July 2021

# Bibliometric Survey on the Effects of Technology Addiction

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# Bibliometric Survey on the Effects of Technology Addiction


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## Abstract:

In today's technology-centric era, our lives have become vastly dependent on the internet. The internet is widely used for social media to connect, communicate, share and collaborate. However, constant usage of technology can increase compulsion or addiction. This bibliometric survey describes the various types of effects of technology addiction on Human body. The purpose of this research is to examine the different types of technology addiction research published in the journal between 2001 to 2020 in different regions in the World. The Bibliometric analysis is done using Scopus. Scopus and VOSViewer were used to plot a recurrence of keywords, publications, clusters of researchers globally active in the field. Also the work used software for VOS viewer to imagine outstanding innovations in the journal, using bibliographic linking and review of co-citation. The survey describes that all publications are from the journal affiliated to Computer Science. United States lead publication followed by Hong Kong and China.



## Keywords:

Technology Addiction, Smartphones, Addiction, Internet Addictions, The Internet, Social Media, Mobile Phones

## 1. Introduction:

In the last 5 years, communication Media has had a broad impact on people's interpersonal behaviour. The addiction to technology is a very good example of behavioural addiction(Gerhart, 2017; Selvi et al., 2019). Mainly the Internet and mobile devices have prime roles for this impact. Usually, people use the internet for inter-personal communication with friends and family. Many people have fallen so deep into its addiction that they have forgotten how to talk to a friend or a relative with the real world and real emotions. They know how to behave online to anyone, but they are unable to deal with real emotions. They are habituated with the internet and search the answer for everything online. They do work on mobile and the internet for many hours during the daytime and also during night-time. Thus they habited deeper and deeper into the virtual world away from the real one.

People 's relationship with their smartphones is even more established than any other computer device as the mobile technology has become more widespread. Is an outcome, people continue to use their mobile more often than in the previous years and appear more addicted to this (Rapeepisarn et al., 2016). A smartphone is built with the same technologies and can have the same or even greater impact than the Internet(Aljomaa et al., 2016) The cell phone made a huge impact on our society. Lives without cell phones are hard to imagine (Vinodha & Raghavan, 2015). The bidirectional relationship between anxiety and mobile phone addiction was found (Lim et al., 2020). In view of the prevalence of the usage of social networking (SNS) websites (e.g. Facebook, twitter or Instagram) and a few other large proportion of the world's population, SNS use surveys have been listed as one of the key research areas(Lin et al., 2019)

Addiction is caused by repeated actions with a negative number of consequences (Madlock & Hessling, 2020; Salehan & Negahban, 2013). The internet addictions are going to become the hardest addiction in the world (Relova et al., 2010). The term Internet Addiction ( IA) is well founded in Asia, pretending to believe that it poses a major public health problem (Kear & Folkes, 2018). Internet addiction is a common problem because humans are unable to control their Internet use of addictive behaviour, resulting to psychological, academic, personal , social and work-related difficulties or disorders(Hall et al., 2015; Zheng et al., 2016). In addition, unique online addictions such as mobile addiction (Olson et al., 2020), Social media dependency and IGD have common characteristics of an addictive behaviour (Chen et al., 2020). The internet addiction arose as an adolescent behaviour problem after the Internet had grown well (Yen et al., 2008). Several of the research shows that long-term cell phone use will harm health (Smitha & Narayanan, 2013, 2015). The Internet and related mental addictions are crucial problems facing the urban Indian population (Chandra et al., 2018).

China became the first nation to formally accept the disease of internet addiction and supports education, study and treatment in collaboration with South Korea (Brooks et al., 2020; Korea, 2008), And also built several recovery facilities. The United States of America had internet broadband adoption of 73 percent in 2016, a figure projected to grow further (Pew Research Centre, 2017a). Social networking use This is one of the most popular internet behaviours (Socialnomics.net, 2012). Cyber psychology refers to "the study of how human behaviours and subjectivities

influences and are influenced by new communication technologies"(Serafin et al., n.d.) The phenomenon forced scientist to perform studies concerning this subject to analyse the threat of online social media dependency or to assess the effectiveness regarding treatment(Rad, 2018).

In 2016, 69 percent American adults were users of media (Pew Research Centre, 2017b). Through 2018 only Facebook had more than 2.23 billion concurrent users per month (Facebook, 2018). Meanwhile, 27 percent of Internet timeframe is usually spending on digital press, more than (non-social) entertainment, along with mail and news (Tatham, 2013). Survey analysis found that 24.6 percent Depressed mood compulsivity and psychiatric disorder due to internet use and isolation also (Bisen & Deshpande, 2020). The depression currently affects more than 300 million people globally (from 2005 to 2015 the number increased by 18.4 percent), and almost 800,000 people die each year from suicide, which is the 2nd major cause of death among people aged 15 to 29. The prevalence of IA in European countries ranges from 1.0 to 18.3 per cent and in Asian countries from 13.7 to 18.4 per cent (Gürarslan, 2020). The effect of stress on the university student is well known worldwide with many researching problems(Flynn et al., 2020). Evidence indicates that anxiety correlates the use of various technologies such as social networking sites ( SNS)(Tarafdar et al., 2019). Mental health issues have also hit a large part of the world 's population (Teles et al., 2019).

Bibliometric is an area of research which examines bibliographic content quantitatively through the study of a subject area and the identification of its leading trends (Blanco-mesa et al., 2016). Bibliometric can also be built in a broad variety of ways through research subject analysis, journals, organizations and countries (Memon et al., 2019). Bibliometric surveys have systematic and rational approach to discovering the flows and trends of information in a field structure(Hernández-torrano et al., 2020). This paper provides a bibliometric analysis of technology addiction. Section 2 highlighting the partial compilation of data on technology addiction publications; section 3 offering comprehensive bibliometric research. The research also utilizes the VOS viewer tools to imagine leading journal developments through bibliographic coupling and co-citation analysis (Jan & Ludo, 2010) in section 4. The future scope and limitations of the work conducted are respectively preceded in sections 5 and 6 by the conclusion of Remarks in section 7 and the reference in the end of this article.

## 2. Initial collection of data:

The publication databases can be mainly categorized as open access and paid access. This publication can be access through various channels such as Library portals or we may register to website. We can retrieve data from required databases using the number of different methods. There is various publication database such as Scopus, Research gate and Google scholar. The most popular citation database for our technology is Scopus. Scopus is the data base for abstracts and citations for Elsevier which was introduced in the year 2004. Scopus includes almost 36,377 titles (22,794 active titles and 13,583 inactive titles) from approximately 11,678 editors, of which 34,346 are peer-reviewed journals in top-level subject areas such as social sciences, health sciences, physical sciences and life sciences. Scopus is an online bibliographic collection of journals. This set of data was described as the "most comprehensive server

index"(Aparicio-martinez, 2019). In this we find the Scopus as the basis for this research paper, using the essential keyword defined in section 2.1.

### 2.1. Important Keywords:

Keywords are the notable words used to find information when researching. The right combination of keywords helps define important areas of study (Chaudhari & Joshi, 2019). The search keyword used was “technology addiction”. The most relevant keyword technology addiction was divided into two compartments: master and primary type. Table 1 provides the list of keywords for this research as below.

**Table 1 Designed keyword search strategy**

| | |
|---|---|
| Master-Keyword | “Technology Addiction” |
| Primary-keyword(AND) | “Technology Addiction” OR “Human” OR “Depression” OR “Internet Addiction” OR “Stress” OR “Mental Health” OR “Mental Stress” OR “Smartphones” OR “Mind Body Therapies” OR “Mental Disease” OR “Mobile Phone” |

### 2.2. Bibliometric Results:

Bibliometric studies provide useful information on national and international scientific results. The base of this research paper is Scopus. All types of Articles are under a review. Recent articles have been published in the journals by researchers in the technology addiction research field. There were 60.3 percent of the Journal and Paper proceedings articles, 22.4 percent of the Conference papers and 6.0 percent of the Review papers. The remaining forms were chapter books (4.3 percent), books, conference review and the editorials have similar findings (1.7 percent), the letters and short surveys (0.9 percent) summarized in Table 2.

**Table 2 The publication types in technology addiction**

| Types of Publications | Number of Publications | Percentage of 116 |
|---|---|---|
| Journal and Article | 70 | 60.3% |
| Conference Paper | 26 | 22.4% |
| Review Paper | 7 | 6.0% |
| Book Chapter | 5 | 4.3% |
| Book | 2 | 1.7% |
| Conference Review | 2 | 1.7% |
| Editorial | 2 | 1.7% |
| Letter | 1 | 0.9% |
| Short Survey | 1 | 0.9% |
| Total | 116 | 100% |

### 2.3. Key highlights of the data:

Reviving the relevant documents as papers, articles, analysis, Conferences, Book, Editorial, Letter, and Short Survey etc. for the period of twenty years from 2001 to 2020. But there are no any publications on technology addiction from 2002 to 2008. The annual publishing patterns are shown in Table 3 and in Figure 2 for the research field of technology addiction. The largest number of publications in 2019 are 23 relatives to other publications.

**Table 3 Yearly publishing patterns in technology addictions**

| Year | Publications Count |
|---|---|
| 2001 | 1 |
| 2002-2008 | 0 |
| 2009 | 3 |
| 2010 | 3 |
| 2011 | 5 |
| 2012 | 7 |
| 2012 | 7 |
| 2013 | 3 |
| 2014 | 9 |
| 2015 | 8 |
| 2016 | 14 |
| 2017 | 12 |
| 2018 | 14 |
| 2019 | 23 |
| 2020 | 13 |
| Total | 116 |

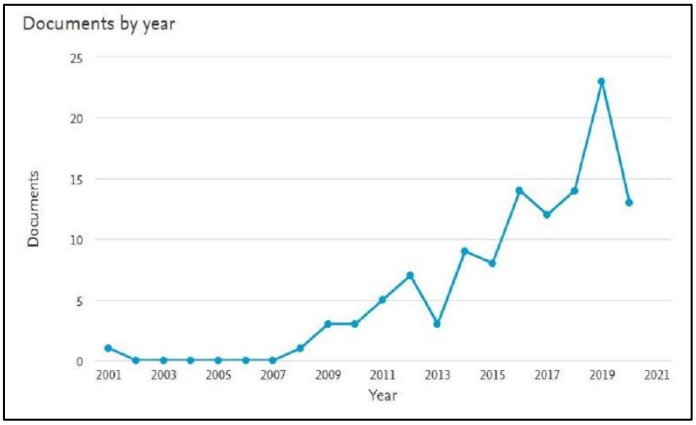


**Fig 1 Annual publishing developments in technology addiction**

**Source:** https://www.scopus.com/ (accessed on 24th May 2021)

### 2.4. Investigating details:

In section 3, the comprehensive bibliometric study was conducted to know the difference of literature, technology, addiction researchers and common research through association statistics, authors' contributions, journals where the papers and their statistics were published, along with citation analysis and collaborative studies.

## 3. Bibliometric Evaluation:

The following two approaches are used to do a bibliometric study of the idea of technology addiction, and they are:

- Regional and citation analysis etc.
- Keyword details, affiliation, author and publication, source and sponsor of funding.

### 3.1. Analysis by Country:

Figure 3 reveals the first 10 countries that have technology addiction publications. The USA, China and Hong Kong are the topmost countries in terms of research on technology addiction. It can certainly be that the United States is leading with almost 36.20 percent followed by Hong Kong with 15.51 percent and China with 13.79 percent of publications.

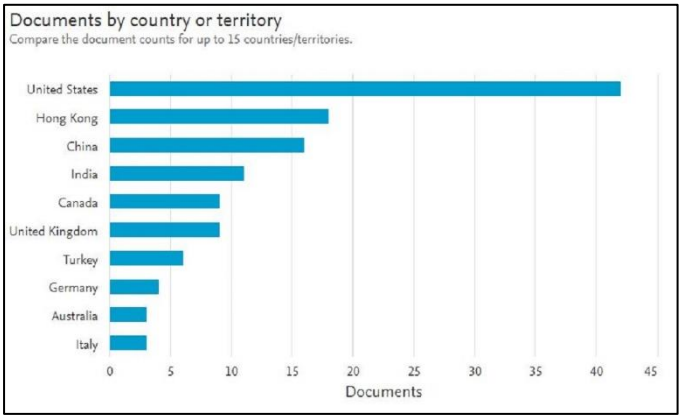


**Fig 2 Top 10 countries that publish articles on technology addiction**

**Source:** https://www.scopus.com/ (accessed on 24th May 2021)

### 3.2 Statistical Keywords:

Key terms explain whatever the study actually needs to look for. The right selection of keywords helps to target prominent areas of study(Chaudhari & Joshi, 2019). There are first ten keywords list in Table 4 from considered technology addiction publications.

**Table 4 First 10 keywords for addiction to technology**

| Keywords | Number of Publications |
|---|---|
| Technology Addiction | 52 |
| Addiction | 30 |
| Internet Addiction | 24 |
| Social Networking(Online) | 24 |
| Human | 22 |
| Internet | 20 |
| Information System | 18 |
| Technology | 14 |
| Behavioural Research | 13 |
| Social Media | 10 |

### 3.3. Documents by Author:

Figure 4 shows the top ten authors contributing to recognizing the effects of a given author in the field of technology addiction. It's obvious from this chart, that Turel, O. Has the largest number of technology-addiction research publications led by Cheung, C.M.K. and Lee M.K.O.

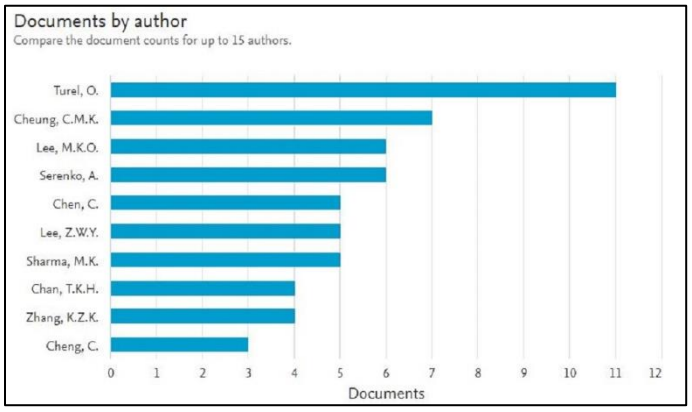


**Fig 3 Central contributors**

**Source:** https://www.scopus.com/ (accessed on 24th May 2021)

### 3.4. Documents by Affiliation:

Figure 5 shows top ten university / organizational affiliations that have applied. Technology addiction has been a research field of concern between California State University, Hon Kong City University and Hong Kong Baptist University. The state university of California obtains the most excellent performance, with the number of publications is much greater than that of other institutions. The National Institute of Mental Health and Lakehead University shows similar findings in the context of technology addiction.

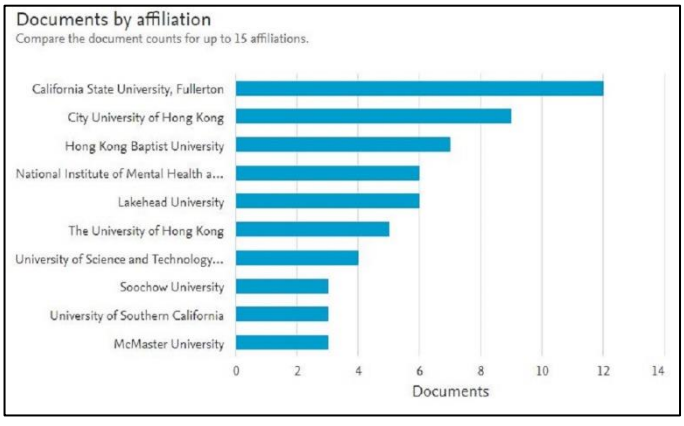


**Fig 4 Statistics on affiliation to technology addiction**

**Source:** https://www.scopus.com/ (accessed on 24th May 2021)

### 3.5. Documents by Subject Area:

Figure 6 displays subject-specific wise sections for the publications on derived technology addiction. This statistic clearly states that maximum work is carried out in Computer Science (30.2 percent) followed by Social Science (15.9 percent) and Psychology (15.3 percent). It is also noted that less Engineering work has been carried out (1.6 percent).

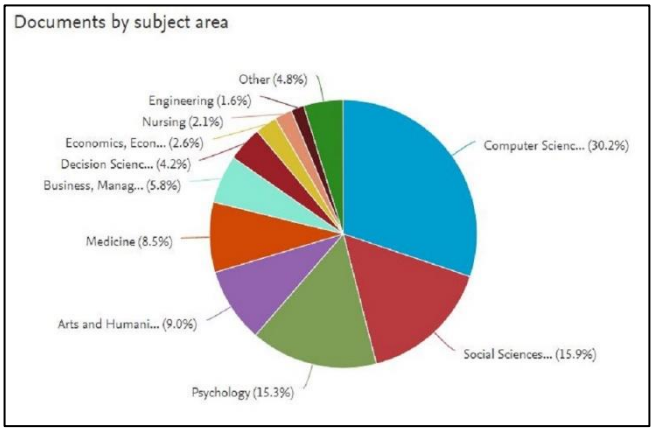


**Fig. 5 Technology addiction topic field of derived literature**

**Source:** https://www.scopus.com/ (accessed on 24h May 2021)

### 3.6. Journal Statistics:

Figure 7 encompasses forms of publishing outlets in the field of addiction to technology. The collected information reveals that 60.3 percent of publications are from Journals and Reports, and 22.4 percent are from Conference publications. It is also found that in the context of a review article, only 6.0 per cent of the contribution is made.

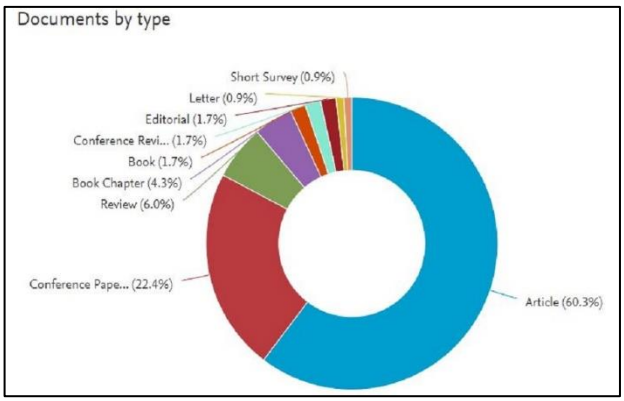


**Fig 6 Groups of resources for 'technology addictions' publications**

**Source:** https://www.scopus.com/ (accessed on 24h May 2021)

### 3.7. Documents by Source:

Figure 8 covers documents per year by the source in the area of technology addiction. From the following figure it is clear that there are the highest number of publications in Computers in Human Behaviour in 2019 followed by The Indian Journal of Psychological Medicine and European Journal of Information System.

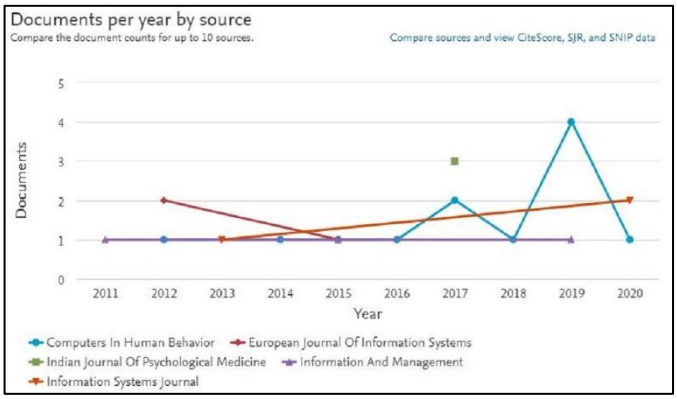


**Fig 7 Documents per year by source**

**Source:** https://www.scopus.com/ (accessed on 24th May 2021)

### 3.8. Documents by funding sponsor:

Figure 9 gives brief knowledge of documents by funding sponsor. The extracted information demonstrates that the National Natural Science Foundation of China has topmost funding sponsors followed by The University of Hong Kong and Canada First Research Excellence Fund.

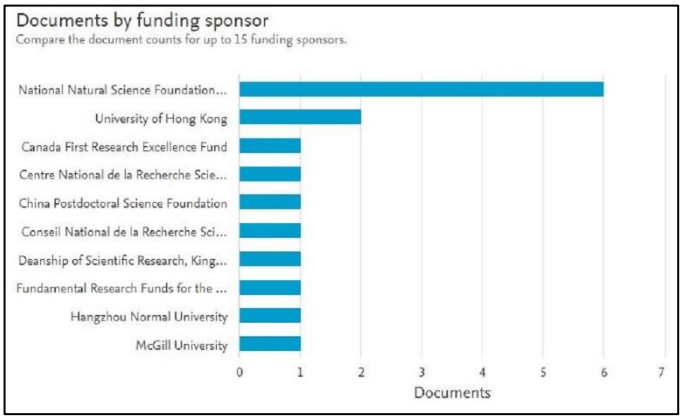


**Fig 8 Documents by Funding Sponsor**

**Source:** https://www.scopus.com/ (accessed on 24th May 2021)

## 4. Mapping through VOSViewer User Applications:

This segment will create a graphical overview of the key problems in technology addiction to provide a more detailed picture of the leading trends in technology addiction. We are using VOS viewer framework, that uses bibliographic coupling and co-citation analyses to display bibliographic content (Jan & Ludo, 2010). Co-citation, like bibliographic linking, is a measure of syntactic and semantic similarity for documents that make use of quotation relationships. Co-citation is characterized as the wavelength at which two papers are collectively cited.(Blanco-mesa et al., 2016). Those documents are said to be co-cited if at least one other document quotes two documents in common. Co-citation indicates most-cited studies and its relations.

Initially let us concentrate on bibliographic coupling to carry out the graphical analysis. Figure 9 demonstrates the bibliographical linkage of the most popular entrepreneurs in technology addiction. Recognition of these groups has relative implications of the study subject, as its dedication enables the quantity and quality of the relationships formed between researchers from various institutions and knowledge areas to be defined. To define and calculate the relation between authors, The VOSViewer uses algorithmic visualization technique (Jan & Ludo, 2010). The algorithm of VOSViewer focused on detecting objects in a limited space such That the distance is an objective measure of their connection between two items.

Figure 9 shows the citation cluster of co-authors based on addiction to technology. This figure indicates an association between lead authors and the other field investigators. This figure illustrates the most cited papers in technology addiction and shows their connectivity with other papers. Turel O. is the most cited author of this research area. The most cited paper is from Turel O. and Serenko A., published in 2012, entitled "The Benefits of Danger Environments with Social Networking Websites". This paper shows the largest number of citations 263 founds with 18 links. The second most cited paper is of Turel O., Serenko A., Giles P., name reported in 2011 as "An Empirical Analysis of Online Auction Consumers." This cluster has 24 links and 250 citations. The third cluster consists of Xu Z., Turel O., Yuan Y., published in 2012 as "Online Game Addiction among Adolescents: Factors of Motivation and Prevention". There are 24 links and 250 citations on this list.

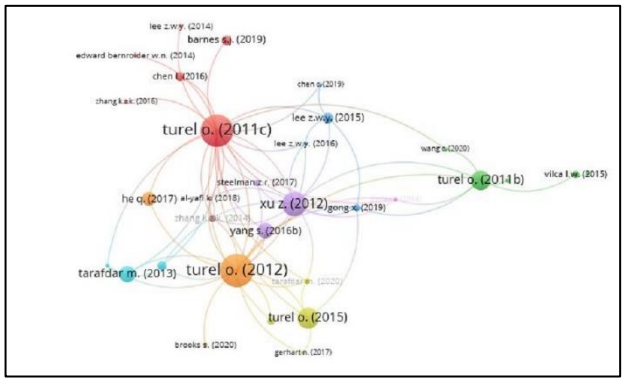


**Figure 9: Cluster of Co-authors Citations focused on 'technology addiction'**

Another analysis that we did was to determine the keywords used in publications. Over the last two decades, 116 documents identified where technology addiction was the most common keyword. Figure 10 gives a brief understanding of keyword co-occurrences. Overall, it is highly important to research keywords in scientific work, as this decides the Publication patterns and tracking of those publications. This figure shows a word cloud, where

the dimension of each phrase reflects the context of the keyword as opposed to the number of documents it is used in. Figure 10 was developed using VOSViewer software and the VOS mapping tool. Colour signifies the separation of keywords with respect to the thematic field for which those colours were selected. The circular dimensions display the frequency of use of each terms and the lines connecting each circle show the relationships between various parameters used in publications. Below figure shows that 4 clusters were found. Red cluster focuses on "human" and "addiction". Green cluster focuses on "technology addiction" and "social networking(online)". Blue cluster focuses on "internet addiction" with "students". Yellow cluster focuses on "technology" and "smartphones". Addiction to technology has 40 links with strength of 207 and 52 occurrences. Technology addiction was the highest occurrences followed by addiction and internet addiction. Addiction shows 35 links with strength of 188 and 30 occurrences. Moreover, internet addiction shows 38 links with strength of 133 and 24 occurrences.

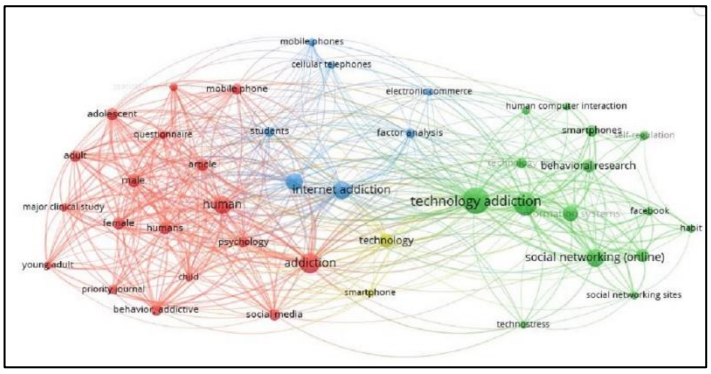


**Figure 10: Cluster according to occurrences of Keywords**

The map of social media networks shown in Figure 11 indicates global collaboration trends among studying editors. The United States is the vertex of this network, considering the number of interactions for other nations and the number of articles. The United States collaborates with many other regions like UK, Hong Kong, Australia, China, India and so on. The United States have 42 documents and 1289 citations with a total of 5900 link strength. Hong Kong is a second-most important cluster. Despite fewer links than Hong Kong, China is also the second most powerful node in this cluster.

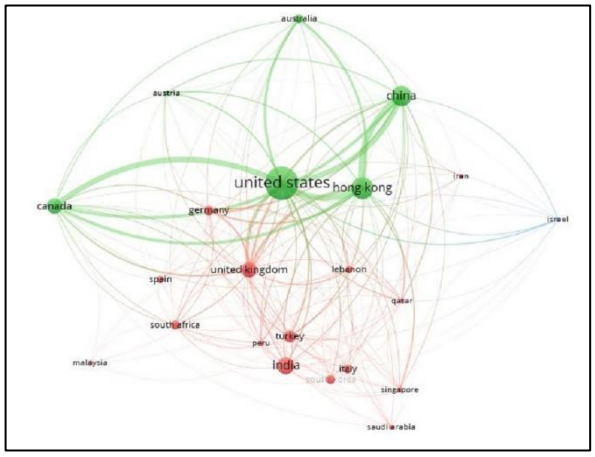


**Figure 11: Bibliographic Coupling of Countries**

Figure 12 gives the brief knowledge about bibliographic analysis of co-citation of cited references. Clusters are red, green, and blue. Another relevant point is to recognize authors' co-citation. Editors who have earned the greatest number of quotations in this field and how they relate their status with other writers. The Lines connecting each circle denote connection between the various cited references used in the publications. It clears that 'Turel O.' has highest cited references rather than others.

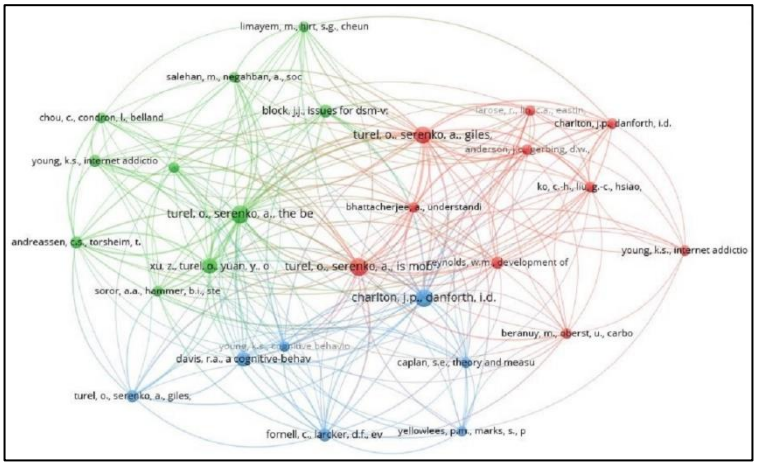


**Figure 12: Bibliographic Analysis of Co-citation of Cited Reference**

Figure 13 indicates graphical analysis of co-citation of cited sources. It consists of 22 nodes. There are various kinds of journals like computers in human behaviour, Information and management, cyber psychology and behaviour, the European Journal of Information, Computer and Education and so on. But it can be clear that Computers in Human Behaviour has the highest number of publications in terms of technology addiction.

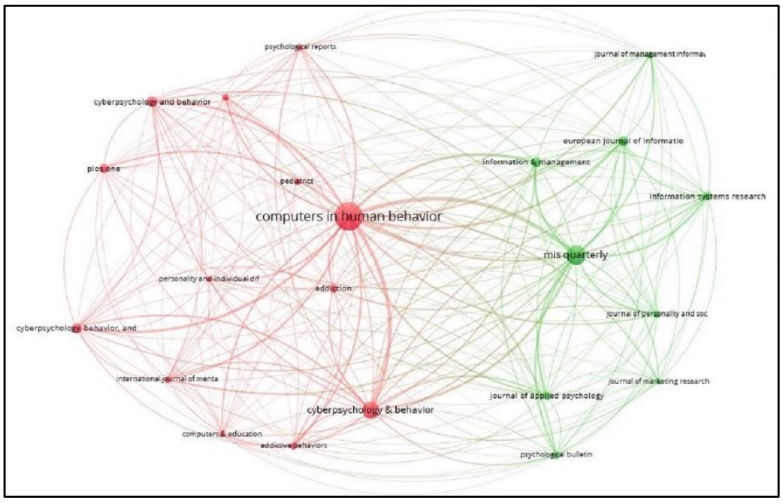


**Figure 13: Co-citation of Cited Sources**

## 4. Research Implication of the Study:

We are working in the environment of Technology. As the consequences of heavy technology usage there may be possibility of addicting to technology. Technology addiction research work has importance worldwide. This research work presents the essential orchestrate that will prompt creative ability to do research. It also illuminates the consequence of technology addiction on human beings. It is a mechanism to bring about change by investing in their systems. The US and India are the rising economies of the world, and their research system is increasing at a rapid rate.

## 5. Limitations of the Present Study:

i) This review restricted to English-language academic papers only.

ii) This study represents the search result from Scopus database only.

iii) This study is limited to combinations of some keywords only.

## 6. Conclusions:

In recent years, the increase of digital addiction has led Scientists conducting research in that field to analyse the risk components associated with addiction to online social media platforms or to assess the effectiveness of diagnosis. This bibliometric survey on technology addiction released that total releases are of Computer Science. These come from conferences, reviews and journals, and are associated with Human Computers. The United States leads these publications followed by Hong Kong and then China. After Computer Science, Social Science and Psychology is the subject field that contributes and the minimum contribution in terms of survey papers. In this study, we noticed that addictions to the Internet and social sites are substantially correlated with technostress-related rises in social media. This suggests that addiction to smartphones is expected to develop in the future and become one of the most prevalent forms of addiction.

## Funding:

No financial support was given to the author(s) for the research, authorship and/or publication of this article.

## Declaration of Conflict Interest:

The Author(s) declare(s) that there is no conflict of interest.

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