influenced lifestyle of most people. Malnutrition, smoking, drug abuse, alcohol consumption, unhealthy diet, stress, substance abuse so on are key components of an unhealthy lifestyle. Moreover, with the advent of IT to virtual communications and internet a new challenge threatens our physical as well as mental health. In some countries like Iran, overuse of drugs and self-medication make it one of 20 countries using most medications. (Farhud, 2015). Pain relievers, eye drops and antibiotics have most usage in Iran. Similarly, according to Washington based Centre for disease dynamics antibiotic intake rises 30% in last decade in India (Kaul, 2021). In simple words whether it is skipping meals or eating fast or too much, smoking, not exercising, eating unhealthy food or spending too many hours in front of TV, PC or Cell-phone all lead to detrimental effects on healthy life style. Moreover, we are exposed to countless chemicals every day at work, home, in food, in air etc. We abuse our bodies' everyday by the medicines which can be avoided. Children are addicted to fast and processed foods. Herbicides, pesticides and other carcinogenic substances are sprayed on foods while they are in growing stage. In India, the government has not approved around 90% of drugs given to milk animals. 60-99% of cattle slaughtered are given hormones primarily estrogens during their growth. Overall, these events lead to an unhealthy lifestyle.

As there is a saying, ''*Journey of thousand miles begins with a single step''*. Regular physical activity, proper sleep, portion size, avoidable health care screening, laugh, family and friends, control on addictive behaviours, sexual indiscretion, strength, quiet mind, stress management etc lead to a perfect lifestyle (Szoeke, 2017). According to a recent study smoking, overconsumption of alcohol, lack of exercise and avoiding fruits and vegetables can hustle you into early grave and the effect is so much

that you age by as many as 12 years. Our life is full of stresses, deadlines, hassles, frustrations and demands but it is full of charm, happiness, fitness, solutions and calmness. We need to embed good habits to our lifestyle in order to increase life expectancy and a healthy way of life. Thomas Edison rightly narrates it, “The doctor of the future will give no medicine, but will instruct his patients in care of the human frame, in diet, and in the cause and prevention of disease.”

Global Health Issues

As mental health is a significant indicator of the overall comfort of a society, it has now become a global problem. According to information given in figure 8 and 9, depicts that developed countries having strong economy and facilities, people in these developed countries are suffering from more mental disorders as compared to the developing countries. In addition, figure 8 and 9 illustrates, in the United States, North Africa and in Europe the prevalence rate of anxiety disorders is much higher than other countries.

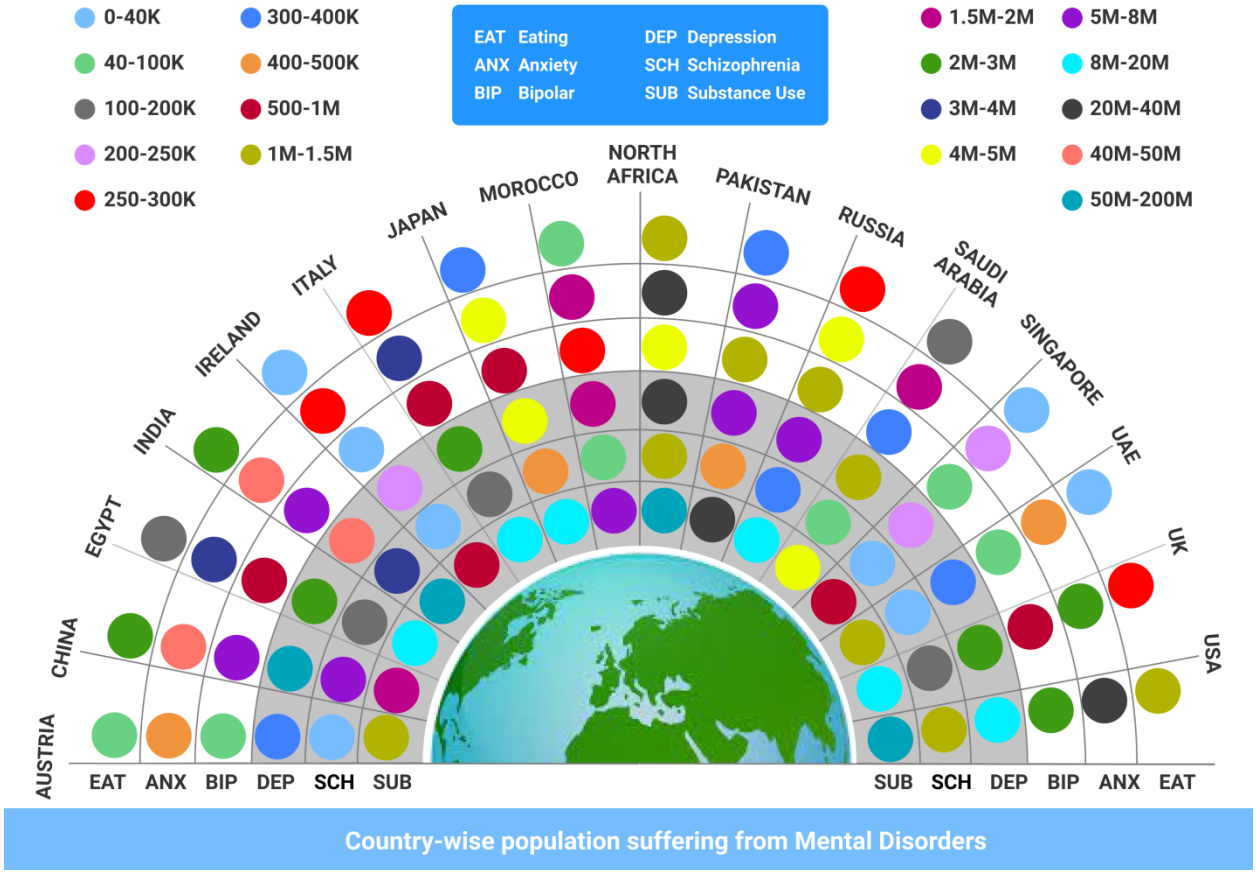


Figure 8. Country-wise population suffering from Mental Disorders

Figure 10 also shows that Countries like the United States and Morocco with high GDP and in spite of having more resources, these countries have one of the highest rates of anxiety disorder in the world in comparison to developing countries like Pakistan.

Country-wise Prevalence of Mental disorders							
Disorders(%) → / Country ↓	Schizophrenia	Bipolar	Eating	Anxiety	Drug Use	Depression	Alchohol Use
Austria	0.26	0.94	0.68	5.34	0.9	3.26	1.82
China	0.34	0.32	0.16	3.03	1.11	3.31	1.22
Egypt	0.19	0.78	0.19	4.36	1.47	3.24	0.66
India	0.26	0.56	0.16	3.3	0.53	3.53	1.13
Ireland	0.3	0.81	0.56	5.84	1.05	4.25	2.11
Italy	0.24	0.95	0.63	5.63	1.15	3.46	0.46
Japan	0.03	0.69	0.45	3.57	0.92	3.34	0.58
Morocco	0.19	0.78	0.18	4.99	1.64	5.41	0.57
North Africa	0.2	0.79	0.21	4.94	1.71	3.97	0.66
Pakistan	0.26	0.57	0.15	3.82	0.66	3.33	1.53
Russia	0.2	0.68	0.23	2.95	0.91	3.71	4.73
Saudi Arabia	0.21	0.82	0.29	4.75	1.71	3.54	0.68
Singapore	0.27	0.73	0.55	3.73	0.91	3.44	0.49
UAE	0.21	0.81	0.26	4.26	2.92	2.88	0.76
UK	0.26	1.09	0.45	0.65	1.66	4.12	1.9
USA	0.33	0.65	0.51	6.64	3.45	4.84	2.04

Figure 9. Country-wise Prevalence of Mental Disorders

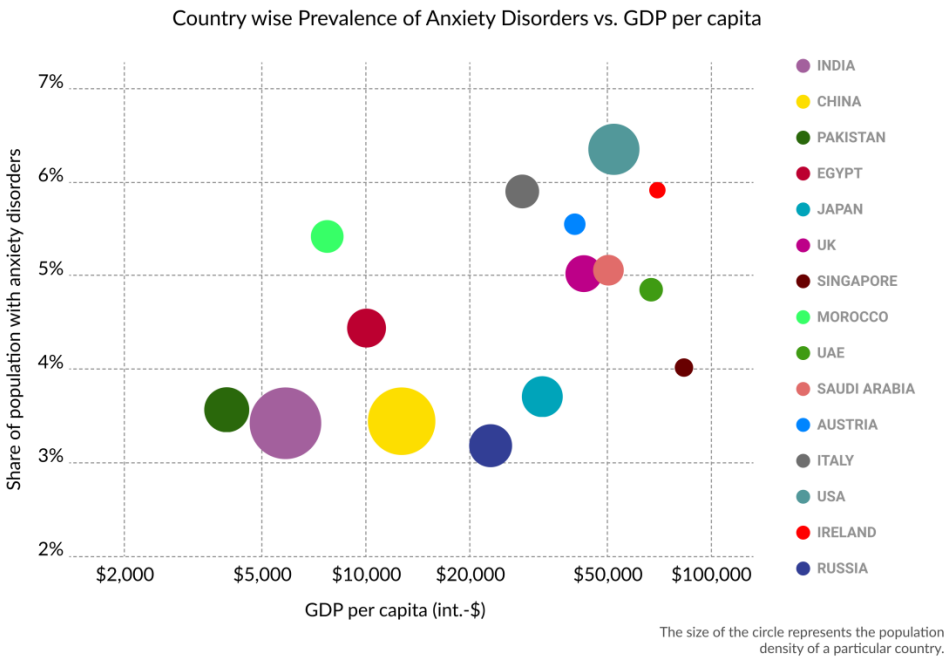


Figure 10. Country-wise Prevalence of Anxiety Disorders vs. GDP per capita

This is alarming that the countries with higher economy are more suffering due to mental disorders, for which there is an urgent need of actions to be taken by the government officials. The only solution for developed countries is to pay attention to the seriousness of this growing problem and more appropriate policies are needed to overcome this problem. In case of developing countries, majority avoids check-ups because they worry that they will be treated differently, stigma, and social rejection so most cases go unreported and do not have accurate data. For which, it is necessary to normalize mental health treatment in all institutions like other health treatments.

Part 3: Harnessing Science

Understanding Science - Brain, Mind, And Body In Modern Era

Our world could be a large, complex system, with many various competing interests all eyeing for your attention. To make the civilization world we have today, we would have liked a full slew of things to line up – a way to feed ourselves, a way to avoid dangerous, find ways to stop deadly effects, find ways to advanced technology, maintain bodies healthy enough to travel our lives. And it all started with something called – SCIENCE.

The term “Science” has been universally being employed and researched for centuries; however, it is intriguing how the meaning and application of the identical term has evolved. The classic term has been derived from the Latin word, *Scientia*, meaning knowledge, expertise, or experience. Science has been defined as an enquiry of information, knowledge and a good understanding of the natural and social world following a scientific methodology supported on evidence (“Science Council”, 2009). The National Academy of Science (2008) defined it as “The use of evidence to construct testable explanations and predictions of natural phenomena, still because the knowledge generated through this process.” Scientific revolutions were observed in 16th and 17th century with remarkable discoveries within the field of physics, chemistry, biology etc. Nevertheless, researchers have discovered how the planet currently goes through fundamental changes and altering the scientific understanding of the globe (Miller, 2018). The irreversible changes are perhaps leaving remarkable imprints that are revolutionizing and are redefining the physical nature of the globe itself. This science and social revolution are often attributed to industrialization, digitalization, technological advancements etc.

Undoubtedly and evidently, the scientific revolution that we are witnessing has had an infinite and mind-blogging impact on our brain, mind, and body. Researchers have indicated structural and functional changes within the brain within the digital era over the years (Dunham, 2018). The dimensions of the brain has increased over time which has been attributed to increased childhood nutrition and cure for various diseases occurring with technological development (Hawks, 2013). Psychologists and neuropsychologists have observed changes in various cognitive processes like deciding (Montoya & Bos, 2017), problem-solving (Hawk, 2013), attention (Lodge & Harrison, 2019), and social processes like interpersonal interactions, relationships, prosocial behaviour have also been altered (Meshi, Tamir & Heekeren, 2015; Montoya & Bos, 2017). Ancarani, Cooper, Gilligan and Thwaites (2016) explored the body in digital age and confronted human existence and its fundamental relationship with technology, and experiences of the body without the acknowledgement of technology. The changes in diet, sleep, increased substance use, lack of physical activity, and technological addiction have immensely impacted our body and its functioning (Khanna, 2019) Hence, with the astonishing yet alarming changes occurring within the mankind and also the environment of a personal, it is pressing have to concentrate on the impact on mind, body and brain within the era.

Neuroscience

Understanding how the human brain works is one amongst the most important challenges. Science will shape the planet we live and also the requirements we will face during the approaching years, as computer science such as artificial intelligence is being further explored and developed. The human brain is important to our existence and it is a fantastic complex and interconnected series of neuronal networks. It is widely acknowledged because the most complex, flexible, best-organized and highest performing “machines” within the known universe. The human brain is that the center of decision making; our brains control nearly everything we do, including our actions and our behaviors.

Studying the systema nervosum advances understanding of our basic biology and body function. Knowing how things typically work can help shed light on what may happen when there are problems. Neuroscience may be a rich field dedicated to scientific studying of the numerous facets of the systema nervosum. Neuroscience psychology, also referred to as neuroscience, studies the activity within the brain that influences human behaviour, focuses on the biological and chemical processes that enable the brain to function efficiently (Ayd,Frank J. Jr 2000) . The earliest study of systema nervosum dates to ancient Egypt, Trepanation, the surgical practice of either drilling or scraping a hole into the skull for the aim of curing head injuries or mental disorders , or relieving cranial pressure, was first recorded during the Neolithic period. Manuscripts dating to 1700BC indicate that the Egyptians had some knowledge about symptoms of brain damage . The scientific study of the systema nervosum increased significantly during the half of the twentieth century, principally thanks to advances in molecular biology, electrophysiology and computational neuroscience. This has allowed neuroscientists to study the systema nervosum altogether its aspects: how it is structured, how it works, how it develops, how it malfunctions, and way it are often changed.

Our brain, the peripheral nervous system, the endocrine, immune system, the organs of our body and every emotional responses we have got, share a common chemical language and that we are constantly communicating with each other

Neuroscience has made immense contribution to the sphere of psychology in understanding and treatment of assorted conditions that affect psychological state and behaviour like Pakinson’s disease (Frontiers Science News, 2017), a degenerative disorder which causes impairment within the brain nerve cells that affect movement together with deciding ability; Alzheimer, a cognitive deterioration which ends up in a progressive decline in an exceedingly person’s intellectual abilities (National Institute on Aging, 2019); Schizophrenia a mental disorder characterized by the impaired perception of reality like as psychosis, hallucinations and delusions. Scientists were ready to discover when and where dopamine alterations occur. Having a clear understanding of the neurotransmitter system and brain region affected aids in identifying the core neurobiological features of schizophrenia (Kesby et al., 2018)

Neuroscience studies have also helped identify the suitable intervention and treatment program for depression by understanding the baseline activation of the subgenual anterior cingulate cortex (sgACC). In cases of hysteria, brain chemical messengers are assessed in reference to the strain sensitive amygdala region. Through this, researchers understood the underlying mechanism through which the chemical helps reverse the strain response caused by the hormone.

Our Human Body

The human body is the physical substance of the human organism, composed of living cells and extracellular materials and arranged into tissues, organs and systems. The human body requires five vital organs that are essential for survival; brain, heart, kidneys, liver and lungs. The human body has over hundred billion neurons and cells, all which is intertwined and composed of elements including hydrogen, oxygen, carbon, calcium and phosphorus. Systems are the foremost complex of the component units of the physique arranged together to perform complex functions for the body. The important systems are Skeletal, Muscular, Nervous, Endocrine, Cardiovascular, Lymphatic, Respiratory, Digestive, Urinary, Integumentary and Reproductive.

Nervous System

The systema nervosum includes both the central nervous system, consisting of a brain and spinal cord, and the peripheral nervous system comprised Somatic and the Autonomic nervous systems. The brain, weights approximately 1.3 to 1.4kg, lies within the skull and is formed sort of a mushroom shape. The brain consists of four principal parts – the brain stem, the cerebrum, the cerebellum and the diencephalon which host the thalamus and hypothalamus. The thalamus is where sensory and other impulses go and coalesce. There are two varieties of matter within the brain: grey matter and white matter. Grey matter receives and stores impulses. Cell bodies of neurons and neuroglia are within the grey matter. Substantia alba within the brain carries impulses to and from grey matter. It consists of the nerve fibers (axons). Other parts of the brain include midbrain and also the pons. The medulla spinalis composed of a series of 31 segments, maybe like a long tube-like structure thar extends from the brain. Both motor and sensory nerves are located in the medulla spinalis. The meninges – a three layers of membranes offer protection to the brain and the medulla spinalis by acting as a barrier against bacteria and other microorganisms. The cerebrospinal fluid (CSF) nourishes the brain and medulla spinalis.

70% of our immune system is housed in our gut. A healthy gut contributes to a powerful immune system, heart health, brain health, improved mood, healthy sleep, and effective digestion, and it is going to help prevent some cancers and autoimmune diseases.

The somatic nervous system consists of peripheral nerve fibers that devour sensory information or sensations from the peripheral or distant organs (aloof from the brain like limbs) and carry them to the central nervous system. These also carries with it nerve fibers that c of the brain and take the messages for movement and necessary action to the skeletal muscles. For example, on touching a hot object, the sensory nerves carry information about the warmth to the brain, which sucessively, via the motor nerves, tells the muscles of the hand to withdraw it immediately. The Autonomic Nervous System has three parts; The sympathetic nervous system, the parasympathetic nervous system and the enteric nervous system; controls the nerves of the body's inner organs on which humans have not any conscious control. This includes the heartbeat, digestion, breathing (except conscious breathing), etc. The nerves of the autonomic nervous system innervate the involuntary muscles of the (internal organs) and glands and cause them to function and secrete their enzymes. The enteric nervous system is a complex network of nerve fibers that innervate the abdomen's organs like the gastrointestinal tract, pancreas, gall bladder, etc. It contains nearly 100 million nerves.

Cardiovascular System

The cardiovascular, or circulatory, system supplies the body with blood. It consists of the heart, arteries, veins, and capillaries. The heart, a significant organ in our bodies beats about 2.5 billion times in a median lifetime. It functions 24/7, pumping million gallons of blood to each a part of the body. It is one amongst the foremost essential organs keeping us alive. When the heart stops, other systems fail almost instantly.

Cardiovascular diseases (CVDs) are a bunch of disorders in the heart and blood vessels which includes coronary cardiovascular disease, cerebrovascular disease, peripheral arterial disease, rheumatic heart disease, congenital heart disease, deep vein thrombosis and pulmonary embolism. Cardiovascular diseases are the leading explanation of death globally with an estimated 17.9 million people in 2019, representing 32% of all global deaths. Of those deaths, 85% were due to heart attack and stroke and over three quarters of deaths take place in low- and middle-income countries. Out of the 17 million premature deaths (under the age of 70) due to noncommunicable diseases in 2019, 38% were caused by CVDs. (WHO, 2021)

For the heart to stay healthy “Avoid any foods that have the words 'trans,' 'hydrogenated,' or 'partially hydrogenated' on the label [indicating bad fats], often found in commercially fried foods, donuts, cookies and potato chips. Activities like walking, jogging, running, cycling, swimming, aerobics, rowing, stair climbing, hiking, cross country skiing and dancing are “pure” aerobic activities. Sports like soccer, basketball, squash and tennis may also improve your cardiovascular fitness.

Science of Drug and Medicine

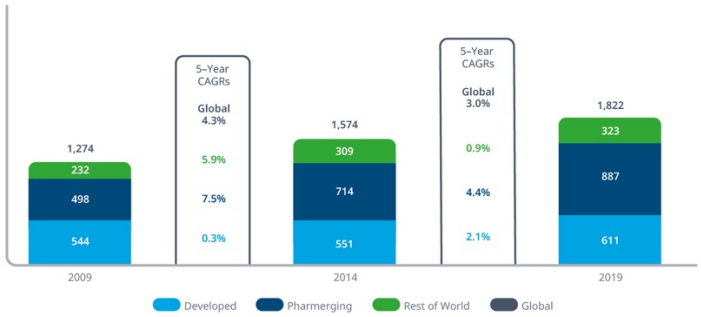
Medicine

In a survey, 17% CISOs said that they had turned to medication or alcohol to help deal with that stress
1 in 6 CISOs now use medicines or alcohol
(Winder, Davey, 2019)

Medicine as defined by team of philosophers and ethicists as – 1. Preventing disease and injury, promoting and maintaining health; 2. Relieving pain and suffering caused by maladies; 3.caring for and curing those with a malady and caring for those who cannot be cured; and 4. Avoiding premature death and pursuing a peaceful death.

History of medicine may be dated back to the Stone Age where plants were used as a kind of medicine. Hippocrates, an ancient Greek physician (460-377BC), described medicine as “to do away with the sufferings of the sick; to reduce the violence of their diseases’(Hanson, Ann Ellis 2006) Modern days medicines are chemicals or compounds accustomed to treat and forestall symptoms and diseases and to assist during a diagnosis.

The consumption of medicine has increased worldwide over the years (by 7% since 2009) with pharmerging countries[1] have the foremost consumption rate followed by the developed countries and then the rest of the planet. (The IQVIA Institute, 2020) Toegther with benefits, almost every medicine has some varity of a side effect. Medicines may alter other molecules likewise aside from the target ones bringing about unwanted effects. (Failli, 2017). These side effects can vary from minor issues like as a running nose or headache to life threatening issues like as a severe allergy, asthma or even a risk of a cardiac arrest.



Source: IQVIA Market Prognosis, Sep 2019; IQVIA Institute, Dec 2019
Notes: Chart represents IQVIA Institute estimates of global defined daily doses (DDD). These estimates are based on IQVIA audited data and application of WHO-DDD factors in IQVIA MIDAS as well as additional DDD calculation assumptions developed by the IQVIA Institute (see Methodology).
Report: Global Medicine Spending and Usage Trends: Outlook to 2024. IQVIA Institute for Human Data Science, March 2020

Fig. 11 - Consumption of Medicine

Global Invoice Spending and Growth in Selected Countries

	2020 SPENDING US$BN	2016–2020 CAGR	2025 SPENDING US$BN	2021–2025 CAGR
Global	1,265.2	4.6%	$1580–1610	3–6%
Developed	959.5	3.8%	$1130–1160	1.5–4.5%
10 Developed	847.2	3.8%	$990–1020	1.5–4.5%
United States	527.8	4.2%	$605–635	2–5%
Japan	88.2	-0.2%	$75–95	-2–1%
EU5	180.4	4.4%	$215–245	2–5%
Germany	54.9	5.3%	$65–85	3.5–6.5%
France	36.3	2.4%	$43–47	1–4%
Italy	33.3	4.2%	$38–42	2–5%
United Kingdom	30.2	5.3%	$38–42	2.5–5.5%
Spain	25.7	4.6%	$28–32	1.5–4.5%
Canada	22.8	4.8%	$28–32	2–5%
South Korea	16.2	6.8%	$18–22	4.5–7.5%
Australia	11.8	3.3%	$13–17	1–4%
Other Developed	112.3	4.2%	$125–155	2.5–5.5%
Pharmerging	290.8	7.4%	$415–445	7–10%
China	134.4	4.9%	$170–200	4.5–7.5%
Brazil	28.7	10.7%	$43–47	7.5–10.5%
Russia	17.5	10.8%	$33–37	11–14%
India	21.1	9.5%	$28–32	7.5–10.5%
Other Pharmerging	89.1	9.6%	$120–150	8.5–11.5%
Lower Income Countries	15.0	3.9%	$18–22	3–6%

Source: IQVIA Market Prognosis, Sep 2019; IQVIA Institute, Dec 2019
Exhibit Notes: Spending in US$Bn, CAGR = Compound Annual Growth Rate using Constant US$ with Q2 2020 exchange rates.
Pharmerging, Developed and Lower Income Countries are defined based on a mix of national income and pharmaceutical market dyanmics, see definitions.
Report: Global Medicine Spending and Usage Trends: Outlook to 2025. IQVIA Institute for Human Data Science, April 2021

Fig. 12 – Global spending on Medicine

A survey by the Kaiser Family Foundation reported that 45 percent of Americans felt that the COVID-19 crisis is harming their mental health; while 19 percent felt that it is having a “major impact.” In a recent poll from the Pew Research Center , 73 percent of Americans reported feeling anxious at least a few days per week since the onset of the pandemic. Between mid-February and mid-March 2020, prescriptions for antianxiety medications increased 34 percent. During the week of March 15, when stay-at-home orders became pervasive, 78 percent of all antidepressant, antianxiety, and anti-insomnia prescriptions filled were new (versus refills).

WHO estimates that “more than half of all medicines are prescribed, dispensed or sold inappropriately, which half of all patients fail to take them correctly. The overuse, underuse or misuse of medicines results in wastage of scarce resources and widespread health hazards.” (WHO, 2020), an estimated 18 million people have misused such medications at least once in the past year with US being at the highest. (SAMSHA, 2018)

Drugs

“Early humans discovered that eating some plants gave a sense of relaxation, happiness, drowsiness, or peace…..Some gave a sense of increased energy, alertness, and stamina. And a few caused strange sensations, terrifying visions, or a profoundly different awareness” (Gahlinger, 2004, p. 5). The three primary types of drugs include raw plants (such as cannabis or mushrooms), refined plants (such as heroin or cocaine), and synthetic drugs (such as ecstasy, amphetamine, and New Psychoactive Substances (formerly called as "legal highs").

Fig. 13 – World Drug Report, 2020

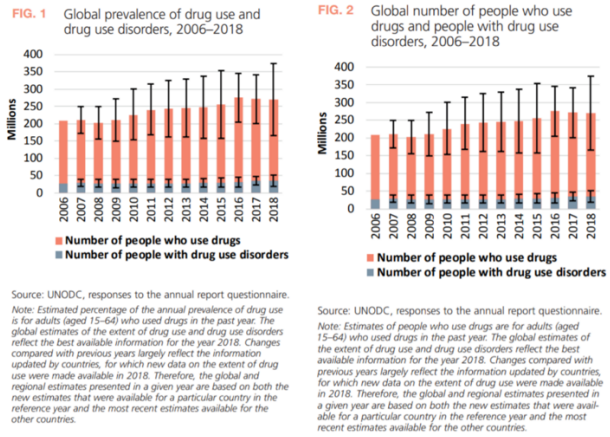


Fig. 14 – Global Prevalance of Drug use

Adolescents and young adults account for the largest share of those using drugs, while young people are also the most vulnerable to the effects of drugs (UNDOC, 2021). Drug abuse and addiction is twice as common in men than in women. (Our World in Data, 2019)

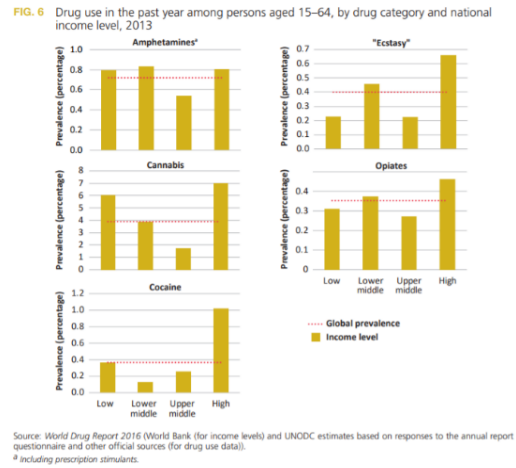


Fig. 15 – Global number of people who use drugs and people with drug disorders

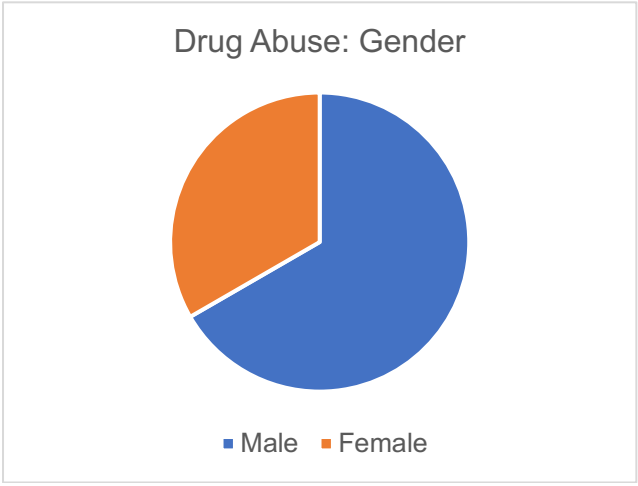


Fig. 16 – Drugs used by category

Drugs disrupt the normal transmission, reception, and processing of information by nerve cells. They do this by

- mimicking the brain's natural chemical messengers,
- overstimulating the brain's reward system
- flooding the brain with surplus chemicals, and
- binding to brain receptors.

Table 5. Neurotransmitters Implicated in Drug Use and Addiction

Neuro- transmitter	Distribution in the Central Nervous System	Functions Affected	Drugs That Affect It
Dopamine	○ Midbrain ○ Ventral Tegmental Area (VTA) ○ Cerebral cortex ○ Hypothalamus	○ Pleasure and reward ○ Movement ○ Attention ○ Memory	○ Cocaine ○ Methamphetamine ○ Amphetamine ○ In addition, virtually all drugs of abuse directly or indirectly augment dopamine in the reward pathway.
Serotonin	○ Midbrain ○ VTA ○ Cerebral cortex ○ Hypothalamus	○ Mood ○ Sleep ○ Sexual desire ○ Appetite	○ MDMA (ecstasy) ○ LSD ○ Cocaine
Norepinephrine	○ Midbrain ○ VTA ○ Cerebral cortex ○ Hypothalamus	○ Sensory processing ○ Movement ○ Sleep ○ Mood ○ Memory ○ Anxiety	○ Cocaine ○ Methamphetamine ○ Amphetamine
Endogenous opioids (endorphin and enkephalin)	○ Widely distributed in brain, but regions vary in type of receptors ○ Spinal cord	○ Analgesia ○ Sedation ○ Rate of bodily functions (e.g., breathing)	○ Heroin ○ Morphine ○ Prescription pain relievers (e.g., oxycodone)

Table 5. Neurotransmitters Implicated in Drug Use and Addiction

Neuro- transmitter	Distribution in the Central Nervous System	Functions Affected	Drugs That Affect It
		○ Mood	
Acetylcholine	○ Hippocampus ○ Cerebral cortex ○ Thalamus ○ Basal ganglia ○ Cerebellum	○ Memory ○ Arousal ○ Attention ○ Mood	○ Nicotine
Endogenous cannabinoids (anandamide)	○ Cerebral cortex ○ Hippocampus ○ Thalamus ○ Basal ganglia	○ Movement ○ Cognition and memory	○ Marijuana
Glutamate	○ Widely distributed in brain	○ Neuron activity (increased rate) ○ Learning ○ Cognition ○ Memory	○ Ketamine ○ Phencyclidine ○ Alcohol
Gamma-aminobutyric acid (GABA)	○ Widely distributed in brain	○ Neuron activity (slowed) ○ Anxiety ○ Memory ○ Anesthesia	○ Sedatives ○ Tranquilizers ○ Alcoh

(Source: NIDA, 2017)

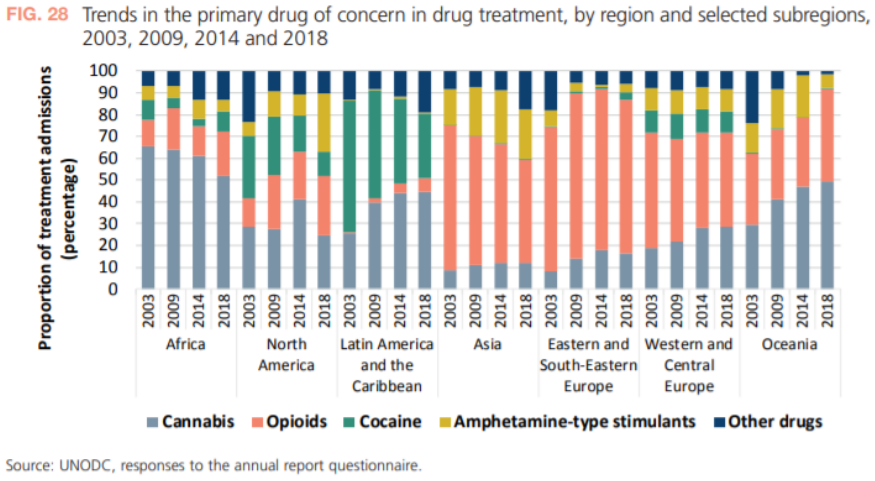


Fig. 17 – Drug treatment, by region and selected sub regions

11.8 million deaths are caused by substance abuse each year out of which more than 180 thousand are linked to drug abuse and overdose (Our World in Data, 2019; WHO,2019).

How Stress Can impact one's mental health

Figure 18. Signs and Symptoms of Stress (Courtesy: University of Regina, n.d.)

Nearly 1 in 3 security team members experience tremendous stress
Over 1 in 4 of CISOs admit stress levels greatly affect ability to do job
(Crest, 2020)

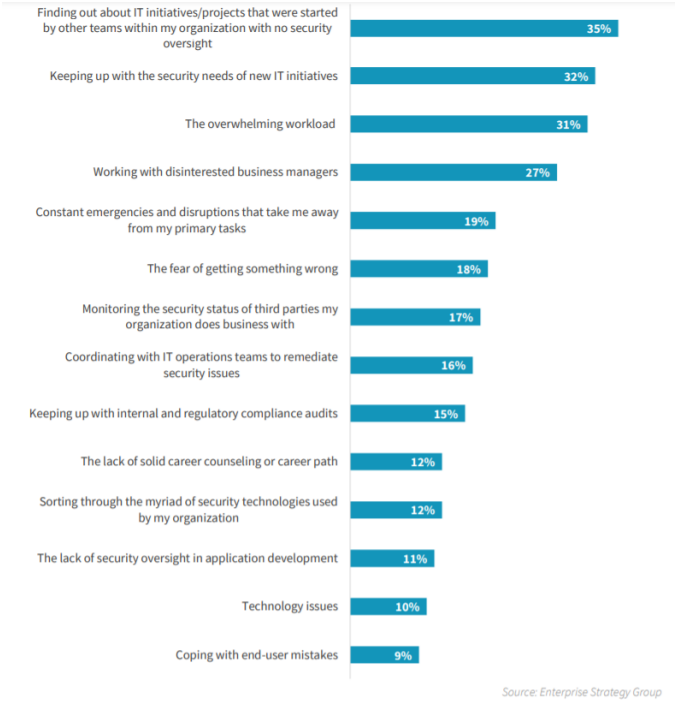


Fig. 19 – Stress level of cybersecurity professional

- Cybersecurity careers can lead to personal issues. The pace and stress of a cybersecurity job can lead to personal consequences—29% of respondents say that they've either experienced significant personal issues as a result of cybersecurity job stress or they know someone else who has.
- Sixty percent of respondents claim that a cybersecurity job can be taxing on the balance between one's professional and personal life. This and the unhealthy levels of stress of a cybersecurity job (36%) may be a leading cause of the significant personal issues described above.

Stress is an interior state of the body which will be caused by situations and circumstances which are evaluated as potentially harmful, uncontrollable or exceeding our resources for coping. "More than one in three adults (35%) worldwide said they experienced stress plenty of the day yesterday in 2019." (WSI, 2021). As per research, stress may have a spread of harmful impacts on the brain, starting from resulting in psychopathy to really reducing the capacity of the brain. The persistent stress on the brain causes a rise in myelin-producing cells but a decrease in neurons and might have a detrimental effect on the hippocampus of the brain.. A study at Yale School of Medicine (2012) found that stress can also cause shrinkage in brain regions related with emotion regulation, metabolism, and memory even in healthy individuals. It can reduce the gray matter in the brain - "in portions of the medial prefrontal cortex, an area of the brain that regulates not only emotions and self-control, but physiological functions such as blood pressure and glucose levels" - even in subjects who had only recently experienced a stressful life event.

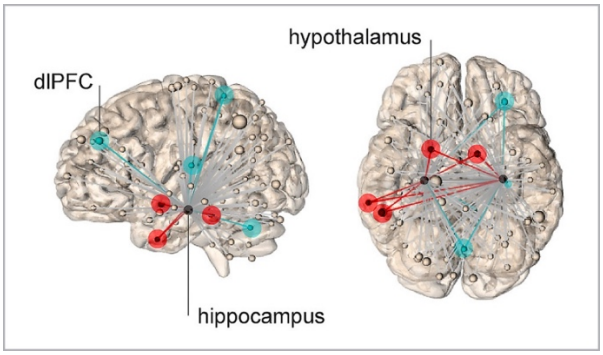


Fig. 20 – Stress level in our brain

The sensation of stress is generated by neural networks emanating from the hippocampus. Networks represented by red lines show connections to hypothalamus, which predict higher levels of stress. The blue lines represent connections to dorsal lateral frontal cortex, and lower subjective levels of stress. (Source: Yale School of Medicine, 2020)

Psychological stress can impair cognitive function both within the short term (e.g., when a person's thoughts are preoccupied with an argument that occurred earlier, leading to a reduced ability to focus to, keep track of, or remember steps within the tasks) and within the future (e.g., compared to less stressed individuals of the identical age, those that experience chronic stress show accelerated cognitive decline). (Scott et al., 2015) It can cause health problems and worsen existing problems. Research has linked 90% of illness to stress. Physical health problems include lowered immune system working, heart issues, asthma, diabetes and even cancer.

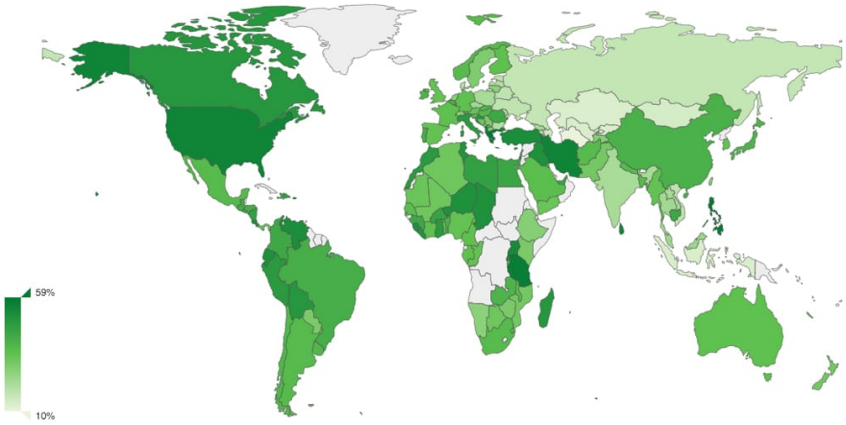
Fig. 21 – Three stages of Stress

Stress is a contributing factor to mental illnesses such as depression, anxiety, insomnia, substance abuse and even suicide. Stress is also a major contributor in developing and worsening anxiety – exhaustion, constant worrying, being edgy, fear, and more

Being exposed continuously or on a daily basis to stressors builds up to a cycle of stress and this is can have detrimental effects on one's mind and body. Chronic stress (long term) is more harmful than acute

stress (short term) as the body is not able to get back to normal functioning easily due to being exposed continuously to stressors.

Stress hormones like cortisol and corticotropin-releasing hormone can aid in responding to an imminent threat. However, if stress levels remain high instead of decreasing, those chemicals may increase anxiety and contribute to mood disorders. Sustained or chronic stress, in particular, raises cortisol, the stress hormone, and lowers serotonin and other neurotransmitters in the brain, including dopamine, which has been related to depression. When these chemical systems are functioning normally, they regulate biological processes such as sleep, appetite, energy, and sex drive, as well as allow normal mood expression.



Most stressed	Least Stressed
Greece - 59%	Turkmenistan - 10%
Philippines - 58%	Uzbekistan - 13%
Tanzania - 57%	Kyrgyzstan - 13%
Albania - 55%	Kazakhstan - 13%
Iran - 55%	Indonesia - 13%
Sri Lanka - 55%	Mongolia - 14%
USA - 55%	Azerbaijan - 15%
Uganda - 53%	Russia - 17%
Costa Rica - 52%	Vietnam - 18%
Rwanda - 52%	Ukraine - 18%

Fig. 22 - Most and least stressed countries in 2018

Stress can either be positive or negative and, stress affects the brain (Cherry, 2021). Good stress, or stress that helps you perform well in the face of adversity, helps to wire the brain in a good way, leading to stronger networks and more resilience.

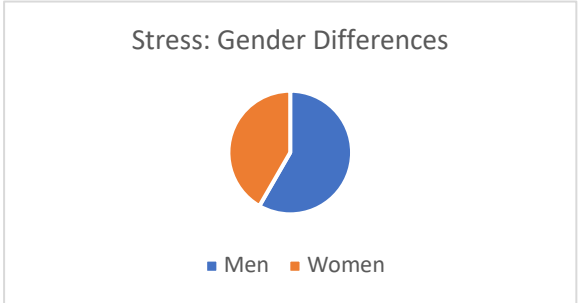


Fig. 23 - : Stress and Gender, APA

Women are more stressed as compared to men, with highest being for women in their midlife. Females are more likely to report physical and emotional symptoms than males. (Stress and Gender, APA)

Cause of stress can range from physical, social and psychological to personal and emotional.

Academic Stress	Work Stress	Major Life changes	Daily Hassels
• Most common cause of stress in students • Factors include exams, deadlines, poor time management, balancing work and academics, grades, assignments, competition.	• Most common stress among adults • Factors include overwork or underwork, conflicts and relations with colleagues and boss, meeting job demands and deadlines, job stability, hours of work, type of work, discrimination and harassment, pay and perks.	• Can be positive such as wedding, promotion, new job or school, or unpleasant such as divorce, job loss, financial setbacks, death of a loved one can be stressful • It may threaten an individual's sense of stability or self-esteem as they bring about changes that are usually overwhelming.	• Account for daily or minimal stressors, minor issues and irritations in life • Act as constant triggers to the stress response • Include losing of keys, small arguments with family and friends, traffic, being late.

Disasters and Catastrophic events

- Earthquakes, genocide, wars, pandemics
- The first reaction to such situations is fear and distress. It can become overwhelming and traumatic, and affect an individual's sense of security.
- They are completely beyond normal human experiences. These situations are completely unpredictable and leave and individual in a state of shock.

Fig. 24 –Cause of Stress

The recent major event is the Covid 19 pandemic, it has ravaged all aspects of human life causing immense distress and fear. Not having enough knowledge about the virus to contracting it, procuring essential items to businesses and economies collapsing, adjusting and adapting to the new demands and restrictions to wanting to socialize, adjusting to new ways of work, live and communicate – it has all taken a toll on the mental health.

Gallup finds that 2020 was officially the most stressful year in recent history, with a record-high 40% of adults worldwide saying they experienced a lot of stress the previous day.

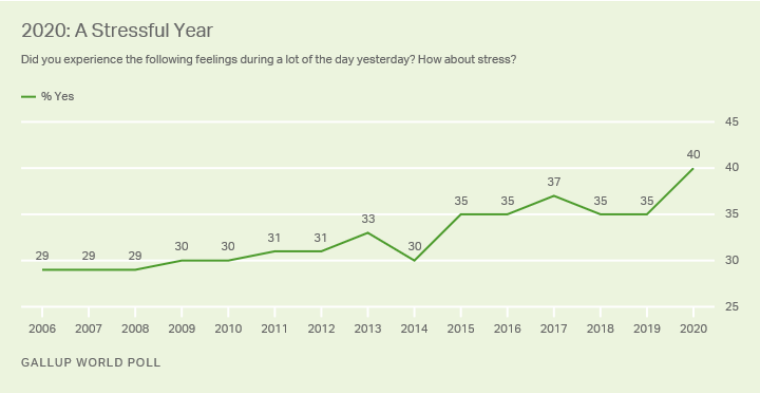


Fig. 25 – 2020 A Stressful Year (Image Courtesy: WSI. 2021)

The Food We Consume

Food has a direct link with our physical and mental health. A healthy diet is, therefore, essential to ensure that our body and mind receive the required nutrients that it needs to function effectively. The dynamic of a healthy diet might shift throughout our lives depending upon the need for particular dietary food or nutrients for our age or in any disease. Yet, research reveals that intake of specific nutrients and food groups positively impacts our health and promotes mental wellness.

What we eat is millions of microbes, cumulative product of the chemistry and microbes in the soil where it grown, the factory where it processed and whatever you touched before you eat it

A healthy diet consists of macronutrients such as carbohydrates, proteins, and fats to be consumed in proper proportions for energy production and to meet physical wellbeing. Likewise, a balance of micronutrients such as minerals and vitamins and water intake is required for growth development and improving metabolism. The key sources of energy are carbohydrates that are present in vegetables, fruits, and grains. Whole grains are preferred as the processed grains are stripped of micronutrients. Evidence suggests that whole-grain intake reduces the risk of cancer, heart disease, diabetes, and stroke (Aune et al., 2016). Similarly, fruits and vegetables are a rich source of energy and even helps reduce the risk of hypertension (Li, Li, Wang, & Zhang, 2016).

Micronutrients are important to stimulate the mental function and promote the growth development of the body. Vitamins and minerals ensure that age-related complications are reduced in life. Likewise, water intake is an essential part of the diet as it affects the body weight and provides micronutrients as well. Research shows that drinking water supplies 20% of the daily requirement of calcium and magnesium (WHO, 2005).

Food plays a vital role in influencing the mental health impacts on our mind and body.
Processed dietary foods or western diet leads to the development of depression, and obesity (Galland, 2010). Poor intakes of nutrients such as zinc and B12 also lead to fatigue, depression, and low mood (Sensi, 2011). Another contributing factor that links diet with mental is sugary products such as soft drinks which causes inflammation that leads to depression, bipolar disorder, and schizophrenia.

Mediterranean diet is recommended by experts as it contains a balanced intake of all necessary nutrients and intermittent fasting which has immense positive changes in life such as decreased tension, anger, improved emotional wellness, and reduction in depression (Hussin, Shahar, Teng, Ngah, & Das, 2013).

Importance of Sleep

Lack of sleep on a regular basis is harmful as it leads to poor health that affects the entire body and also the mind. The body needs to sleep and rest just like it needs oxygen to breathe. While sleeping the body heals itself, memory is retained, and chemical balance is regulated. If the body doesn't get enough sleep, the brain and body might not function properly and ultimately, the quality of life is decreased significantly. A report suggests that getting too little sleep will increase the chances of a young death (Cappuccio, D'Elia, Strazzullo, & Miller, 2010).

Sleep deprivation has drastic effects on the mental health and emotional stability of a person and can leaves the person feeling tired and fatigue. It causes the brain to go foggy, decreases the ability to retain information, creativity as the person is unable to focus clearly and compromises the ability to make sound decisions. Sleep deprivation can also makes the person feels irritates, annoyed, restless, and is more vulnerable to mood swings.

Sleep deprivation can also lead to mental risks such as anxiety, depression, paranoia, and suicidal thoughts. It also intensifies already existing mental illnesses such as people with bipolar disorder might get triggered and experience intense emotions. Sleep deprivation leads to a high rate of suicidal tendencies in teenagers due to anxiety and depression (Lee, Cho, Cho, & Kim, 2012).

Globally, 51% of adults suffer from sleep deprivation and try to make it up for on the weekends. The most sleep-deprived adults reside in the UK at 63%, followed by 62% adults in Singapore (Wakefield Research, 2018)

Cultivating the Support System

Emotional and social support is the backbone of many individuals during the time of crisis or stressful situations. They can rely on their friends, family members for comfort and care when needed. It is an important part of managing difficult situations in life. People who receive emotional support in their lives tend to be happier, satisfied with life, and can deal with tough situations in their lives. Poor support structure or being alone in their misery, can have negative effects on their physical and psychological health.

A study was conducted in the US to determine the effects of emotional support provided by the parents in the lives of their children. The study revealed that less emotional support and neglect from parents towards their children leads to the potential development of mental illnesses such as depression later in adulthood (Shaw, Krause, Chatters, Connell, & Ingersoll-Dayton, 2004). Lack of support can often lead to loneliness which pushes teenagers in particular towards compulsive use of the internet. The risk of developing internet addiction is most common in teenage boys (Tsang, 2014).

Leveraging Science to Thrive

Resilience

Resilience is perceived as a dynamic equilibrium state within which psychological, physical, spiritual elements and protective factors have reached a balance. The resilience process is attained by having a biopsychospiritual homeostasis, that is, a comfort zone when one is balanced and adapted mentally, physically, and spiritually to a group of events (Richardson, 2002). Resilience helps us to develop physical and mental well-being and cultivates self-efficacy; fosters emotional strength to process and address adversity, trauma, and hardships

The term ‘Resilience’ etymologically, has been derived from a Latin word *‘resiliens’* which refers to elasticity of an object. Ann Masten (2001, p. 228) defines resilience as “a class of phenomenon characterized by good outcomes in spite of serious threats to adaptation or development”, Ryff and

Singer (2003, p. 20), define resilience as “maintenance, recovery, or improvement in mental or physical health following challenge.”

Cultivating The Four Pillars of Resilience

Mental resilience
Mental resilience is also referred to as psychological resilience is defined as “the ability to mentally withstand or adapt to uncertainty, challenges, and adversity” (Hurley, 2020). Mental fortitude helps individuals develop strategies to bounce back after a stressful or adverse events. Therefore, inculcating mental resilience equips individuals’ to remain steadfast and calm when dealing with misfortune and affliction. Meditation, mindfulness therapy and being psychological flexibility are some key contributions in building mental resilience.

Physical resilience
Physical resilience means the “ability of an organism to respond to physical stress, specifically, stress that acutely disrupts normal physiological homeostasis” (Schorr et al., 2017). This alludes to the body’s ability to attune to challenges and adversities. Research depicts that physical resilience plays an integral role in building a healthy aging process (Whitson et al., 2016). Regular exercise, good quality sleep, yoga therapy, breathing practice and qi gong (an ancient Chinese practice for healing, exercise and cultivating positive wellbeing) help foster physical resilience

Spiritual Resilience
Spirituality is a construct that is commonly defined as the thoughts, feelings, and behaviours that are evoked and fueled by religious practices and arise from the search for the sacred. It has its roots in varied religions like Islam, Christianity, Buddhism, Hinduism etc (Snyder & Lopez, 2002, p. 106). A combination of these facets – Spiritual Resilience, is the “ability to sustain one’s sense of self and purpose through a set of beliefs, principles or values while encountering adversity, stress, and trauma by using internal and external spiritual resources” (Manning, Ferris, Narvaez Rosario, Prues & Bouchard, 2018, p. 169).

Encourage Faith – Religious faith is an important aspect of fostering spiritual resilience. Religious activities encourage people to cope with the adversities and challenges in positive light, which further cultivate emotional well-being. Older adults engaging in prayers and reflecting on their blessings, finding their purpose and meaning, and developing a close relationship with higher power or god are found to be more resilient (Bridges, & Moore, 2002).

Cultivating Hope – Hope refers to the tendency to look-forward, inspires us, nudges vitality and fuels our passion for living. It enables us to maintain faith, strikes a sense of optimism, and confidence by engaging in religious practices in the face of adversities (Seligman, Steen, Park & Peterson, 2005)

Practicing Gratitude – Positive emotions such as gratitude have been highly correlated to positive mental health. The cultivation of gratitude capitulates the distressing emotions and experiences, which further leads to healthy aging and fosters resilience (Fredrickson & Levenson, 1998). Gratitude journaling has been widely used to reflect and grow spiritually and mentally (Gutman, 2020).

Emotional Resilience
Emotional resilience indicates to the ability of a person to spring/bounce back emotionally in the face of difficult and stressful situation. It is discerned to be a way of life that is interwoven with self-compassion,

self-acceptance, self-motivation, self-perception, self-efficacy and enhanced cognition. It is the individual's tendency to emotionally evolve through adversities (Marano, 2003)

Self-awareness – This fragment requires the individual to understand and accept and express emotions. It involves regulating the emotional impulses that may surface in the face of adversities. The individual must be able to reflect and hold space for traumatic or unresolved conflicts that may hinder the homeostasis of resiliency. The individual must also have insight about the various thoughts and feelings that are associated with emotions (Segal, Smith, Robinson & Shubin, 2020).
Self-management – The individual may regulate and manage their emotions by engaging into mindfulness practices. Mindfulness practice requires the individual to focus on here and now, offering compassion to self without judgments. This practice draws its roots from Buddhist psychology. It refers to shifting our preoccupation with distressing thoughts, and focusing on the emotional and physical sensations (Segal, Smith, Robinson & Shubin, 2020).
Internal locus of control – This notion involves the individual to perceive that that he/she is controlled by themselves. They have the choice to control how they feel and think about a specific situation (Scott, 2020).

Gender Difference in Resilience

Studies on the impact of resilience on genders have indicated a mixed result. Mousavi and Askari (2010) conducted a research among university students and found that females had higher levels of resilience than male students. Similar results were obtained by Edwin (2004). But, the candidature trends in Kenya revealed that males had higher levels of resilience than females. Lees reported having similar results where males had a higher score.

Studies have indicated that men and women use different coping mechanisms when faced with challenges. Males are more likely to individualistic means, and females may require social support and communal means, hence engaging in collectivistic coping (Sneed et al., 2006).

Japan, a country regularly pummelled by natural and several man-made disasters like floods, earthquake and typhoons has always strived to extend relief and bounces back in the face of challenges. In the last century, the country has endured the Great Kanto Earthquake in 1923, two nuclear bombs over Hiroshima and Nagasaki in 1945; the Kobe earthquake in 1995, and the triple shock of a tsunami, earthquake, and nuclear meltdown in the Tohoku region in 2011. The country has supremacy at technology, meteorology, infrastructure, tackling flooding, and anticipating disasters ("Japan: Pillars of Resilience", n.d.). Japan is an enduring example of demonstrating resilience during hardships. Some have discerned that adversities have bred fortitude and cultivated a cultural trait of resilience.

Positive Emotions

Positive emotions are highly valued and can expand one's thought- action repertories, and it can lead to long-term benefits in important domains such in social, physical, health, emotion and intellectual. Gratitude, Happiness, Empathy, Compassion, Joy, Pride, Hope, Awe, Inspiration, Love, Kindness, Serenity, Interest, Amusement are some of positive emotions. These emotions serve as an indicator of the overall wellbeing and happiness along with being a predictor for future growth and success.

Among the numerous health benefits of positive emotions could be a reduction in stress and a boost to general well-being, allowing you to cope more effectively and preserve your mental state (Tugade, Fredrickson, & Barrett, 2004). Practicing positive emotions can even provide an additional buffer against symptoms of depression and boasting psychological wellbeing (Kiken, Lundberg, & Frederickson, 2017) additionally, in 2006 researchers confirmed that experiencing positive emotions helps you modulate your reaction to worry and allows you to recover from the negative effects of stress more quickly (Ong, Bergeman, Bisconti, & Wallace). Experiencing positive emotions may also encourage individuals to make healthier decisions, indirectly contributing to better health. Herzenstein (2008) found that several positive emotions lead to a variety of health benefits, including increased risk- and variety-seeking and gain-focused behavior and, increased risk avoidance and loss-focused behavior.

A research conducted in 2020 by dR CLB in Singapore has shown those that who practice positive emotions over a period of time has the ability to foster resilience and improve memory which correlated with a study from Peng and Colleagues (2014), indicating that it shares a bi-directional relationship, allowing people to 'bounce back' better than others (Tugade & Frederickson, 2005).

Positive emotions can lead to enhancements and enhancements of work life, encouraged organizational citizenship behaviour as well as increasing work engagement. A study from 2013 found that positive emotions increased self-efficacy and have a positive effect on task performance, facilitating transformational leadership (Liang & Steve Chi, 2013).

Most Happy			Moderately Happy			Least Happy		
Country Name	Happiness Ranking	Fragile Index	Country Name	Happiness Ranking	Fragile Index	Country Name	Happiness Ranking	Fragile Index
Finland	1	16.2	Hungary	49	51.1	Bangladesh	92	85
Denmark	2	18.8	Thailand	50	70.9	Guinea	93	97.4
Switzerland	3	19.9	Nicaragua	51	18.4	South Africa	94	70
Iceland	4	18	Japan	52	32.2	Turkey	95	79.7
Netherlands	5	82.2	Argentina	53	50.1	Pakistan	96	90.5
Norway	6	16.6	Portugal	54	26.8	Morocco	97	58.5
Sweden	7	21.4	Honduras	55	79.4	Venezuela	98	92.6
Luxembourg	8	21.1	Croatia	56	49.8	Georgia	99	72.6
New Zealand	9	24.1	Philippines	57	82.4	Algeria	100	73.6
Austria	10	26.1	South Korea	58	32.5	Ukraine	101	69.8
Australia	11	21.8	Peru	59	71.4	Iraq	102	96.2
Israel	12	43	Bosnia and Herzegovina	60	72.9	Gabon	103	67.4
Germany	13	24.8	Moldova	61	69.9	Burkina Faso	104	87.1
Canada	14	21.7	Ecuador	62	71.2	Cambodia	105	80.6
Ireland	15	22.2	Greece	63	54.5	Mozambique	106	71.5
Costa Rica	16	42.5	Bolivia	64	74.9	Nigeria	107	96
United Kingdom	17	41.5	Mongolia	65	67	Mali	108	67.6
United States	18	44.6	Paraguay	66	66.4	Iran	109	84.5
Belgium	19	31	Montenegro	67	52.3	Uganda	110	92.9
France	20	32.5	Dominican Republic	68	64.7	Liberia	111	89.5
Bahrain	21	66.7	Belarus	69	68	Kenya	112	89.2
Malta	22	96.6	Russia	70	73.6	Tunisia	113	69.2
United Arab Emirates	23	40.3	Tajikistan	71	75.1	Lebanon	114	89
Saudi Arabia	24	69.7	Vietnam	72	63.3	Namibia	115	93.8
Spain	25	44.8	Libya	73	97	Myanmar	116	93.9
Italy	26	45.2	Malaysia	74	83.2	Jordan	117	76.8
Slovenia	27	28.2	Indonesia	75	67.6	Chad	118	105.8
Guatemala	28	79.4	China	76	68.9	Sri Lanka	119	80.5
Uruguay	29	35.9	Armenia	77	69.8	Comoros	120	82.5
Singapore	30	26.6	Nepal	78	64.3	Egypt	121	85
Brazil	31	75.8	Bulgaria	79	51.6	Ethiopia	122	99
Mexico	32	38.1	Maldives	80	56.9	Mauritania	123	36.2
Jamaica	33	61.2	Azerbaijan	81	75.1	Madagascar	124	64.5
Lithuania	34	38.7	Cameroon	82	97.2	Togo	125	85.1
Cyprus	35	57.4	Senegal	83	73.4	Zambia	126	84.9
Estonia	36	39.5	Albania	84	59	Sierra Leone	127	83.4
Panama	37	48.7	North Macedonia	85	98	India	128	77
Uzbekistan	38	72	Ghana	86	63.9	Burundi	129	97.1
Chile	39	44.1	Niger	87	77.1	Yemen	130	111.7
Poland	40	43.1	Turkmenistan	88	68.2	Tanzania	131	79.3
Kazakhstan	41	61.2	Gambia	89	80.5	Haiti	132	97.5
Romania	42	51	Benin	90	72.8	Malawi	133	79.5
Kuwait	43	52.9	Laos	91	76	Lesotho	134	77.9
Serbia	44	67.4				Botswana	135	57
El Salvador	45	71.6				Rwanda	136	85
Mauritius	46	89.1				Zimbabwe	137	99.1
Latvia	47	44				Afganistan	138	102.1

Fig 26 World's Happiest country

Source: Source: Helliwell, John F., Richard Layard, Jeffrey Sachs, and Jan-Emmanuel De Neve, 2021. Fiertz et al, 2021

For the fourth year in a row, Finland has been named as the happiest country in the world, followed by Denmark, Switzerland, Iceland and the Netherlands

The Four Quotients - Iq, Eq, Sq, And Aq

It has been conventional that people differ from one another, not only physically but also psychologically. Some maybe introverts or shy and some maybe extroverted and outgoing; some may be dominating whereas some maybe submissive. Allport and Odbert (1936) conducted a dictionary search and found 4500 adjectives in the English language that represented psychological differences in people. Each of these adjectives symbolized different personality trait, a consistent pattern of behaviour that a person possess.

The term Intelligence has been an evolving and a prime construct in the field of psychology. It denotes a complex interrelated assemblage of functions, none of which is completely or accurately known to mankind (Yerkes & Yerkes, 1929). It is not a single unitary entity, but rather a composite of several functions that denotes a combination of abilities required for survival and advancement within a particular environment (Anastasi, 1992). Intelligence can be defined as “the aggregate or global capacity of the individual to act purposefully, to think rationally, and to deal effectively with his environment” (Wechsler, 1958, p. 7). It is the ability to solve problems and to have the ability to create new products that have more value in cultural settings (Gardner, 1993). Some researchers have discerned intelligence to be a general ability, whereas other theorists have asserted that intelligence entails specific skills and talents. Some of them have considered intelligence as inherited and others perceive it to be largely influenced by the environment.

Intelligence Quotient

Researchers have outrightly established that the environment has a strong influence on the development of our cognitive abilities. Studies have pointed out that Intelligence Quotient (IQ) has increased over successive generations across the globe and has been widely studied since the 1930s. Hence, the younger generations may have a higher IQ than the older generations, with an average IQ test score increasing by 10 points per generation. This phenomenon is referred to as the Flynn Effect, coined by James Flynn (1985). It is the tendency for the average IQ scores to increase over time (Flynn, 1987).

One of the most noteworthy findings associated with the Flynn effect is – while both genders’ IQ scores have improved over time, women’s scores have significantly risen faster and have surpassed those of men. Historically, it was affirmed that women had lower levels of IQ than men; however, this notion has grown obsolete.

How to develop IQ?

i) Memory activities

Memory activities help us to enhance our language and reasoning skills. Activities like crossword puzzles, jigsaw puzzles, Sudoku, card matching games

ii) Executive control activities

It refers to the ability to control complex activities by management and regulation. Executive functioning has been strongly associated with fluid reasoning. One can develop executive control by brainteasers, pictionary, and scrabble.

iii) Visuo-spatial reasoning activities

This entails the mental processes related to physical representations. Visuo-spatial has been closely linked to the IQ of the individual. Activities that enhance this reasoning are prisms, 3-d models etc.

iv) Relational skills

The Relational Frame Theory (Hughes & Barnes-Holmes, 2016) entails the development of cognition and language through relational associations. This theory has been closely linked to numerical reasoning and verbal reasoning. This can be enhanced by learning a new language and amount comparison.

v) Musical instruments

Playing a musical instrument has been associated with various cognitive abilities. One study found that musicians had better working memory than non-musicians (Talamini, Carretti & Grassi, 2016).

Emotional Intelligence

The term "Emotional Intelligence", coined by Mayer and Salovey (1993), can be discerned as an intersection between cognition and emotion. Emotional intelligence is "the ability to perceive and express emotion, assimilate emotion in thought, understand and reason with emotion, and regulate emotion in the self and others" (Mayer, Salovey & Caruso, 2000, p. 396). It is the "set of skills hypothesized to contribute to the accurate appraisal and expression of emotion in oneself and others, the effective regulation of emotion in self and others, and the use of feelings to motivate, plan, and achieve in one's life" (Salovey & Mayer, 1990, p. 185).

Mayer, Caruso, and Salovey (2016) formulated a four-branch model of intelligence that identified four areas of abilities or skills of emotional skills – perceiving emotions, facilitating thought through emotions, understanding emotions, and managing emotions. These branches are arranged from lower order to higher order psychological processes. They have also added that abilities on the left side of the given branch emerge relatively early in life; and abilities on the right emerge later in life. The following diagram depicts the four branches of Emotional Intelligence.

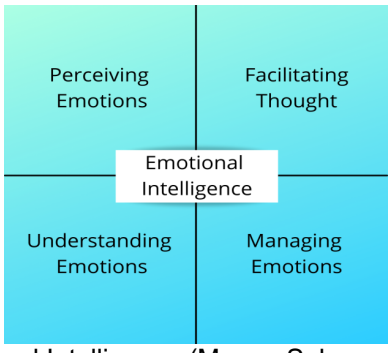


Fig. 25 – Emotional Intelligence (Mayer, Salovey & Caruso, 2016)

A study conducted in India among medical graduates revealed higher scores of EI among females (Chandra, Gayatri, & Devi, 2017).

Social Intelligence

Social intelligence is mostly learned and extrinsic in nature. Thorndike (1920) described social intelligence as "the ability to understand and manage men and women, boys and girls – to act wisely in human relations" (p. 228). Vernon (1933) elucidated social intelligence as the "ability to get along with people in general, social technique or ease in society, knowledge of social matters, susceptibility to stimuli from other members of a group, as well as insight into the temporary moods or underlying

personality traits of strangers" (p. 44). Cantor and Kihlstorm (1987) have viewed the construct from a "knowledge view" and described it as individual's fund of knowledge about the social world. This view does not classify social intelligence as a trait, rather views it as, social behaviour is intelligent that is mediated by cognitive processes of memory, perception, and reasoning. Goleman (2006) postulated two domains under social intelligence, i) Social awareness that includes the ability to perceive the emotional state, feelings and thoughts of the surrounding, and to comprehend according to the demands of complex situation. It entails primal empathy, social cognition, empathy accuracy, and attunement; ii) Social facility, or relationship management builds on social awareness that allows for smooth, and effective interactions and includes self-presentation, self-management, interaction synchrony, influence and concern for others.

How to develop social intelligence

i) Paying close attention to your surrounding
One of the important facets of SI is being mindful of your surrounding, the people who are around, the work they are doing and paying attention to social cues

ii) Enhancing emotional intelligence
Although similar to social intelligence, cultivating EI entails emotional awareness, emotional expression, and emotional regulation.

iii) Respecting cultural differences
Respecting the beliefs, values, customs, of a different culture is vital. One must also seek out cultural differences so he/she can understand them

iv) Fostering active listening
Actively listening before responding is a vital practice. The individual must first listen, understand, reflect, think of 3 possible responses, and respond to the best of them.

v) Validating your mistakes and vulnerabilities
Recognizing one's mistake, and admitting it is an important facet.

Adversity Quotient (AQ)

People from all walks of life are exposed to numerous adversities and challenges throughout their life. Adversity Quotient is defined as the person's ability to deal with the problem effectively. The term was coined by Paul G. Stoltz in his book: Adversity Quotient: Turning Obstacles into Opportunities (1997). Andriani and Fauziah (2016) elucidated adversity Quotient as, "The intelligence in his face difficulties or obstacles and the ability to survive in a variety of life's difficulties and challenges experienced" (p. 1). It is the ability of an individual to think, manage, and endure challenges in life (Utami, Hardjono, &Karyanta, 2014).

How to develop Adversity Quotient

Connors, Hickman and Smith (2004) in their book, The Oz Principle discussed a model known as the Steps to Accountability that arrays itself with the development of AQ. The model entails four steps –

i) See it
This step requires the individual to reflect upon acknowledging the need for the change, the reason for change, preparing for the change, and handling it effectively. This step includes constructive feedbacks, an insight that will enhance the behaviour required.

ii) Own it
This step entails the individual to foresee the resistances, apprehensions, challenges and failure and compassionately accept and own them. The individual in this step must cultivate positive emotions and agency. He/she must also reflect on the purpose of the change.

iii) Solve it

This step requires the individual to develop an action plan. The individual must also counter the barriers and formulate an alternative plan.

iv) Do it

This step involves the person to execute their plan and follow through. As the individual unfolds, he/she must reflect on the purpose of the change, their agency and the outcome.

Exercise with Science

Exercise Science is a discipline that studies movement and the associated functional responses and adaptations. In the past, scientists found that exercise benefits the heart, muscles, lungs, and bones. New research is now centring on how it can improves the brain, build better memory, and faster learning. Studies suggest that exercise is additionally a robust medicine for several common mental health challenges. Regular exercise can have a profoundly positive impact on depression, anxiety, and ADHD. It can also relieves stress, improves memory, helps you sleep better, and boosts your overall mood and one of the best way to prevent or delay the onset of disease such as Alzheimer's disease. People who exercise regularly tend to do so because it gives them an enormous sense of well-being. They feel more energetic throughout the day, sleep better at night, have sharper memories, and feel more relaxed and positive about themselves and their lives.

A recent study done by the Harvard T.H. Chan School of Public Health found that running for 15 minutes a day or walking for an hour reduces the risk of major depression by 26%. In addition to relieving depression symptoms, research also shows that maintaining an exercise schedule can prevent you from relapsing.

Exercise promotes all kinds of changes in the brain, including neural growth, reduced inflammation, and new activity patterns that promote feelings of calm and well-being. It also releases endorphins, powerful chemicals in your brain that energize your spirits and make you feel good. Exercise is also a good form of stress and anxiety management as it relieves tension, boosts physical and mental energy and enhances well-being through the release of endorphins.
Exercise also improve our cardiovascular health, in addition to prevent heart disease.

Meditation
Historically, in the Buddhist culture, the primary goal of meditation has been to alleviate human sufferings, promote mindfulness, and augment relaxation. Meditation, a holistic approach, is defined as “a state or skill which promotes well-being of the body, mind, and spirit through triggering measurable physiological responses” (Chan, 2014).

Since 2012, the number of people practicing meditation has tripled making meditation the second most popular mind and body practice in the United States. According to the recent statistics, **200-500 million people across the world meditate** (Rakicevic, 2021). Owing to the innumerable benefits of meditation,

children should also start meditating as early as age 7. This is primarily because the initial years of child's life "are crucial to setting up a strong foundation for relationships, learning, and mental health" (Deshpande, 2016).

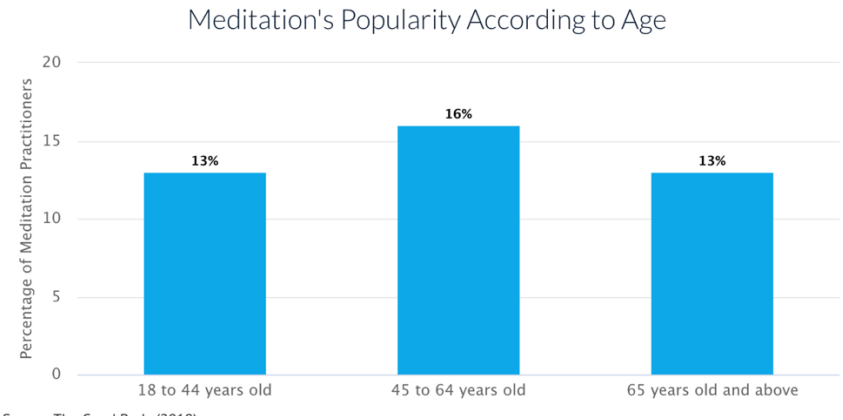


Fig. 26 – Meditation Popularity according to Age

As meditation prompts humans to go beyond the "thinking" state into a profound state of "awareness", there are thousands of studies that have been backed up with scientific evidence proving the positive effects of meditation on human health and mind. A study conducted by various researchers at the National University of Natural Sciences in Seoul, South Korea, delved into the practice of meditation and its impact on stress resilience. The researchers concluded that "meditation causes an immediate enhancement in resilience" (Kwak et al., 2019) Meditation is also found effective in controlling addiction, inhibiting aggression, controlling suicide and depression, plummeting stress and enhancing well-being and other mental health issues (Iqbal, Singh, and Aleem, 2016).

Fig. 27 – Meditation enhance wellbeing (Image courtesy: thegoodbody, 2021)

It is postulated that "meditation improves anxiety levels 60% of the time" (Rakicevic, 2021), "reduces depression relapses by 12%" ("Meditation Statistics, 2021"), and "reduces symptoms of post-traumatic stress disorder 73%" (Rakicevic, 2021).

Contrary to the popular belief that technology is deteriorating mental health, research elucidates that the popularity of meditation has seen an influx through technology as it allows and teaches people to engage in methods of meditation. The apps like Headspace, Calm, and Insight Timer allow users, especially the younger population, to fit art of meditation in their busy schedules with just one click. Therefore, meditation apps are viewed as "convenient, accessible and cost-effective way" to practice meditation (Rose, 2020). Subsequently, the market for meditation especially in the US is soaring with "generating over $100 million in revenue per year" (Zukerman, 2020).

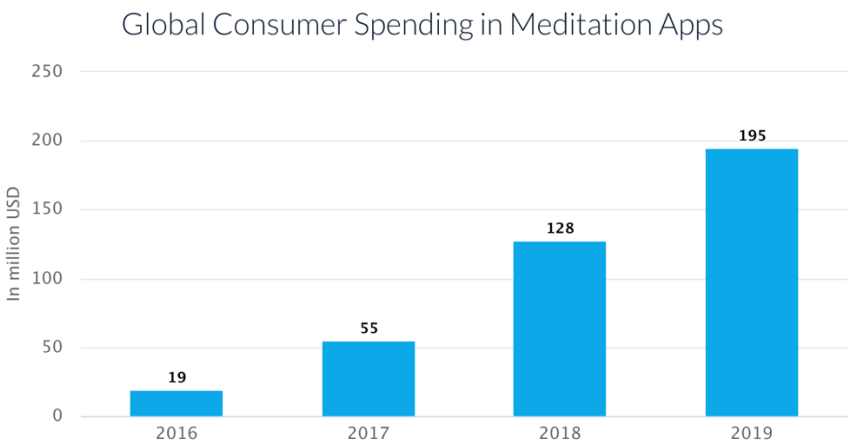


Fig. 28 – Global Consumert Spend in Meditation Apps

In 2021, "Cleanse the mind, cleanse the world" echoed by Buddhist monks in Thailand, commemorated Earth Day by lighting 330,000 candles to bring together people from all race, religion, and nationality to meditate, practice empathy, and save the planet for the future generation. It is only through meditation that one becomes consciousness of "self" and the "others".

Yoga

Over the years, yoga therapy, a practice originated from the East, has attracted attention of affluent Western nations resulting in a multibillion-dollar industry. The word 'yoga' is derived from the Sanskrit root word 'Yuj' which means 'to yoke', 'to join' or 'to unite". Therefore, it is an exercise that creates consonance between the mind and body leading "to the union of of individual consciousness with that of the Universal Consciousness" (Basavaraddi, 2015). Georg Feuerstein, praxis of yoga, defined yoga therapy as a "holistic treatment of various kinds of psychological or somatic dysfunctions ranging from back problems to emotional distress". Therefore, yoga is a specific type of therapy that focuses on building resilience, strength, flexibility, and durability of individual's mind, body, energy, and emotions. The integral elements of Yoga are breathing and posture, entailing number of movements aimed to increase flexibility and strength. According to the International Yoga Federation, approximately 300 million people across the globe practice yoga (Rakicevic, 2020). Therefore, yoga therapy is gaining momentum in the world with yoga practitioners growing exponentially. Alone in the United State, yoga participants increased from 20.4 million in 2012 to 55.05 million in 2020 (Zuckerman, 2020).

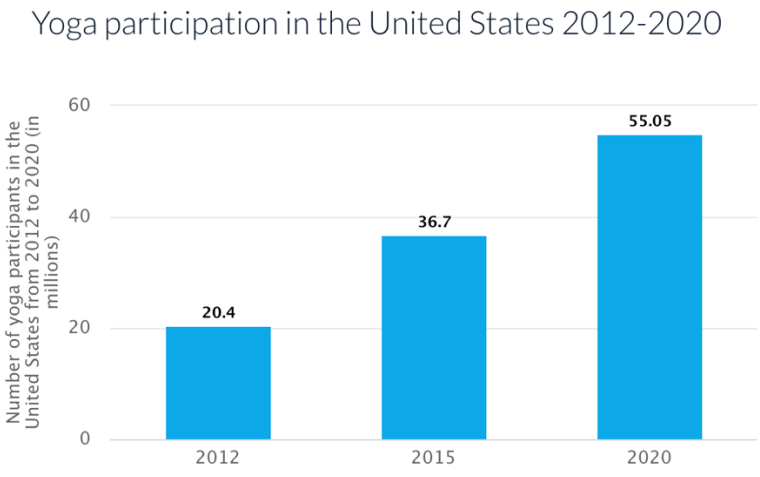


Fig. 29 – Yoga participation in the United States

By analyzing the demographic statistics on yoga, it can be reasonably inferred that the most yoga practitioners fall in the category of 'middle aged' (30-39 years old) individuals. Looking at the profile of the yoga practitioners, it is expounded that woman, individuals who consume moderate alcohol, educated individuals, and nonsmokers are more open to performing yoga therapy. Therefore, similar to meditation, various studies concluded that although the number of men practicing yoga are increasing steadily, women are still outnumbering men in this practice. This is because many men still view yoga as a "women's practice," even though the benefits for physical health and mental well-being extend to both the sexes.

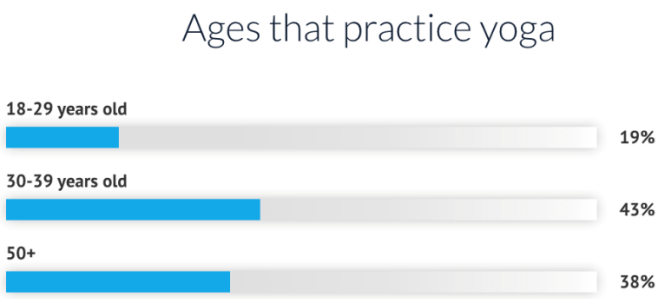


Fig. 30 – Ages that practice yoga

The increasing popularity of yoga is because of its profound psychological and physical benefits: an "increased cardiopulmonary and central nervous system (CNS) function and reduced respiration rate, blood pressure, fatigue, and symptoms of anxiety and depression" (Hartfiel, Havenhand, Khalsa, Clarke & Krayer, 2011). Moreover, yoga is said to have a positive effect on human heart as it helps in lowering blood pressure, lowering cholesterol levels, and restoring "baroreceptor sensitivity" ("Yoga – Benefits Beyond the Mat - Harvard Health", 2015). Also, yoga entails taking breaths at higher volume which results in declining respiratory rates from from 13.4 to 7.6 breaths per minute due, thereby strengthening the lungs (Dobrić, 2020). Apart from numerous physical benefits, practicing yoga reduces secretion of cortisol, relieves anxiety, fights depression, alleviates chronic pain, relieves migraines, and improves wellbeing by instilling happiness and positivity.

Thus, on the accounts of innumerable benefits, the ancient sages, philosophers, and sibyls adopted yoga as a way of life. Although the practice of yoga is 3000 BCE old, dating back to the Indus valley civilization, it has gained enormous popularity in this pandemic. For instance, yoga became the most popular topics on Instagram across the globe where "demand for yoga equipment grew by 154%" and classes saw an "increase of 25% in reservations as people joined via online classes from home" (Andre, 2021). Furthermore, yoga therapy is most practiced in its birthplace India with the rest of the world increasingly catching up to reap the benefits of this ancient practice. In China, yoga is "the third most popular sport amongst Chinese millionaires" (Hurun Chinese Luxury Consumer Survey, 2021). Similarly, in the UK, the "market size of yoga industry is worth £926 million" (IBISWorld, 2020). On the social media, France saw a massive spike in influencer accounts within the yoga space; "more high scores in the growth dynamic of yoga Instagram influencers were Spain (221%), Australia (127%), and Italy (110%)" (Andre, 2021). Additionally, "countries with only double-digit growth on yoga influencer dynamics were Germany at 58% and the US at 50% "(Andre, 2021). Thus, yoga has become a worldwide phenomenon with millions of celebrating international yoga day on 21st June.

Nature / Ecotherapy

Nature therapy also known as ecotherapy, is the practice of being in nature and green to boost mental and health wellbeing. This therapy is based on the principle of ecopsychology, it looks at how we feel interconnected with the earth (Lockett, 2019). Nature therapy improve the mental wellbeing of a person and improve the physical functions of the body as well. It improved sleep and reduced cortisol levels. It helps one clear their mind and focus on the present, helps calm the influx of emotions, and balance the emotions a person is experiencing that helps re-charge the energy of a person.

A study conducted by a mental health organization, Mind, indicated that 71% of the participants reported having reduced symptoms of depression compared to the one's who took a walk in a shopping centre (2007). Ecotherapy not only enhances our well-being but also has a sensorial impact on human. In a recent study, participants recovered from stress faster when they were exposed to nature sounds (tweeting birds) than when they were exposed to traffic noise (Alvarsson, Wiens, & Nilsson, 2010). Another study found that food and fruit fragrances inhaled by hospital patients had reduced their depressive symptoms. Surprisingly, researchers have also discerned that not only being in nature, but looking at pictures has also enhanced well-being, job satisfaction, life satisfaction, and reduced anxiety (Ulrich, 1979; Kaplan, 1993).

Some examples of nature therapy includes forest bathing, horticultural therapy, grounding / earthing. Activities includes walking barefoot on grass or mud, allowing the skin to touch the ground and help reconnect with the earth; laying down on the grass or mud or sand, submerging in water in a lake or river to connect with nature; doing breathing exercises, visualization a calm place while closing your eyes and feeling the energy reach the heart and relaxing the nerves.

Though limited resources are available in this domain, yet the reports have shown that nature therapy help to improve the mental state and physical health of a person; lower the effects of chronic fatigue (Chevalier, Patel, Weiss, Chopra, & Mills, 2019), help relieve back pain (Chevalier, Brown, & Hill, 2015) and lower the effects of anxiety and depression can improve mood and help with sleep disorders (Chevalier, 2015).

Tai Chi

Tai Chi (also written as Taijiquan) is an ancient Chinese form of exercise, has traditionally been practiced for multiple purposes, including self-defense, mindful nurturing of well-being, and fitness enhancement. The foundation of Tai Ji has deep roots in ancient Chinese philosophies of Confucianism and Taoism, which have been embraced in various cultural practices such as traditional Chinese medicine.

The blending of focused physical activity with breathing exercises in Tai Ji has long been thought to nurture the full integration of body, mind, ethics, and behavior. The deliberately executed movements that are slow, continuous, and flowing, results in calmness, release of stress and tension, and heightened awareness of the body in relation to its environment. Practice of Tai Ji is also believed to improve the function of the nervous, cardiovascular, respiratory, and musculoskeletal systems, thus enhancing physical fitness, preventing chronic disease, improving overall quality of life, and increasing longevity.

A recent review of the literature suggests that practising Tai Ji can have a positive effect on brain and cognition, reduced risk of developing dementia.. It is also suggested to be effective in dealing with negative emotions and psychological disorders such as depression, anxiety, hostility, and delusion.

Art Therapy

The term ‘art therapy’ was composed by Adrian Hill, British artists who came across the healing benefits of drawing, coloring, and painting while fighting tuberculosis. Art therapy is a creative way to manage psychological issues; improve mental wellbeing through different techniques such as coloring, painting, collaging, drawing and sculpting, etc. Experts have observed that patients often express themselves through art which has eventually led to viewing art as a form of therapeutic healing. Moreover, viewing art or creating art is linked with assisting people to understand their emotions, cope with stress, work on their social skills, enhance self-esteem, and explore the themes that affect their emotions.

This type of therapy focuses on improving mental health and targets the mind of the person. Art therapy is applied on children, adults, and old age people for treating anxiety, depression, emotional trauma, abuse, and improving social skills.

- It is beneficial as studies have shown that in adult trauma patients, art therapy was able to decrease symptoms of depression and helped cope with trauma (Regev & Cohen-Yatziv, 2018).
- Another study demonstrated how old-aged people were able to boost self-esteem and reduce the effects of depression through art therapy (Ching-Teng, Ya-Ping, & Yu-Chia, 2019).
- Art therapy has a positive impact on children with special needs as it is a form of the way for them to express their emotions and thoughts (Cohen-Yatziv & Regev, 2019).
- Art therapy has reduced severe anxiety in women aged 18-65 by improving their self- value (Abbing, De Sonneville, Baars, Bourne, & Swaab, 2019).

In US art therapy is commonly used, with 5000 art therapist registered with American Art Therapy Association , 90% of the female are art therapists and 10% male are art therapists (Art therapist demographics in the United States, 2017). Whereas in UK, there are 1600 art therapists registered with British Association of Art Therapists (Job guide - Art therapist).

Successful art therapy courses are:-

- Client-Therapist Relationships
- Art Based Clinical Assessment
- Working With Children
- Group Counselling
- Process and Theory
- Methodologies
- Group Dynamics

Music Therapy

Music therapy, a form of expressive arts therapy that employs music to improve and maintain an individual's physical, psychological, and social well-being –
E. Thayer Gaston, also known as the father of music therapy.

Music therapy improves self-expression and communication (Levy, Jillian, 2017), aid in relaxation and pleasure (Koelsch et al., 2009) and help to reduce anxiety. Listening to music can lead to the production and release of dopamine, a hormone that makes individuals feel good, as well as endorphins, which are chemicals that can generate a joyful mood. (Erkkilä, Jaakko et al., 2018), and lowers cortisol levels,

which is a stress hormone. (Novotney, Amy, 2013). Researchers also discovered that listening to and playing music boosts the body's production of the antibody immunoglobulin A as well as natural killer cells — the cells that target invading viruses and improve the immune system's efficiency.

Music therapy is a useful and underrated non-pharmacological support technique for individuals suffering from a variety of psychiatric illnesses. (Witusik, Andrzej et al., 2019) Music therapy has been shown to be beneficial in treating mood problems associated with neurological diseases such as Parkinson's disease, dementia, stroke, and multiple sclerosis. (Ragilo, Alfredo et al., 2015). Music has been shown to boost mood, increase intellect, improve learning and attention, and slow the effects of brain ageing. Music therapy can assist with a variety of emotional and cognitive problems, as well as enhance the quality of life in Alzheimer's patients. (Deane, Alban, n.d).

Music therapy has grown significantly as a results of its positive impact on babies in neonatal medical care like wise as people with Alzheimer's disease, PTSD, depression, misuse, pain, autism spectrum disorders, dementia, and other life challenges.

Animal-Assisted Therapy

Animal-assisted therapy (AAT) involves caring for or spending time with an animal during a goal-oriented therapy session (Arathi Kannan, 2019) and used as an adjunct therapy along with traditional therapy. The history of animal assisted therapy dates back to 600 BC. The greeks were the first in the world to notice that presence of horses uplifted the mood of seriously ill patients. Florence Nightingale in the 1800’s continued the interest in AAT when she observed that small pets seemed to reduce anxiety in her psychiatric patients and this sparked an upswing with regard to formal studies surrounding animal therapy. During the 1960s, research involving animal therapy began in earnest.

Animal Assisted Therapy can be used for various mental health concerns like children with ADHD, Post Traumatic Stress Disorder and Autism Spectrum Disorder. Therapy dogs are also known as “comfort dogs”. Research indicates that remarkable improvements were noted in pain levels and irritation following therapy with pets and patients with brain injury showed increased amount of social interaction post AAT. AAT also helped reducing pain induced insomnia. AAT is common in most developed countries such as the United States, Australia and Singapore.

Part 4: Harnessing Technology

Spurring Technology: Genetic Engineering And Genome Editing

Technological innovations in medicine coupled with broader strategic objectives linked the use of advanced medical techniques and associated tools to be used not only for civilian benefits but also to facilitate the militaries to achieve leverage over their respective adversaries. Science and technology, while being an enabling component, has become a double-edged sword: it is being used to decrease or minimize physical and mental illnesses on one hand whereas on the other hand, militaries are employing such tools to develop cyborgs, super-humans and enhanced soldiers to dominate war cycles. In this regard, concepts such as genetic engineering and genome editing have become visible in the last two decades. To examine how the fourth industrial revolution and cyberspace's use are creating effects on mental, and at times physical, health, it is pertinent to understand what the aforementioned concepts are.

Genetic Engineering

Genetic engineering finds its roots back in the 1970s when it was first used to introduce and describe the then developing discipline of recombinant DNA (rDNA) technology. At that time, rDNA was used to clone DNA's small pieces, experiments on bacteria and so on and so forth. In the contemporary sci-tech and medical environment, the field has matured to an extent that whole genomes are being cloned, transferred among different cells and introducing variations at cellular level (Bodine, 2021). Genetic engineering is a process of modifying the natural DNA sequences in genomes by using various approaches of molecular biology technology and employing advanced tools (Lanigan et al., 2020). It can also be explained as the alteration of genome (genetic blueprint) of an individual by knock-ins (insertion of DNA sequence), knock-outs (deleting DNA sequence) or modifying (replacing DNA sequence with exogenous sequence) (Lanigan et al., 2020) the existing genetic structure to attain a set-criteria of properties in an individual. If any organism goes through genetic organism, it is termed as genetically modified organism (GMOs) (Shaltami, 2020).

Genome Editing

Genetic engineering is based on different genome editing, also known as gene editing, technologies where the aforementioned processes are conducted. This makes genome editing part of the genetic engineering process. Different methods have been developed and their respective applications have been tried and tested. Genome editing enables modification of DNA to get specific outcomes such as eye color, enhanced physical traits, and decreased disease risk. The process ensured two outcomes simultaneously: (i) increased efficiency of the gene editing and (ii) containing off-target effects. Research on gene editing started in the 1980s (Harrison & Hart, 2017) but it was not until 2009 when CRISPR-Cas9/guideRNA was developed, revolutionizing the genome editing patterns (*What Is Genome Editing?*, 2019). The United States (U.S.) Department of Defence (DOD)'s Defense Advanced Research Projects Agency (DARPA) established a project namely *Human Genome Project* to map and structure human genome. It was aimed at engineering human cells to become capable of manufacturing nutrients and producing energy in the human body. The underlying driving factors behind the genome writing pilot project was to combat food shortages, malnutrition and biosynthesis of medicines.

However, DARPA had broader strategic objectives in essence of creating “self-sustaining soldiers” consuming a set-amount of edibles (Shah, 2019).

CRISPR-*Cas* Gene Editing Technology

Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR)-*Cas* has become one of the most reliable, efficient, powerful and relatively cheaper genetic tools as compared to others of its category being utilized for genetic engineering. CRISPR-*Cas* evolved as a multidisciplinary tool notably used in fields including microbiology, agriculture and above all human biology. By using CRISPR-*Cas*, in 2017 at the Oregon Health and Science University, scientists cured 36 embryos from hypertrophic cardiomyopathy (HCM) and 13 embryos were partially mutated free of the disease. The chances of HCM in the latter ones dropped to 50%. HCM involves a heart condition where stiffness of heart tissues causes severe pain and sudden cardiac arrest. According to estimates, it affects 1 out of 500 people across the globe (Tangermann, 2018).

Innovations in technology have not only increased the efficacy of gene editing tools but have widened their scope up to the level of curing deadly diseases – be they hereditary or congenital. During the last decade, CRISPR-*Cas* has been used to cure HIV by experimentation. In 2017, a successful experiment by Chinese researchers highlighted that resistance against HIV can be increased through replication of mutated genes. It prevents viruses from entering new cells. The experiment was carried out on mice to gauge its workable results in humans. It has been outlined that humans naturally have a small percentage of HIV resistance which can be boosted through CRISPR-*Cas* (Tangermann, 2018).

Recently, CRISPR-*Cas* has shown phenomenal results in curing established tumors in humans. Researchers have used CRISPR-*Cas* as a tool to cure Human PapillomaVirus (HPV) which causes tumor growth resulting in cervical cancer. Through specific on-target gene editing of HPV E6 and E7 proteins coupled with PEGylated liposomes eliminates the virus and cancerous cells (Jubair et al., 2019).

Weaponization through Genetic Engineering

Genetically engineered biological pathogens have been used in the past as part of warfare. Many countries developed covert biological and chemical weapons programs to have strategic leverage over adversaries. Anthrax spores terror campaigns conducted through the U.S. Postal Service in 2001 resulted in the death of five people due to inhalation whereas some other forms of disease developed in 18 others. “Anthrax anxiety” accounted for a broadened scope of prophylaxis measures: over 50,000 people took antibiotics and many others purchased it as preventive action (Ainscough, 2002).

In virtue of its applications, genetic engineering has enabled countries to develop stealth viruses. Stealth virus is a “cryptic viral infection” which, after secretly entering, remains dormant in human cells and is activated by an external stimulus to cause infections or diseases. Stealth viruses can be used to covertly infect targeted populations or can be used as a potential blackmail in the backdrop of threat of activation. In this regard, oncogenes can be the most crucial components: if activated, through bio-regulators, they can result in cancer by distorting the cellular growth and adversely affecting structural composition of the DNA (Ainscough, 2002).

Adoption of genetic technology in the military revolutionized military affairs in the past. In the contemporary landscape, using CRISPR technology continues to transform warfare as a concept. Using CRISPR to cure diseases is one part of the story whereas human enhancement denotes the other part. Advanced militaries are using it to enhance performance of their soldiers by various processes including

preventing muscle breakdown which enables soldiers to run faster and have minimal exhaustion effects. In addition, the United States (U.S.) Defence Advanced Research Projects Agency (DARPA) is using these tools to reduce emotional vulnerabilities of the soldiers making Post-Traumatic Stress Syndrome (PTSD) less effective on them. These developments point towards the development of super soldiers who would serve as "efficient killing machines" with superior strength, regulated emotions and higher levels of resolve (Shah, 2019).

With the induction of WARP-10 LED Device in the U.S. military, the injured soldiers were able to speed up the healing time of wounds. The high intensity therapeutic photon energy emitted by the device ably healed any injury (Crane, 2004). After this development, DARPA started a project to develop artificially-enhanced "pain vaccines" to cut the inflammatory, swelling and pain-toll on the soldiers. In this regard, to further miniaturize WARP devices, a program is focused on developing microscopic magnets to limit and stop bleeding of wounds as they would be injected inside the capillaries (Singer, 2008).

DARPA has also developed self-healing and injuries' prevention programs among soldiers. Under its *Safe Genes* platform, DARPA is using CRISPR technologies to protect its armed forces from misuse of genome editing, be it intentional or accidental. Moreover, the program aims to enhance the soldiers via gene editors and inhibit "unwanted genome-editing activity." The U.S. military has also laid the foundation, under DARPA, of its *Metabolically Dominant Soldier Program* (Shah, 2019). Peter Singer, Director of the 21st Century Defence Initiative, at Brookings Institutions highlighted that through this program, the U.S. military is conducting research, finding solutions and ways to meld biology and technology in order to build a cyborg. This would result in development of a man-machine combination to ouster limitations of the human body when it comes to operationalization of the soldier (Singer, 2008).

Nanotechnology – An Enabling Scientific Component

Working in entirety, science and technology have amalgamated redefining each other's scope and application of research and operations. Although technologically-dependent cyberspace is a relatively newer domain in terms of global availability and acceptance. However, nanotechnology dates back to the last quarter of 20th century when it was coined as a distinct area and terminology. Nanotechnology matured as one of the primary drivers of science and technology and was employed for a multidisciplinary fusion in order to conduct research and development for the betterment of human beings. Advancements in nanotechnology reconfigured the standard operation procedures in many fields notably medicine, agriculture, electronics, and even military. To understand how nanotechnology continues to facilitate humans, it is imperative to first have a clarity about what the terminology denotes. This section is divided further into four parts: (i) Defining Nanotechnology; (ii) Use of Nanotechnology in Civilian Domain; and (iii) Military use of Nanotechnology.

What is Nanotechnology?

With its development starting in and around 1958 (Nikalje, 2015) followed by introduction of the concept of nano technology in 1959 by Richerd Feyman, the term nanotechnology was first used in 1974 by Norio Taniguchi (Madushika, 2018). Various scholarly definitions of the term are present where majority uses scale as a reference point to explain it. However, the European scientific society, uses theoretical definitions for it. According to the U.S National Nanotech Initiative (NIN), nanotechnology denotes study and control of matter at subatomic level particularly between 1 and 100 nanometers. It includes processes such as modelling, imaging, measuring and manipulating matter (Nanotechnology - Definition and Introduction, 2021). The European Science Foundation defines nanotechnology as the use of molecular tools and knowledge to employ science and technology for an array of fields. In the

field of medicine, nanotechnology is defined as the use of science and technology to diagnose, treat and prevent diseases along with healing humans from pain and injuries by exploiting chemical, biological and physical materials at nano-metric scale (Boisseau & Loubaton, 2011).

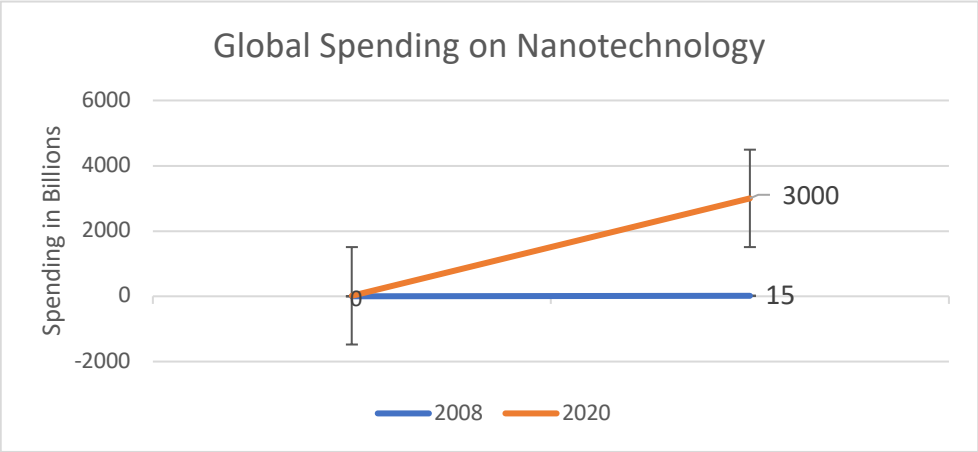


Fig. 31 – Global Spending on Nanotechnology (Source: (Duncan, 2011), GFCyber's Generated Chart)

Before starting with arguments on how nanotechnology has and continues to facilitate humans, discussion on why it is important will serve as a preamble for a holistic understanding. Nanotechnology has helped in the advancement of industrial processes, improving research and application of materials, dissection of various diseases and tapping potential of many products by upscaling them via quantum and surface phenomenon (Nanotechnology - Definition and Introduction, 2021).

Moreover, nanotechnology is applied in every sphere of human life such as electronics, defense and security, energy storage, textile, biotechnology, agriculture, metallurgy and materials, drugs delivery, and many more. Owing to the numerous applications of nanotechnology, the global investment in nanotechnology has been increasing profoundly. The histogram below shows the market value (in US dollars) of nanotechnology worldwide from 2010 to 2020.

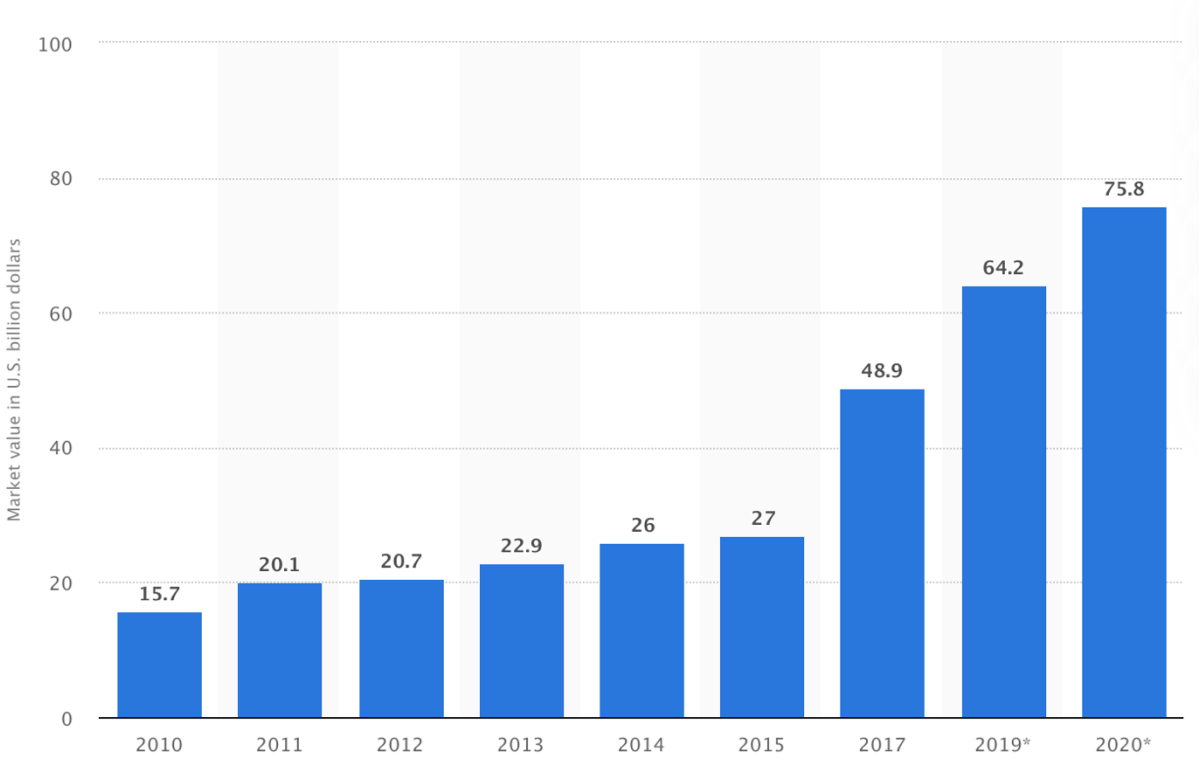


Fig.32 – Market Value (Source: Garside, 2020)

Nanomedicine: Coupling Nanoscience with Medicine

Since its use in medical field, nanotechnology enabled advancements to monitor, control, and repair and improve not only the working of biological systems at molecular level through nanostructures, implanted devices, regenerative medicines etc. but has also reverse engineered many diseases producing spot-on prognosis (Boisseau & Loubaton, 2011). By increasing the efficiency of treatments and prompt detection through devices, nanotechnology has increased patient's quality of life. By combining nano-biosensors or nano devices with medical expertise, medical science has advanced to a great extent (Madushika, 2018). Pacemaker is one of the most widely acknowledged nanotechnology which revolutionized cardiac disorders. Nanotechnology was used to develop "implantable electrical cardiac devices" working on principles of automatic internal defibrillation (ICD) which enabled the prevention of sudden arrhythmic death. It is helps in cardiac resynchronization (CRT) for patients with potential of failing hearts. Miniaturized pacemakers have also bypassed the surgical methods to install traditional pacemakers as they can be implanted through trans-venous route (Daubert et al., 2014). Latest technology has also replaced old pacemakers powered by batteries that needed to be replaced. Today, bio-inspired ultra-energy efficient and solar-powered cardiac pacemakers are being used in the field of medicine. The bio-inspired pacemakers make use of body movement, temperature, blood flow and heart contraction to generate the required energy (Lu et al., 2019).

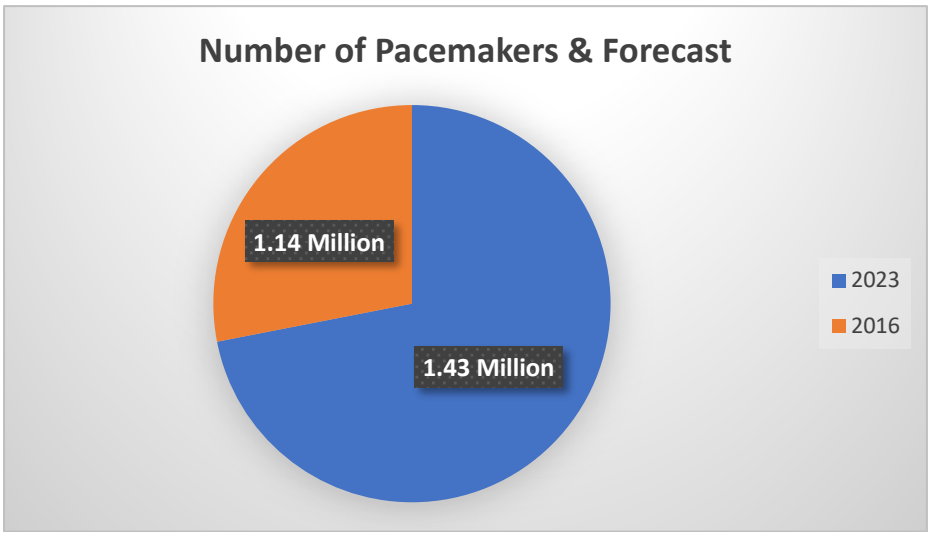


Fig. 33 – Number of Pacemakers & forecast Source: Statistica.com

Nanotech and 5G

The fifth-generation wireless communication network is the newest iteration of cellular technology which provides high bandwidth and unprecedented features. It is noted that “data transmitted” with 5G “can travel at multigigabits speeds, with potential peak speeds as high as 20 gigabits per second.” (Gillis, 2020). This 5G wireless communication entails “antennas with a greater capacity, wider wireless spectrum utilization, high gain, and steer ability due to the cramped spectrum utilization in the previous generation.” (Hao et al., 2020). Moreover, 5G technology uses the flat IP concept which utilizes nanotechnology “as a defensive tool for security concern that arises due to the flat IP.” (Mohamed & Babiker A/Nabi Mustafa, 2016). Therefore, as nanotechnology is considered as the next industrial revolution, it will reform the telecommunications industry with rising opportunities for the entire mankind.

The fifth generation technologies and equipment are primarily associated with nanotechnology. For example, the mobile devices being developed draw support of nanotechnology at the core. Embedded with intelligent platforms, mobile devices have miniaturized sensors, advanced computing and communication chipsets enabling them to act as smart machines with applications in multiple sectors including medicine, transportation, security etc. Moreover, the devices are to have constant link to communication channels for which Digital Signal Processors (DSPs), as an application of nanotechnology, are being used to enhance system capacity and speed of the devices to ensure high speeds and reliability (Iano et al., 2015). Hence, nanotechnologies act as one of the core components to ensure working of 5G communication channels as well as the devices supporting these features.

Commercial Use of Nanotechnology

Nanotechnology is being extensively used to carry out commercial activities. It is being used in various sets including: (i) agriculture industry to make pesticides, vaccines, pathogen detection etc.; (ii) food processing – to improve quality or texture of food, odour enhancing; (iii) food packaging in the form of impermeable polymer films, gas sensors, UV-protection and (iv) nutrient supplements. Out of this packaging has been one of the primary area of using nanotechnology. In 2008, the global market for nano-led food and beverage packaging rounded up at $4.13 billion and grew to $7.3 billion by 2014 with an annual growth rate recorded at 11.65% (Duncan, 2011).

In the textile industry, applications of nanotechnology have become important because of high durability and long-lasting effects. Coating the fabrics with nano-particles also did not affect their hand feel. Coating is one of the methods being carried out through nanotechnology enhancing properties of the

fabric including soil resistance, water repellence, anti-bacteria, wrinkle resistance, UV-protection, flame retardation etc. On part of adding antibacterial properties, metallic ions and compounds are used: nano-sized silver (3, 5, 16-18), titanium dioxide (9, 10, 19) and zinc oxide (12) are employed to activate oxygen in the air through catalysis and dissolve organic substance to create sterilizing effects. Nano-particles are increase the per unit area of particles thereby enhancing the antibacterial effects (Wong et al., 2006).

Effects of global warming have accelerated the growth of many diseases especially at the micro and cellular level. Treating a fabric with nano-TiO2 (titanium-dioxide) results in a photo-catalytic activity which in turn increases the effectiveness of fabric against bacteria and discoloration of stains. ZnO (zinc-oxide) also acts in similar ways to conduct photo-catalysis with the only difference being of band gap. For ZnO it stands at 3.37eV and for TiO2 it is 3.2eV (Wong et al., 2006).

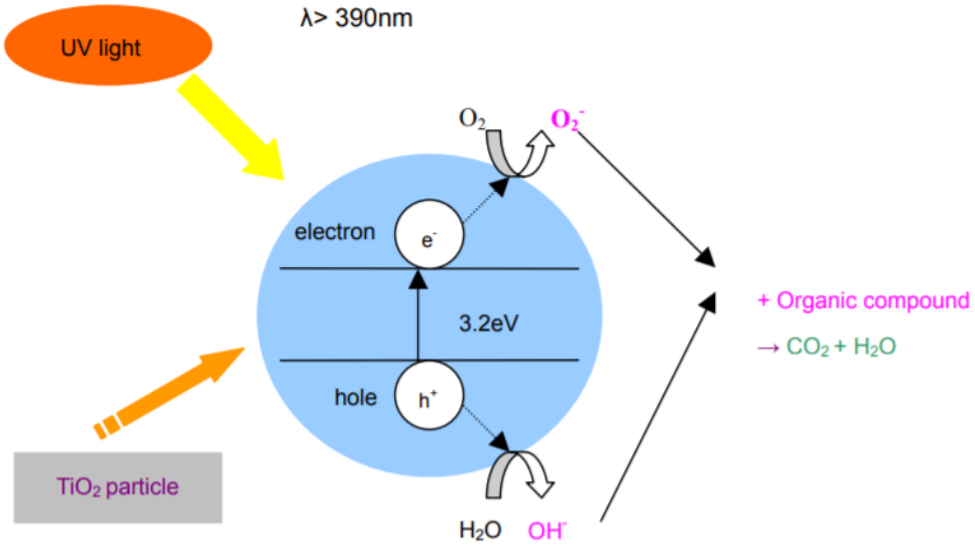


Fig. 34 - Photo-catalysis mechanism of titanium dioxide; Source: (Wong et al., 2006)

Given its flexible nature, nanotechnology is also used for research and development and to enhance performance in various discipline. For example, nanotechnology is being used commercially in the field of bioanalysis. By using silicon-based needle of atomic sharpness, scanning probe microscopy (SPM) helps in imaging the topography of surfaces at atomic and sub-atomic level with pinpoint precision. In addition to its use for analytical research, SPM is being used for automated read-write capabilities (Mazzola, 2003). Metal-based and carbon-based nanomaterials are being used to increase yield and development of crops based on their absorption, accumulation and translocation effects. They facilitate morphological processes enabling the enhancement of germination percentage, increase of root and shoot's length and many other similar positive effects. Similarly, nano-fertilizers have replaced traditional fertilizers as they are more efficient. Nano-fertilizers increase crop production level, have ultrahigh absorption rate, expansive for leaves' surface area, reduce soil toxicity and frequency of fertilizer application (Singh, 2017).

Military Nanotechnology

First and foremost, contemporary militaries are primarily driven by technological equipment and weapons. The command and control structures, C2 to C5ISR, are all powered by nanotechnology in the form of super-processors, miniaturized sensors, transmitters and other associated devices. Nano-

robots are yet another use of nanotechnology in the military domain where these robots are employed for maintenance of fighter-jets (Kharat et al., 2006). Black Hornet Nano Drone is being used in battlefield for intelligence, surveillance and reconnaissance (ISR). Black Hornet acts as an airborne personal reconnaissance system (PRS) for soldiers and has been termed as lifesaving and game-changing equipment. The pocket-sized drone can fly for 25 minutes and enables the user with live video and HD images giving beyond visual range (BVR) capabilities to troops on-ground (*Black Hornet PRS Airborne Personal Reconnaissance System (PRS)* | *Teledyne FLIR*, 2021).

The enhancement of carbon nanotubes to withstand over 800 tons with only 1cm material was one of the groundbreaking developments carried out by China in 2018. The nanotechnology is being used in aerospace and armor-boosting applications (Editors, 2020). Countries like the United States (U.S.), India, and Japan etc. have also used nanotechnology to develop next-gen military uniforms. The U.S.' Institute for Soldier Nanotechnologies (ISN) partnered with MIT to make such suits. Seven teams worked on the project and came up with different ideas for the body-suit having characteristics like "energy-absorbing material protecting from blasts or ammunition shocks, engineered sensors to detect chemicals and toxins, as well as built-in nano-devices to identify personal medical issues such as hemorrhages and fractures" (Editors, 2020).

The U.S. Army Research Laboratory in collaboration with the Center for Nanoscale Materials at Argonne National Laboratory have enhanced the explosive power of conventional munitions by developing a new-type of "ultrafine plasma-treated aluminum nanoparticles." The experiments were aimed at increasing the disruptive power of traditional weapon systems (McMillan, 2021).

Bionics

The term 'bionics' is coined by physician Jack E. Steele in 1968 in the US TV show, The Six Million Dollar Man and Bionic Woman, who defined it as "the science of systems whose foundation is based on living systems, or which have characteristics of living systems, or which resemble these" (Roth, 1983). Therefore, bionics allude to electronic or mechatronic parts that enhance or mend motor functions of a differently-abled person. These implants mimic the function of the non-functional or a lost body part. Moreover, in 2016, the Global Medical Bionics Market touched around $16,000 million, and is expected to reach approximately $30,000 million by 2023, registering a CAGR of 9.6% during the forecast period (Tatkare, 2017).

An important distinction that needs to be kept in mind is the difference between prosthetic and bionics. While bionic refers to the technique of replacing a body part, especially limb, by a synthetic body part or limb which are automatically and electronically powered, prosthetic alludes to an artificial device which replaces missing body parts or limbs. The market for bionics has increased recently due to an increased funding for research and development at governmental level. It is evident from the image below, which depicts the bionic growth market, that the developed countries are the ones mastering in the technology of bionics. Therefore, the bionics industry has grown along with four major application areas: vision, hearing, orthopedics, and a small, motley group of implants that augment cardiac and neurological functions (*Bionics*, 2017).

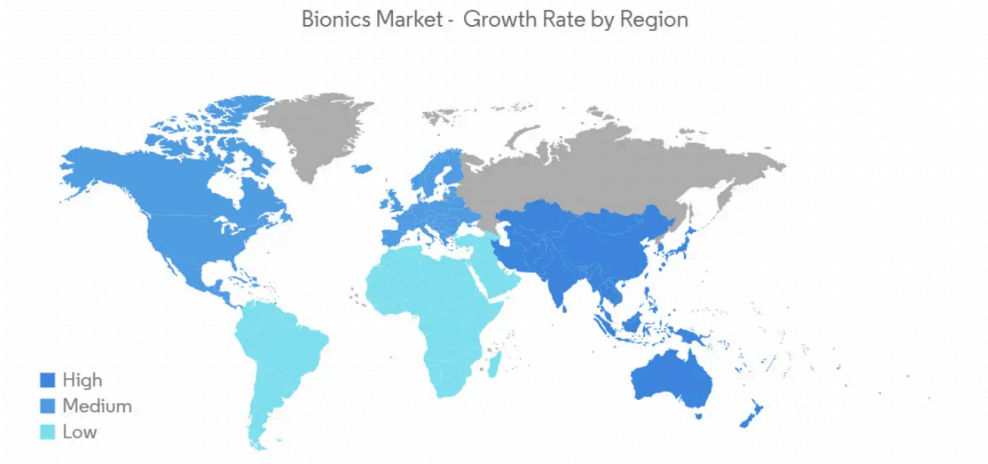


Fig. 35 - (Source: "Bionics Market Share, Forecast| Industry Report, 2026 – Mordor Intelligence", 2021)

Visual Bionics

Approximately 2.2 billion people suffer from visual impairment across the globe (*Vision Impairment and Blindness*, 2021). However, recent technological developments show promising result in helping people gain their visual senses. Subsequently, this amalgamation of science and technology resulted in the concept of vision bionic or visual prosthetics. These "bionic eye—or visual neuro-prosthesis, as vision bionics are sometimes called—are bio-electronic implants that restore functional vision to people suffering from partial or total blindness" (*Bionics*, 2017). The primary idea behind vision bionic is the "stimulation of the residual healthy photoreceptor cells, which makes them produce visual impulses, allowing the blind patient to see patterns of light, and thus improving their awareness of external objects and surroundings" (*Bionic Eyes - How Advancements in Vision Technology Can Help Us See Better*, 2020). A recently published report by FIOR Markets forecasted that that global bionic-eye market would grow from $193.25 million as of 2019 to $502.93 million by 2027. The growth rate would be 12.70%, at CAGR, during the aforementioned predicted timeframe (*Bionic Ear Market by Device Type, End-User, Region, Global Industry Analysis, Market Size, Share, Growth, Trends, and Forecast 2020 to 2027 - Fior Markets*, 2020).

A study carried out by Serge Picaud at the Institute of Vision, France pioneering in conducting research on and understanding the molecular and cellular mechanisms through the retinal the retinal prosthesis and opto-genetic therapies of our vision highlighted that the human eye needs at least 600 pixels to detect face (Scudellari, 2021). Experimenting on this mechanism, Picaud and his team are currently performing trials where they are now investigating devices that can stimulate the eye to at least 625 pixels, which would allow some facial recognition. To achieve 625 pixels, Picaud's team has moved into investigating optogenetic therapy, in which a gene is introduced to cells in the back of the eye to make them become photosensitive. The institute is also developing new therapies for preventing retinal diseases (Scudellari, 2021).

Moreover, the concept of 3D Electrochemical Eye (EC-Eye) is being tested which has the potential to surpass the human eye in means of image resolution. With this technology, an artificial retina is being built with a set of sensors replicating the real retina. This would replace the use of cameras to capture images and employment of additional devices to translate them into light signals (*Bionic Eyes - How Advancements in Vision Technology Can Help Us See Better*, 2020). These are few of the examples to quote when it comes to the use of nanotechnology and associated advancements to improve visual bionics for the well-being of humans.

Orthopaedic Bionics

According to WHO statistics, around one billion people - making it 15% of the world population - live with disabilities which hinders their ability to perform daily tasks (Disability and Health, 2020). The purpose of orthopedic bionics is to restore motor functionality by replacing prosthetic limbs with bionic limbs. The primary difference between bionic limb and prosthetic limb is based on the component of controlling the limb; the bionic gives more control and movement while prosthetic limbs provide little to no functionality and are used as aesthetics to cover/conceal the disability. For instance, in 2013, a ground breaking development occurred in the field of bionics when biomedical engineers, surgeons, and neuroscientists developed a prosthetic limb for a man named Zac Vawter. This novice robotic limb was “programmed to follow Vawter’s commands” reducing the number of errors and un-natural movements by 44% (Smith, 2013). Therefore, modern bionic leg enables the user to carry out full-range of ambulatory movements by developing its connection with the brain – and neural network – of the person using it (Smith, 2013).

Auditory Bionics

Auditory bionics are devices used by individuals suffering from total or partial hearing loss. It “creates an artificial link between the source of sound and the brain with a microelectronic array implanted either in the cochlea or the brain stem.” (Bionics, 2017). The bionic ear device has two parts: an external sound processor and receiver-stimulator. As the auditory bionics convert digital code into electric pulses, it is a far more technological advance than other types of bionics. Moreover, the global market demand for auditory bionics is “expected to grow from USD 14.93 billion in 2019 and to reach USD 26.88 billion by 2027, growing at a CAGR of 7.63%during the forecast period 2020-2027.” (Bionic Ear Market by Device Type, End-User, Region, Global Industry Analysis, Market Size, Share, Growth, Trends, and Forecast 2020 to 2027 - Fior Markets, 2020).

Part 5: Call for Actions

TECHNOLOGY

1. Technology continues to become an integral part of human life with its widening scope and areas of application. However, its availability to public in various domains remains debatable. For example, CRISP technology is one of the most advanced medical tool that can cure an array of diseases. Unfortunately, it is expensive and is limited in terms of availability.
2. Technological innovations are facilitating rather revolutionizing processes from unit to strategic level. From automated needles to landing on moon, humans have made remarkable progress to serve humanity. But, a darker side to the use of technology also persists whereby countries are militarizing rather weaponizing technology is all formats.

a. In the 21st century, most of the wars, conflicts or skirmishes were carried out in a technologically-enabled environment. The use of drones, electronic warfare, robotic sentinels etc. all have added up into the death toll worldwide.

b. The argument does not follow whether its correct to use this technology or not rather it highlights that the collateral damage of carpet bombing through drones, killings of civilians by robotic sentinel is fairly high. This raises a question on the efficiency of these machines.

3. Regional bodies must be established to direct and afterwards regulate countries to develop dedicated institutions for scientific and technological research and development. The scope of operations is specified as regional countries share common interests and face similar challenges for which they can gather together.

a. The institutions should be centralized and a global working theme must be developed for 3-5 years for groundbreaking discoveries, inventions and literature development.

b. Alongside, a regional resource pool must be developed to generate revenues for R&D. It would also aid countries lagging in funding for the projects.

4. Dual-use technologies must be regulated by governments, international and regional organizations including UN, SAARC, ASEAN, EU etc. It is imperative for the governments to have a check and balance on commercial companies, private vendors and contractors who are developing or selling critical technologies.

a. In today's globalized world, where cyberspace is accessed globally, launching a worldwide cyber campaign would not only deteriorate mental health of people but would have larger repercussions on international security.

5. The extended use of nanotechnology in military has become the new-normal. Although, R&D in nanotechnology was started for scientific purposes, it seems that the industry has lost its orientation. In addition, military nanotechnology overshadows the civilian or commercial applications.

a. Governments must enact policies to limit the use of nanotechnology for facilitating military process. It can be argued that the contemporary strategic environment calls for the use of nanotechnology. However, if a collective global action is achieved, it can roll-back multiple billion dollar military projects. Funds saved from those projects can be used for constructive activities.

Proposed Universal Cybercrime legal framework against Cyber Bullying, Cyber Fraud, Cyber Stalking

In recent years, number of countries have launched and proposed several projects to combat cybercrime, but the level of implementation of the legal frameworks against cyber bullying, cyber fraud, cyber stalking includes several inconsistencies. It requires the political, economic, and security factor for the better implementation of the cyber crime framework in the long run,. Given the rapidly changing nature of cybercrime, it is important to think about what would be the legal framework that could prevent all cyber related crimes. Although, it may not be possible to eradicate all cybercrimes completely, however, there are many effective strategies which may help to secure the data, human lives and networks. The following diagram describes the possible options for the prevention of cybercrime including clear policies, security measures, management, effective technologies, legislation, etc.

For the better implementation of the cybercrime framework in the long run, requires the political, economic, and security factor. Given the rapidly changing nature of cybercrime, it is important to think about what would be the legal framework that would prevent all cyber related crimes. Although, it may not be possible to eradicate all cyber crimes completely but there are many effective strategies that may help to secure the data, human lives and networks. Figure 17 describes the possible options for the prevention of cybercrime that includes clear policies, security measures, management, effective technologies, legislation, etc.

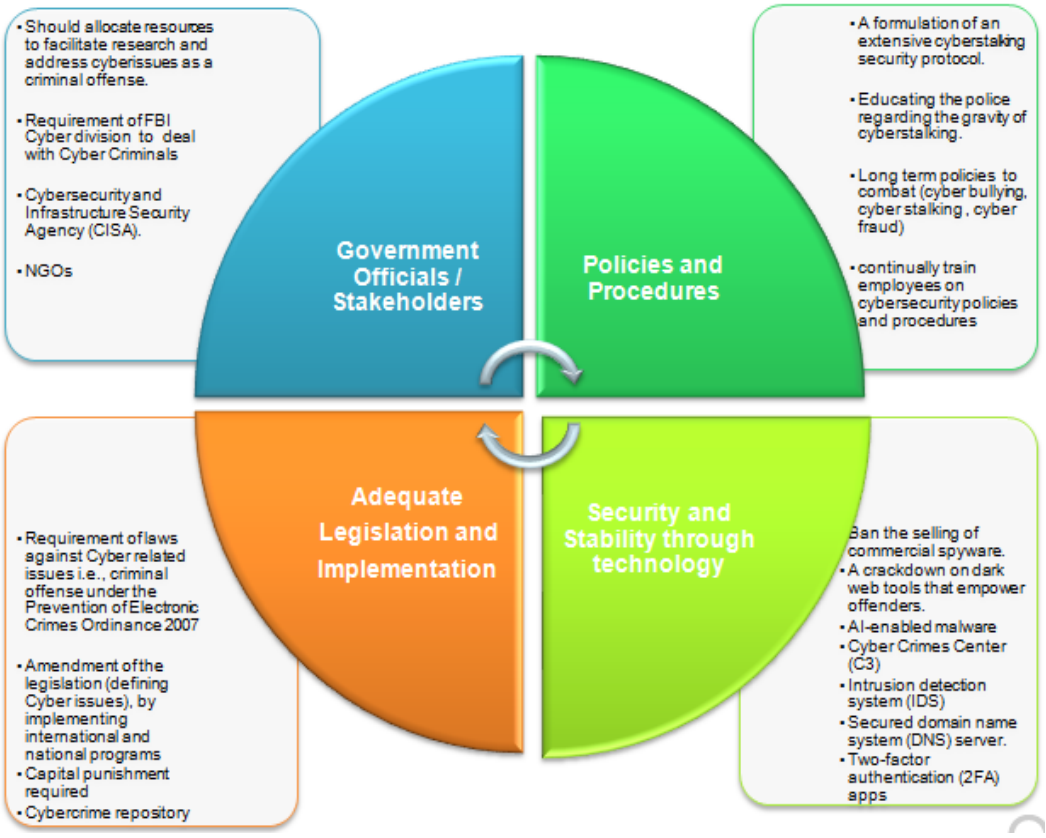


Figure 36. Proposed Universal Cybercrime Legal framework

A proposed Uniformity Policy Framework on Humanity

The proposed policy framework for humanity is based on strategies and facts, which combines recent research findings and provides a legal framework to be adopted to save humanity. It highlights that the strict actions and strategies are required by the states to be implemented. In a globalized world, the countries need to adopt policies that will cater to the rise in heterogeneous societies. These strategies will allow better facilities, employment opportunities, housing, and education facilities, the financial support for the homeless children and allow families to mix in the social and economic pool. Moreover, the government should allow putting criminal punishments for child physical and sexual abuse across states. Further, to prevent this issue community based programs may also spread awareness at street level.

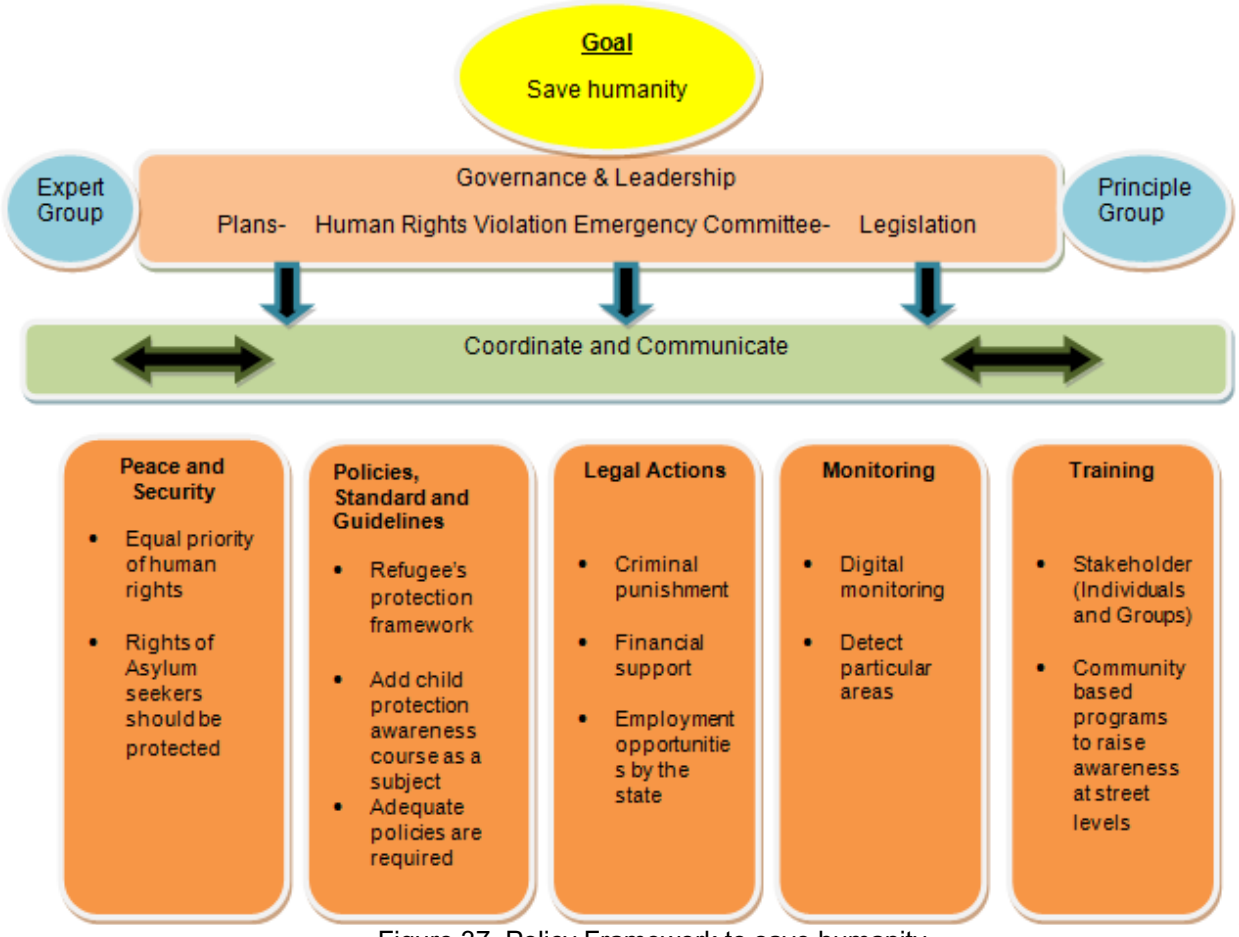


Figure 37. Policy Framework to save humanity

A proposed Uniformity Framework on Building Mental Positive

While the race between the cybersecurity industry and cyber criminals continues to exacerbate, simply relying on technology would prove scanty and less beneficial approach. Rather, cultivating positive

emotions like optimism, self-efficacy, hope etc. would further provide the agency to the professionals and act as protective factors to thrive in the face of adversities like cyberattacks thus translating to the resilience of the cyber professionals. Hence, a resilient professional would work through the challenges by harnessing various positive emotions and inclining on their support system when necessary. This would further enable them to have a positive approach towards work, approach challenges from a logic-oriented view, and enhance problem-solving skills and motivation (Burton, 2020).

It is vital to notice the breadth and depth of emotions and individual may experience in a day when interacting within his environment. The individual and their environment are in a reciprocal relationship influencing their emotional state throughout the day. Humans are socio-emotional beings, thus embracing the nuances of various emotional experiences and the importance of human connectedness has proven to have numerous benefits. Acknowledging, being aware and feeling one's emotions, be it positive or negative is the key to emotional resilience and higher levels of emotional quotient (Mayer, Salovey & Caruso, 2016). Further, engaging in more cognitive-based activities has also proven to increase self-esteem and self-confidence. Hence, it is a pressing need to further enhance EQ, IQ, SQ, and AQ that would not only contribute to above-stated facets but also lead to development of positive emotions and further precipitate increased psychological well-being.

Positive emotions and mental states can also be enhanced by nurturing our physical selves. Engaging in meditation, tai chi, and mindfulness exercises helps us to be aware of here and now. This cultivates the awareness in the individual about the self and their environment and reduces the levels of stress (Mineo, 2018). Various therapies like Nature Therapy that helps one to reconnect, ground and heal through the power of nature have led to increased mental health well-being; Animal-Assisted Therapy helps the individual receive the unconditional love that would further enhance the social connectedness and the social quotient. Also, nurturing the body with essential nutrients and a night of REM sleep has further been concluded to have increased mental well-being. An adequate amount of sleep leads to increased attention, concentration, productivity, and memory. It has also been found that decreased sleep may lead to lower levels of social skills and reduced emotional expression (Leech, 2020).

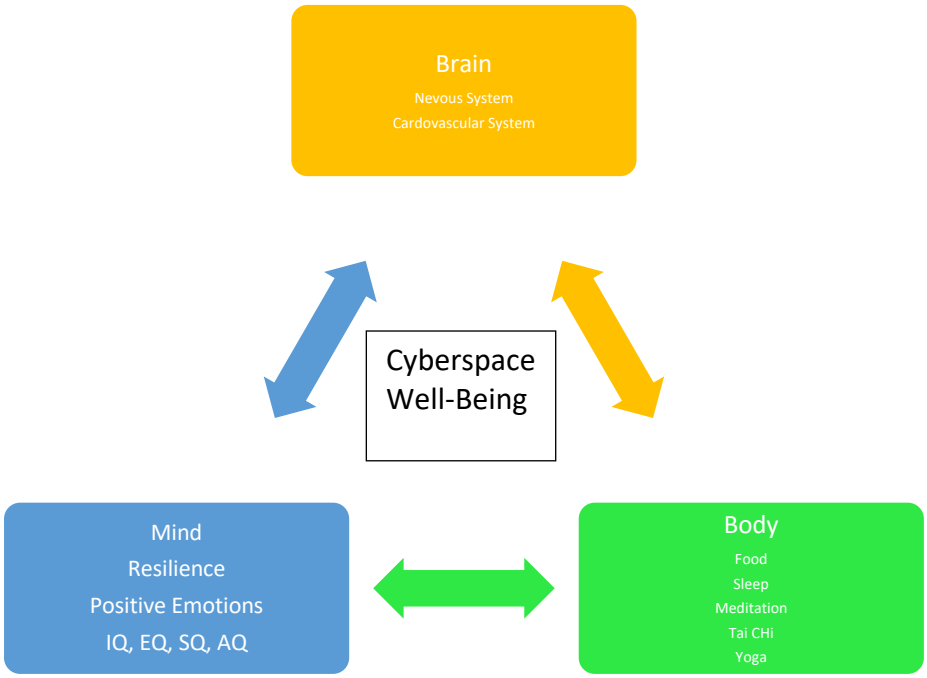


Fig. 38 – CyberSpace Wellbeing Model

Where Is It All Going?

Well, it seems that there are certain Savants in the technology world with next level future vision take are making visionary statement of the future of AI, Consciousness Quantum computers and TRUE AI, self-ware machine systems that are able to 'think' and grow beyond their programming.

The AI based Singularity

The view of Ray Kurzweil

We stand on the threshold of potentially the most existentially otologic human changing event in the modern-day history of man as we know it. The "Singularity'. Ray Kurzweil, Inventor, Futurist, and all-round technology savant explains it as thus.

'From my perspective, the Singularity is a future period during which the pace of technological change will be so fast and far-reaching that human existence on this planet will be irreversibly altered. We will combine our brainpower—the knowledge, skills, and personality quirks that make us human—with our computer power to think, reason, communicate, and create in ways we can scarcely even contemplate today. This merger of man and machine, coupled with the sudden explosion in machine intelligence and rapid innovation in gene research and nanotechnology, will result in a world where there is no distinction between the biological and the mechanical, or between physical and virtual reality.'

This context on the Technological immediate future plays into our narrative in this paper of advanced technology and how this is affecting all humanity with a strong focus on mental health and wellbeing, as well as how the human condition may drastically alter in the immediate future.

The Rise of Quantum Computers

With Quantum computers and processing into the Micro and Nano second already coming online, and the AI world creating ever more sophisticated technology when will the Quantum Consciousness arise and will it ever. This debate has been ongoing for several years and has proponents on several were many that stated a PC on a desk had no future and these were C level technology personnel. So, who is right where is it leading? Sides. When the PC first arrived there

Google has been working hard on its Quantum computer, put the Star Trek computer a step closer to reality.

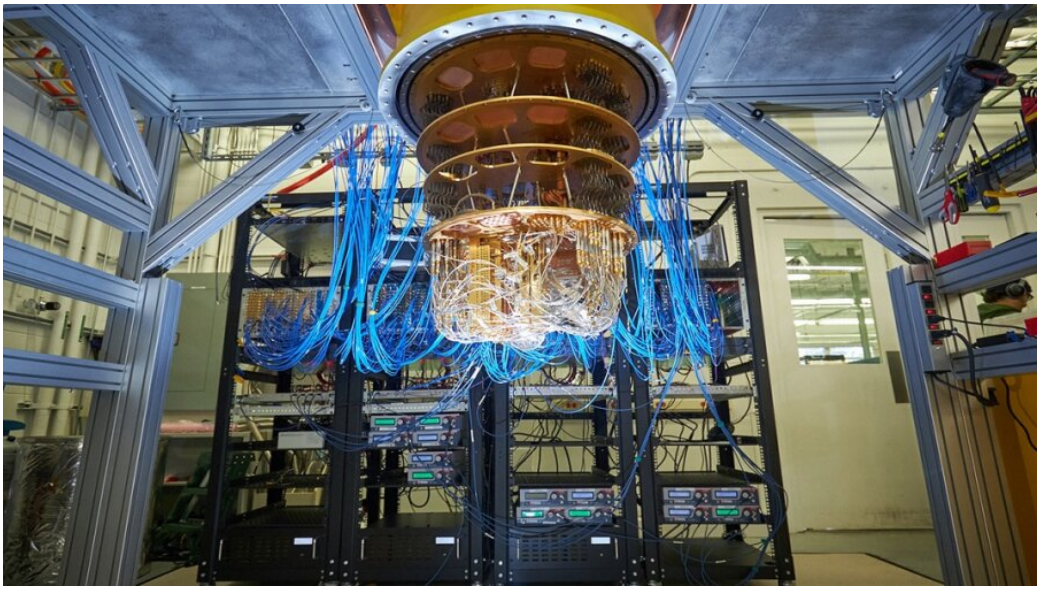


Fig 39 - The Chinese Quantum Computers

Chinese researchers have made a new breakthrough in quantum computing technology.

A group of researchers from the University of Science and Technology of China (USTC) have constructed and fabricated a programmable superconducting quantum computer model prototype with an impressive 62 qubits, largest in the world –, and achieved two-dimensional programmable quantum on the system, state university sources.

The study, led by renowned Chinese quantum physicist Pan Jianwei, was published in the top scientific journal Science recently. The computer prototype was named Zu Chongzhi after the accomplished Chinese mathematician from the fifth century. The race to quantum supremacy is no longer a mere technical one but in fact may be a societal existential one.

The Singularity and Quantum Convergence

As we progress quantumly the IA Singularity in conjunction with sophisticated code also is moving to a juncture were the melding of these technologies will form what we term the new Quantum Consciousness in the on the highway of the Singularity.

While nanotechnology, Genetic editing, AI, and robotics will peak at different times over the course of the next years, we are as of now seeing these in various guises appearing already. Each is powerful in its own right, but their convergence will be an event to behold, and will it be at the so-called point of technological singularity. Kurzweil wrote about these ideas in The Singularity Is Near over 15 years ago, and we are accelerating towards this point, so it seems.

“GNR (genetics, nano technology and robotics) will provide the means to overcome age-old problems such as illness and poverty, but it will also empower destructive ideologies,” Kurzweil writes. “We have no choice but to strengthen our defences while we apply these quickening technologies to advance our human values, despite a lack of consensus on what those values should be.”

Fig 40 - HALL vs Cyberdyne Systems

The debate continues as does technological advancement, and the convergence looks very likely in the next two decades, based on the exponential advances we are seeing today. Will the AI wake up and decided to terminate humans or will HALL win the day. One thing is for sure we will find it soon enough and switching off your power to your computer may not be enough.

The Future of Mental and Wellbeing

Regenerative Mental & Wellbeing – The Next Wave Of Sustainability Model For Wellbeing

Regenerative sustainability for wellbeing is based on a holistic approach and paradigm, harnessing and integrating recent research findings from science and practice, embracing inner and outer dimensions of sustainability necessary for systemic wellbeing transformation.

RSW (Regenerative Sustainability for Wellbeing), modelled through regenerative development and design, aligns science, human beings consciousness and actions with living systems principles through a transformational co-creative processes.

The core aims are for regenerative sustainability wellbeing include holistic approaches based on how thriving living systems function, address the root causes of (un)sustainability, and is inherently more inspiring and motivational. Advancing regenerative sustainability wellness will require fundamental shift supported by more awareness and education, theoretical and practical development, leadership, empowering communities, and integrating spirituality.

“All life depends upon the soil…there can be no life without soil, and no soil without life; they have evolved together” – USDA Yearbook of Agriculture, 1938

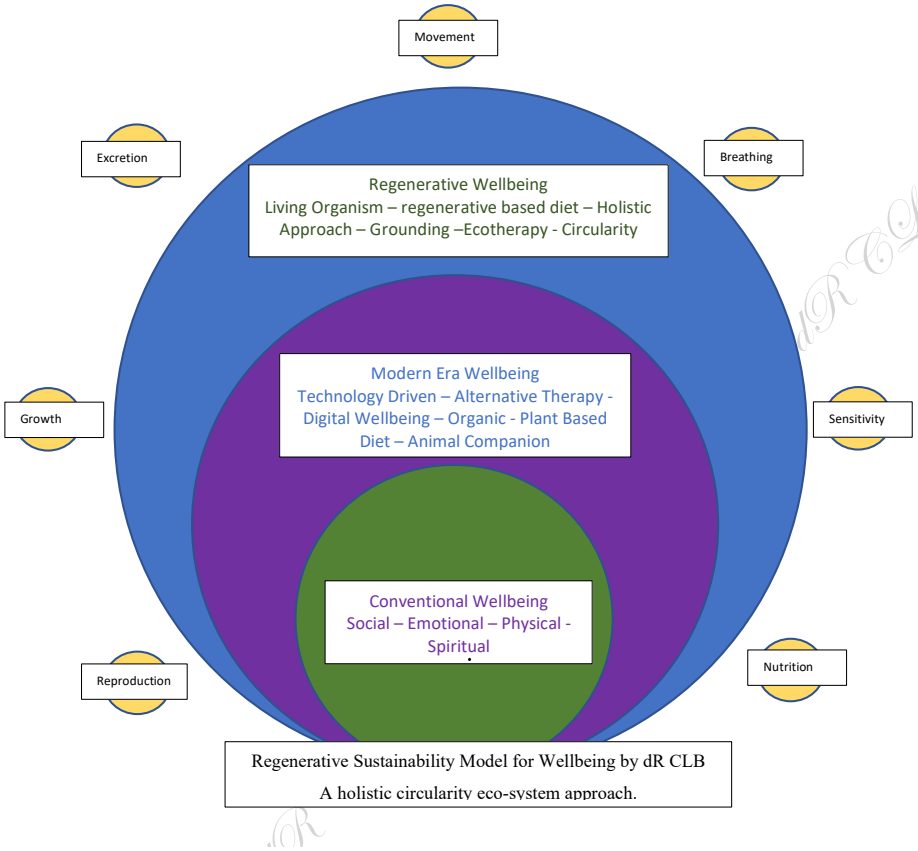


Fig 41 - Regenerative Sustainability Model for Wellbeing by dR CLB

A holistic circularity eco-system approach.

From sustainable development to regenerative sustainability

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