Is Cyber addiction also a reason for increased divorce rates?

Team:
Venkata Naga Sai Krishna Abhinay Pochiraju (1819771)
Mani Niharika Rachuri (1819748)
Vamsi Krishna Varma Gunturi (1794653)
Pavan Kumar Alikana (1826777)
Dastagiri Dudekula (1826239)

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Summary:

Addiction is of many types and any addiction leads to many disorders. In this report, we focused on how cyber addiction is one of the reasons for divorces. After collecting data across different sources, we were able to put together group of countries in which divorce rates are on the rise due to cyber addiction at a particular age or age range. From web of science, we took some indicators for addictions, cyber addiction, divorces, mean age at which divorces usually happen, age at which people are prone to cyber addiction and then based on these indicators we gathered information from different websites. Firstly, we gathered some statistics on cyber addiction worldwide (right from percentage of internet access to average time that people are spending on internet), from that we got countries in which there are higher internet usage rate and some other relative information. Next, countries in which there are higher divorce rates from the age when marriages are happening and age where people are more prone to take divorces). Next, we gathered reasons (mostly ages) for both the cyber addiction and the divorces based on the internet activities of different age groups. After observing these two statistics, we found there are some common indicators (like the common age) between them. Then, we started merging these two data sets, found correlation and performed some statistical methods in excel using different visualization options so as to draw some useful conclusions based on the patterns identified. Finally, we have drawn some statistics about how cyber addiction and divorces are related to each other worldwide. We conclude this analysis by telling that "Cyber addiction is also one of the reasons for increased divorce rates!!! in this digital era"

Introduction:

Cyber addiction is a major issue that people of all ages face nowadays. In this paper, we are trying to analyze the impact of cyber addiction on different ages of people by analyzing the effects of cyber addiction from multiple perspectives and point of views. Based on our observations at the micro level, we are trying to scale the issues to the national level. Based on the data from multiple sources we tried to correlate between cyber addiction and divorce rates based on a host of direct and indirect indicators (mainly age as an important indicator) to get a clear insight on what is the primary contributing entity.

Challenges addressed-

1. Addictions are of many types like internet/cyber addiction, drug/alcohol addiction, gaming addiction etc.., age plays a vital role in addiction. Among them, we focused on age at which people are usually addicted to the internet, through which medium (emails, messenger, work purpose) they are accessing internet at national level.

2. We took another topic called "divorces", age at which divorces are happening worldwide, divorce rate by sex (male and female) and previous marital status.

3. After gathering those two datasets we found the correlation between that two and did some analysis based on age as a main indicator and drawn conclusions about what age cyber addiction and divorces are happening together.

4. After observing the statistics we've done so far, we feel that cyber addiction may not be the only reason for divorces, but we strongly believe that it (cyber addiction) is also one of the reasons for the increased divorce rates.

Literature review:

Initially, we selected a topic on education and secondary education and spent considerable time in gathering data so that we can do some specific analysis on the data downloaded to understand some patterns to do a national level comparison. But after a point, we observed that the subject is vast and there are limited to no patterns for us to delve because the data from OECD and Insights are completely different in terms of a level of attributes and their correlation. So, it became difficult for us to proceed with hypothesis and ideation. So, we decided to select a specific topic which is not very vast and not very small (for which there is no data). So, we decided to note down a list of topics of selection like Global warming, Life expectancy, cyber-crimes, human trafficking, racism and addiction which seemed more or less easy to analyze but difficult to define a model and draw some relevant conclusions. So, we selected sub-topics on keywords identified so we decided to select Cyber addiction which is a type of addiction.

Once we decided on a topic we did search for the same in Incites to get some background on what exactly Cyber addiction is. From this analysis, we got some good overview on what is a cyber addiction and what is not termed as cyber addiction. From this awareness, we proceeded with analysis on how this type of addiction is referred like Internet addiction and behavioral(non-chemical) addiction. We noted some keywords to do further analysis and did corresponding searches on incites to go through different articles (mentioned in the data from incites section) published and analyzed the trends of internet addiction surveys done on countries. This is when we came across information about the rise in divorce rates in some countries due to increased time spent on the internet. So started out the dig deeper on this correlation between divorce rate and cyber addition. We framed above-mentioned model to do the statistical analysis of 3 workflows namely, 1. percentages of cyber addiction and the age groups. 2. percentages of divorces happening and the age groups behind them. 3. If there are any common age group between them what is that and how both the scenarios are correlated.

Background on Cyber addiction:

What is a Cyber addiction?

According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), addiction is defined as "a maladaptive pattern of substance use leading to clinically significant impairment or distress, as manifested by three (or more) of the following, occurring any time in the same 12-month period".
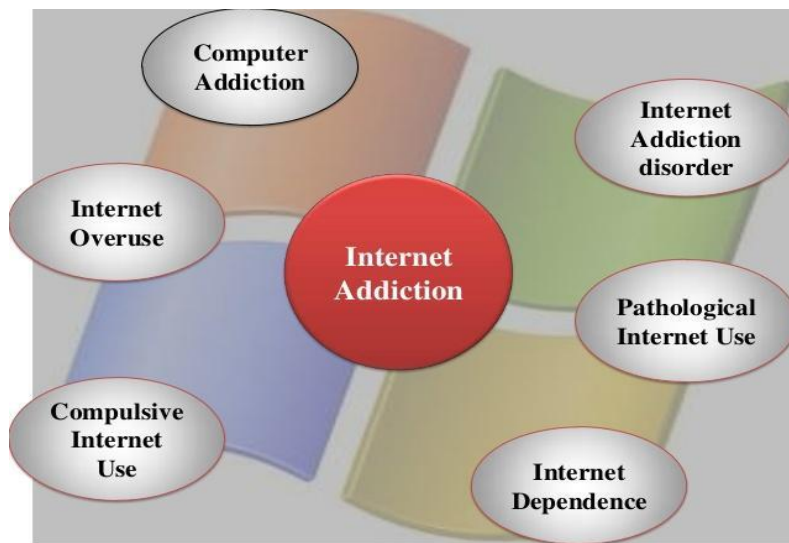
From web of science, there are many articles that state cyber addiction is caused due to psychological problems like:

1. Shyness
2. Loneliness
3. Feeling anxious and lost
4. Locus of control

From the article in the web of science, we found that cyber addiction is one of the reasons for divorces. Mental health professionals report too much computer time is becoming a common thread in marriage and family counseling sessions. To address the issue, the past decade has seen the birth of a quickly growing industry, ranging from software to regulate the use of sites like Facebook and Twitter to full-blown residential treatment programs.

A recent study published in BMC Medicine indicates the number of people with maladaptive computer habits may be on the decline. At the same time, though, emerging research indicates spending too much time plugged in may be more damaging to social, psychological and physical health than previously suspected. About six percent of people surveyed for a recent Stanford University School of Medicine study indicated that "their relationships suffered as a result of excessive Internet use." Eighty-four percent of people aged 19 to 29 said they would rather do without their current partner or their car than give up Internet access, according to a survey conducted by the German broadband association Bitkom. In a 2011 survey, the American Academy of Matrimonial Lawyers found one in five failed marriages are destroyed by social networking.

Data Collection:

Approach for collecting data:

To do this analysis, first of all, we started with, making notes on the topic of consideration which was a Cyber addiction from the articles published in the web of science. From this analysis, we got a good understanding of the scope of the research that was already done on the topic of the internet or cyber addiction and age at which people are addicted to the internet. While analyzing the articles in the web of science, we found an interesting effect of cyber addiction, that is divorces. Then we thought of drawing some relation between the cyber addiction and the divorces. We've analyzed many articles about the divorces, causes of divorces, age at which divorce rate is more etc.., from the web of science. Then we tried to analyze different sources like OECD, EUROSTAT and others to get some pointers about the data already available and how we can extend it based on our problem statement. Other reference points that we used are different infographics available on this subject to get the bird's eye view on the severity of cyber addiction on different walks of life.

Challenges with data collection from Incites:

Based on our data analysis and problem statement we couldn't make much sense out of the impact indicators provided in incites like citation impact and impact related to world, so we planned to derive as much as information as we can from the articles (mentioned above) published on the subject of cyber addiction, instant messaging and internet addiction, divorce on incites. With this analysis, we got a very good overview on input and output indicators that we need to use for our models.

The process that we followed for data collection:

After getting required data from incites we searched for relevant data in Eurostat , OECD and host of other data sources available on the internet. We also referred to many infographics published on similar subjects of analysis to get a high-level overview of statistics on cyber addiction. Once this is done we got data related to divorces and cyber addiction-related data separately for different countries. In our data merging phase, we made an analysis on most driven factor(age) that we can use in internet addiction data and its correlation with divorce data. But the issue we encountered while correlating dependent

factors is that information from different datasets is not tangible or measurable to do model definitions. So we had to separate analysis on individual data sets to have a deeper understanding on contributing factors for divorce then relating it to internet addiction and then with demographic finding whether children have symptoms of getting addicted to the internet if their parents are separated. Here mostly we tried to do hypothesis which we can use totally with final dataset which we can use to train the models that we are building similar to below screenshots that we took during our data collection phase, So as to find relations on key factors that we can use to connect or correlate internet addiction to divorce. For the hypothesis definition and ease of correlation, we had to make some definitions like how we can define addiction like users using internet for more than 6 hours per day fall into addiction zone. Then we have to find, the age factor as well i.e.., at what age people are getting married and when people start spending more time on the internet than giving peer attention which leads to divorce, how can we define threshold limit for this in terms of hours. These are some examples of level of data analysis that we tried to do.

Data chosen (from Incites, Eurostat and other sources):

Keyword	Author	Year	Journal	Indicators found and takeaways for our analysis
	Chou, C (Chou, C)	Dec-05	A review of the research on Internet addiction	• A clear definition of what is internet/ cyber addiction. • When we call anything as addiction • Key factors for internet addiction
	Cheng, University of Hong Kong	DEC 1 2014	Internet Addiction Prevalence and Quality of (Real) Life: A Meta-Analysis of 31 Nations Across Seven World Regions	• By taking the above indicator "addiction" prevalence is positively related to Internet penetration rate and GDP per capita. • This is a multinational meta-analysis, that is data within the data. So if a country has highest penetration rate we can say that internet addiction is higher in those countries.
	Griffiths, M (Griffiths, M)	Nov-01	Sex on the Internet: Observations and implications for Internet sex addiction	• The main indicator for both the models "cybersex/sex-addiction". This comes under the causes for both cyber addiction and divorces
	Chittaro, Vianello	NOV 2013	Time perspective as a predictor of problematic Internet use: A study of Facebook users	• How to get time perspective (TP) by using Zimbardo Time Perspective Inventory (ZTPI) to assess their TP.
	Anderson, CA (Anderson, Craig A.)	Mar-10	Violent Video Game Effects on Aggression, Empathy, and Prosocial Behavior in Eastern and Western Countries: A Meta-Analytic Review	• From the first journal, we got many types of addiction among them gaming addiction is one among them. So, gaming addiction comes under Cyber addiction and the main effect of gaming addiction is "change in prosocial behavior". So behaviour is one of our indicators.
Internet Addiction	Anderson, CA (Anderson, CA); Bushman, BJ (Bushman, BJ)	SEP 2001	Effects of violent video games on aggressive behavior, aggressive cognition, aggressive affect, physiological arousal, and prosocial behavior: A meta-analytic review of the scientific literature	

	Soh, PCH (Soh, Patrick Chin-Hooi)	Apr-18	Parents vs peers' influence on teenagers' Internet addiction and risky online activities	• How age impacts the risk towards cyber addiction. Here we can take age as one of the main indicators.
	Grubbs, JB (Grubbs, Joshua B.)	Jul-18	Predicting pornography use over time: Does self-reported "addiction" matter?	• From this journal, we again got to know that the main cause of the cyber addiction is the "pornography" or cyber-sex.
	Mo, PKH (Mo, Phoenix K. H.)	Jul-18	The role of social support on emotion dysregulation and Internet addiction among Chinese adolescents: A structural equation model	• This paper tells about Chinese children and their emotions. That is from this paper we can take "social behavior" as one of the indicators.
	Griffiths, M (Griffiths, M)	Apr-00	Does Internet and computer "addiction" exist? Some case study evidence	• Just learned the examples and factors which we've to focus in determining whether it's an indicator or not.
	Chak, K (Chak, K)	Oct-04	Shyness and locus of control as predictors of Internet addiction and Internet use	• What is a locus of control and shyness? How they impact cyber addiction
	Kubey, RW (Kubey, RW)	Jun-01	Internet use and collegiate academic performance decrements: Early findings	• By now, we got the main indicators from above journals, now how they impact performance.
	Leung, L (Leung, L)	Jun-04	Net-generation attributes and seductive properties of the Internet as predictors of online activities and Internet addiction	• What tempts the children and adolescence to get addicted to the internet. Here we took video games, isolated environment as indicators.
	Scherer, K (Scherer, K)	NOV-DEC 1997	College life on-line: Healthy and unhealthy Internet use	• There are no indicators in it but observed the patterns of internet usage.
	Wu, CST (Wu, Cynthia Sau Ting)	AUG 18 2016	Parenting approaches, family functionality, and internet addiction among Hong Kong adolescents	• Here marital status of the parents (divorced, single) has an impact on children thereby addicting to the internet. • Here we got indicators for both the models.
Instant messaging and	Grover, K (Grover, Karan)	Jun-16	Effects of Instant Messaging on School Performance in Adolescents	• Instant messaging is also one of the forms of internet addiction. So by gathering information about instant messaging in turn

Internet addiction				we got statistics about cyber addiction
	Fox, AB (Fox, Annie Beth)	Feb-09	Distractions, Distractions: Does Instant Messaging Affect College Students' Performance on a Concurrent Reading Comprehension Task?	• Age in which students are prone to Cyber addiction
	Cameron, AF (Cameron, AF)	Jan-05	Unintended consequences of emerging communication technologies: Instant Messaging in the workplace	• Not only for the students, even adults in offices are prone to messaging, from that we took mental status as an indicator
	Huang, HY (Huang, Hanyun)	Dec-09	Instant Messaging Addiction among Teenagers in China: Shyness, Alienation, and Academic Performance Decrement	• Again shyness, alienation, performance decrement are the results of internet addiction.
	Nuutinen, T (Nuutinen, Teija)	Aug-14	Computer use, sleep duration, and health symptoms: a cross-sectional study of 15-year olds in three countries	• Health condition is also an important indicator of cyber addiction. From cyber addiction, health will degrade and due to some mental illness people get addicted to the internet. They are interrelated.
	Oshima, N (Oshima, Norihito)	Oct-12	The Suicidal Feelings, Self-Injury, and Mobile Phone Use After Lights Out in Adolescents	• Health degradation due to cyber addiction age wise.
	Rice, E (Rice, Eric)	Oct-12	Sexually Explicit Cell Phone Messaging Associated With Sexual Risk Among Adolescents	• Cybersex leads to divorces. So for divorce cybersex is an important indicator.
Divorce	Lee, SA (Lee, Sun-A)	JUN 2018	Parental Divorce, Relationships with Fathers and Mothers, and Children's Romantic Relationships in Young Adulthood	• Parental divorce let their children develop an unstable mind, in turn, leads to another divorce. So parents divorce has an impact on divorces.
	DOWNEY, DB (DOWNEY, DB)	Feb-93	DO CHILDREN IN SINGLE-PARENT HOUSEHOLDS FARE BETTER LIVING WITH SAME-SEX PARENTS	• How children with single parents live. So social life of the divorce's children.
	DRILL, RL (DRILL, RL)	1986	YOUNG-ADULT CHILDREN OF DIVORCED PARENTS - DEPRESSION AND THE PERCEPTION OF LOSS	• Children of divorced parents have some mental disabilities.

	DEMO, DH (DEMO, DH)	Aug-88	Parents separation or divorce. Potential effects on children and recommendations to parents and pediatricians	• How divorces occur and how it affects their children.

Data collection from Eurostat:

Based on the data from Eurostat and indicators from Web of science we have segregated our data set in to 2 files containing marriage / divorce related statistics and internet usage statistics respectively of around **30 European countries**. Based on the data following are the fields that we considered in the consolidated sheets of each file -

For Marriage and Divorce statistics –

Divorce by marriage duration

Divorce indicators – Total divorces, CDR (Crude divorce rate), Divorces per 100 marriages

Marriage indicators – Total marriages, CMR (Crude marriage rate), Mean age at marriage for both male and females

We collected data of 2 age groups for analysis – 28-30, 30-35

For Internet usage statistics –

Frequency of internet use – For individuals, male and female

Internet activities – Emails, Video calls, Instant messaging, Social networking, Internet banking

Internet activities based on activity, gender and age group

For every internet activity we collected 3 main groups like Individual, Male and Female. In turn for every sub group we collected data based on the different age groups

We collected data of 3 age groups for analysis – 16-19, 20-29, 30-35

Note: The data we gathered for both divorces and internet usage from Eurostat is between the period of 2005 to 2017

Snapshot of internet usage statistics data collected -

Country Name	Frequency of internet use											
			Individuals				Male				Female		
	Frequency of		16 to 19 years	20 to 29 years	30 to 35 years		16 to 19 years	20 to 29 years	30 to 35 years		16 to 19 years	20 to 29 years	30 to 35 years
Belgium	68		89	89	88		90	90	88		89	89	88
Bulgaria	59		80	79	76		80	79	76		78	79	76
Czech Republic	57		91	89	84		91	89	85		88	88	83
Denmark	86		96	96	96		95	95	95		95	97	96
Germany (until 1990 former territory of the FRG)	75		93	92	92		93	92	93		93	92	92
Estonia	72		94	94	93		93	92	91		92	95	95
Greece	55		84	83	81		85	85	82		84	81	80
Spain	55		85	86	84		85	86	83		85	87	84
France	67		86	86	85		85	86	85		85	86	86
Croatia	63		89	91	90		91	92	92		91	89	87
Italy	57		86	85	83		86	86	83		85	85	82
Cyprus	60		89	88	85		86	85	83		85	90	87
Latvia	64		95	93	92		95	93	91		93	94	93
Lithuania	64		94	91	88		94	91	88		91	91	89
Luxembourg	82		93	94	94		94	95	95		95	93	94
Hungary	71		88	89	87		89	90	88		89	87	86
Netherlands	81		95	95	95		94	94	95		94	96	95
Austria	71		89	89	88		87	89	87		88	90	89
Poland	62		92	89	86		92	89	86		89	89	87
Portugal	57		88	87	85		87	86	85		86	88	86
Romania	50		70	67	63		69	66	62		66	68	64
Slovenia	67		92	92	90		91	91	89		90	93	92
Slovakia	70		94	92	90		94	92	90		92	92	90
Finland	85		94	95	96		94	94	95		95	96	96
Sweden	85		92	94	93		90	92	93		92	94	94
United Kingdom	75		93	92	92		93	93	93		93	91	91
Iceland	93		97	97	97		97	96	96		96	98	98
Norway	85		98	97	97		98	97	97		97	97	97

Note: All the numbers are either aggregates or averages for the data identified for the period 2010-17

Snapshot of divorce and marriage data collected –

Country Name	Divorce Indicators				Marriage Indicators			
	Total divorces	CDR	marriages		Total marriages	CMR	marriage - Male	first marriage -
Belgium	283,408	2,6	67,8		422.429,00	3,88	31,34	28,92
Bulgaria	122,456	1,7	47,8		257.218,00	3,48	29,70	26,38
Czech Republic	289,017	2,8	59,8		484.690,00	4,65	30,78	27,89
Denmark	157,35	2,8	51,1		314.675,00	5,68	33,91	31,48
Germany (until 1990 former terr	1.808.946	2,2	47,6		3.805.105,00	4,66	32,75	30,01
Estonia	33,483	2,5	55,5		60.583,00	4,56	30,67	28,13
Greece	124,986	1,2	25,3		551.071,00	5,00	32,67	29,32
Spain	1.063.779	2,3	61,4		1.734.117,00	3,76	33,28	31,10
France	1.304.229	2,0	51,7		2.511.382,00	3,97	32,50	30,32
Croatia	54,058	1,3	25,9		211.319,00	4,94	30,10	27,14
Italy	62	1,0	25,9		2.183.254,00	3,67	33,23	30,24
Cyprus	...,25	2,2	31,0		59.086,00	7,21	30,40	27,70
Latvia	64,961	3,1	54,2		121.835,00	5,81	29,68	27,26
Lithuania	102,022	3,3	48,3		212.083,00	6,89	28,62	26,41
Luxembourg	11,653	2,2	64,2		18.249,00	3,56	32,72	30,18
Hungary	228,142	2,3	58,7		391.601,00	3,93	31,10	28,23
Netherlands	332,208	2,0	47,7		699.896,00	4,21	32,60	30,00
Austria	180,09	2,2	50,4		374.274,00	4,38	32,47	30,31
Poland	658,833	1,7	30,7		2.179.795,00	5,73	28,56	26,15
Portugal	250,127	2,4	66,2		384.125,00	3,65	29,92	28,13
Romania	323,964	1,6	25,5		1.299.764,00	6,38	29,74	26,20
Slovenia	23,983	1,2	36,7		65.516,00	3,20	31,74	29,12
Slovakia	115,547	2,2	43,5		266.070,00	4,92	30,32	27,46
Finland	134,992	2,5	48,6		280.110,00	5,22	32,56	30,25
Sweden	232,908	2,5	47,0		495.071,00	5,26	35,37	32,63
United Kingdom	1.308.257	2,1	47,2		2.250.884,00	4,42	30,90	31,50
Iceland	3,191	1,7	33,7		9.524,00	5,05	34,60	32,20
Norway	101,512	2,1	43,2		235.487,00	4,80	33,88	31,12

Models developed:

OBJECTIVE: The main objective of the model is to find how cyber addiction is also a reason for divorce

For the model to develop we took the data as below:

Here we took two topics and merged them to get the relation between them.

CYBER ADDICTION :

Indicators:
1. Emails
2. Video calls
3. Instant messaging
4. Social networking sites
5. Online gaming
6. Internet banking

Crucial Indicators : For the above indicators, we divided according to the following age groups.
1. 16 to 19 years of age
2. 20 to 19 years of age
3. 30 to 35 years of age

DIVORCE :

Indicators:
1. Marital status
2. Internet Addiction
3. Internet banking
4. Emails
5. Instant messaging

Crucial Indicators:
1. 28 to 30 years of age
2. 31 to 35 years of age

Measurement: Both the input and output is in % with respect to national population.

Model work flow:

Internet Addiction Rate(%)

Cyber Addiction

Divorce rate in %

Divorce

Prone in age groups

Prone in age groups

| 16 to 19 |
| 20 to 29 |
| 30 to 35 |

Age Groups

Involves in

| Emails |
| Video calls |
| Instant messaging |
| Social Networking |
| Online gaming |
| Internet Banking |

Activities List

Involves in

| 28 to 30 |
| 31 to 35 |

Age Groups
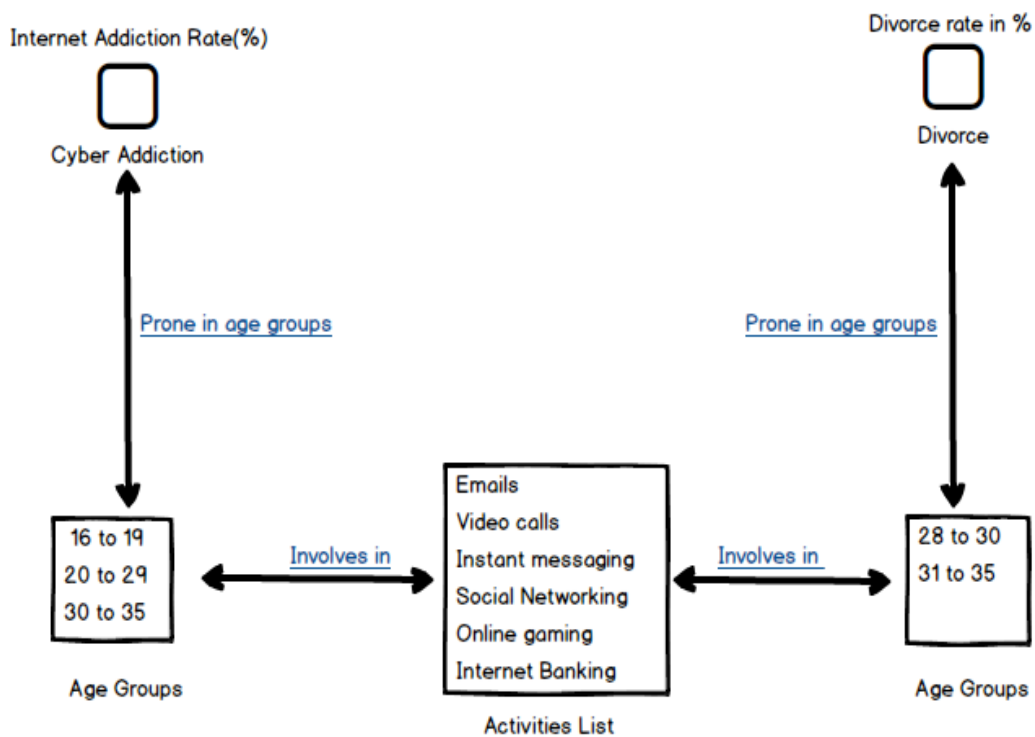
As you can observe, this workflow is bidirectional i.e.., we are trying to do the 2-way analysis of divorce to cyber addiction and vice-versa

Infographics (based on the data collected from Eurostat and Incites):

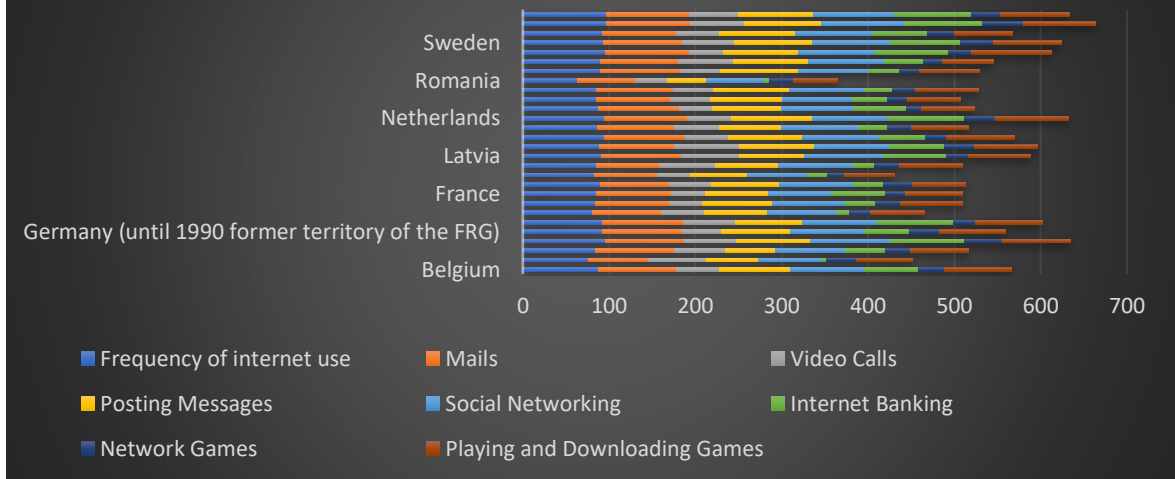**Note:** Visualizations are scaled, (i.e., multiply by 1000 to get actual value of a particular statistic)
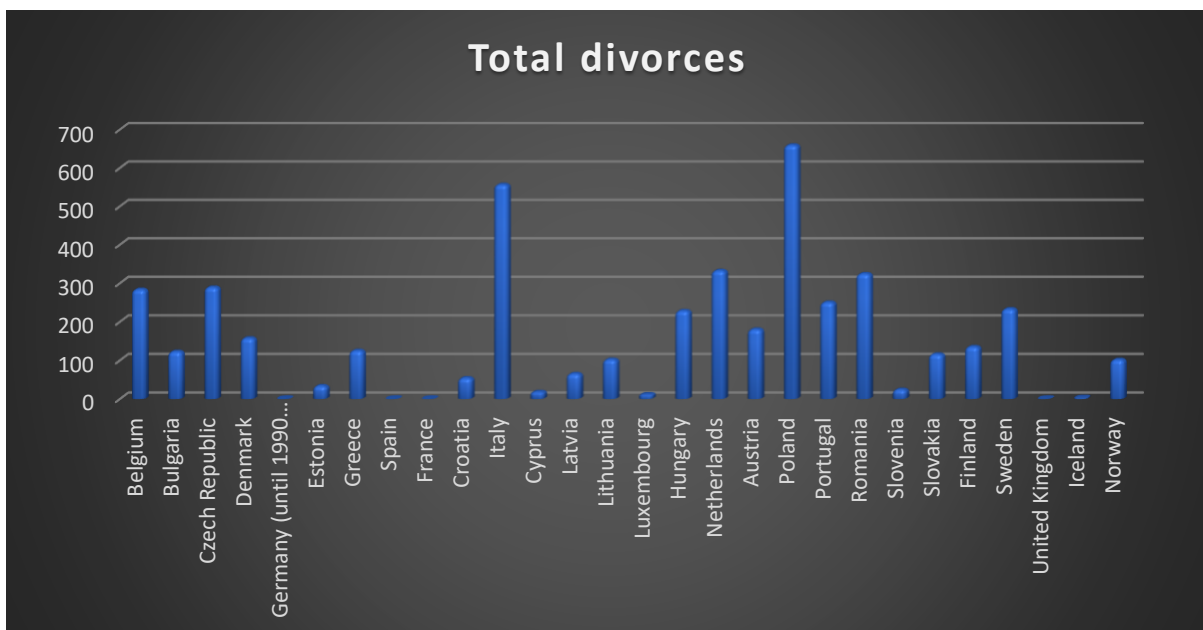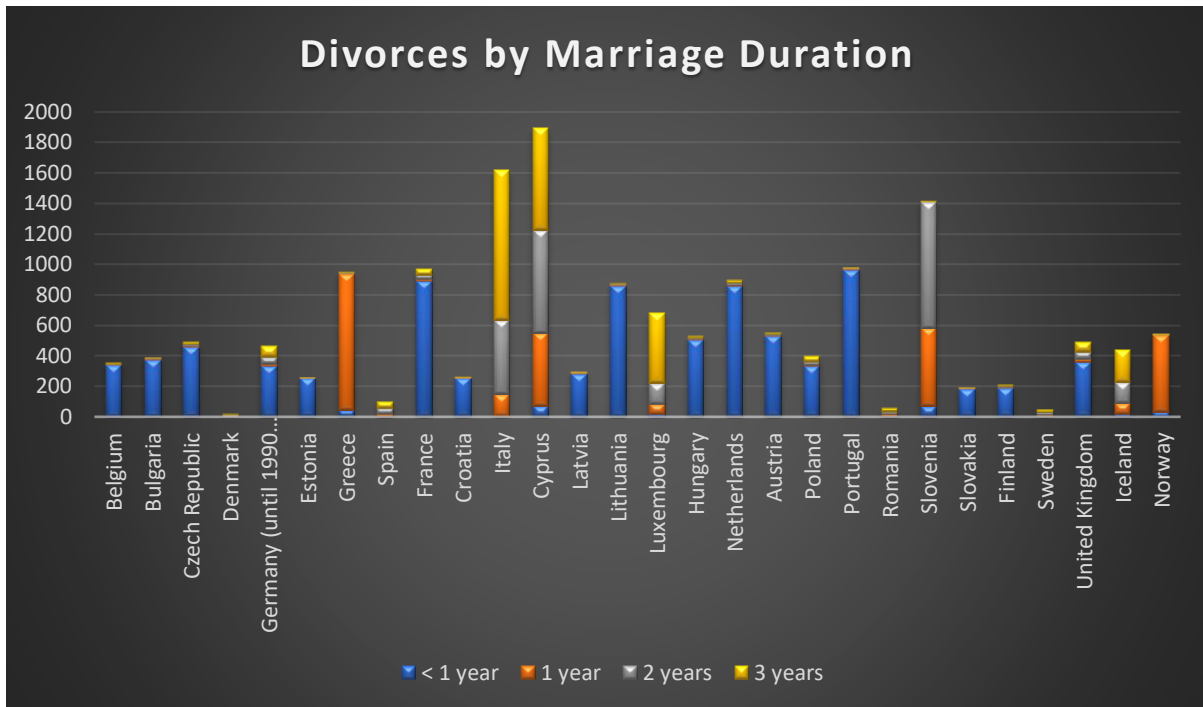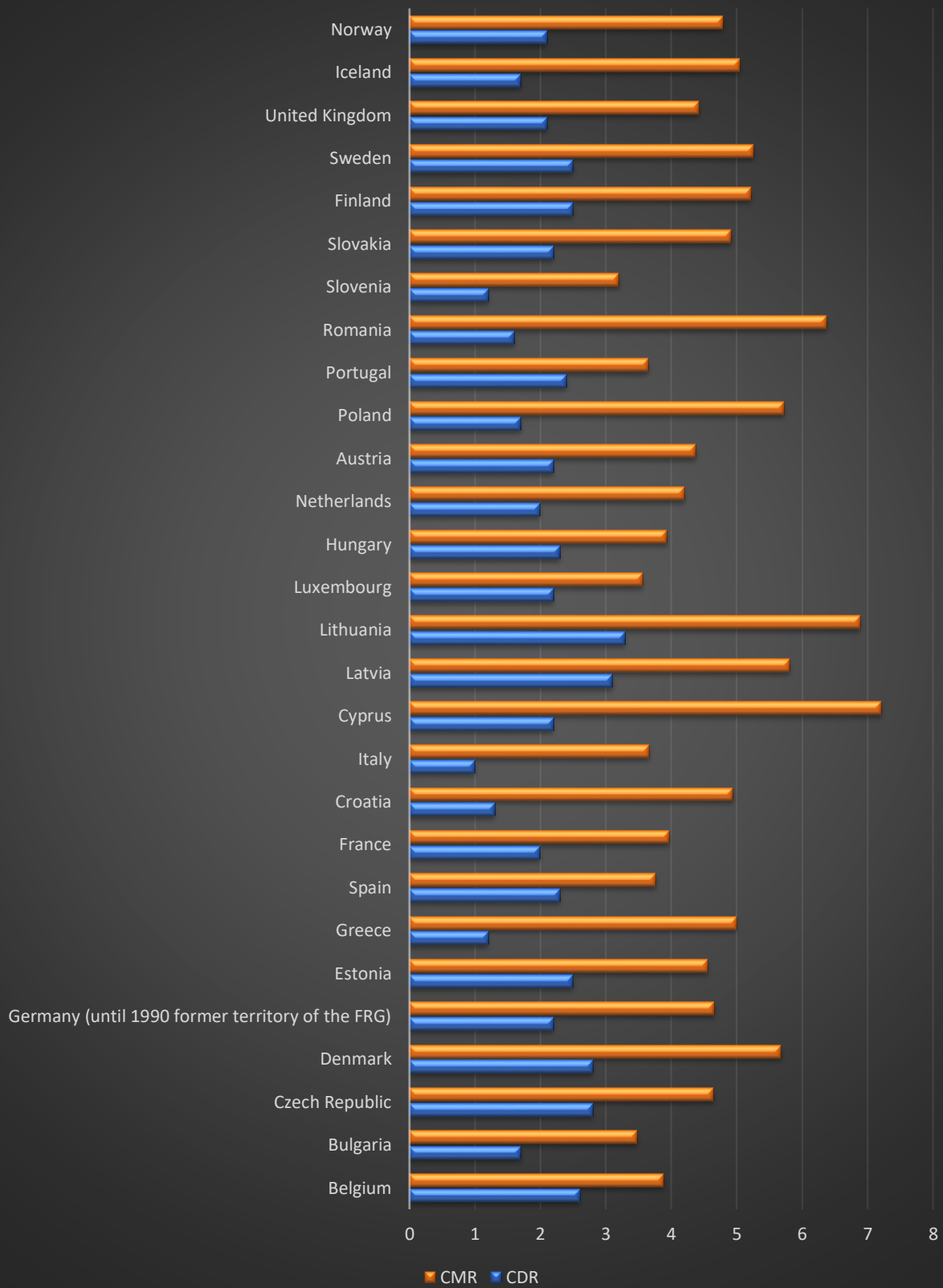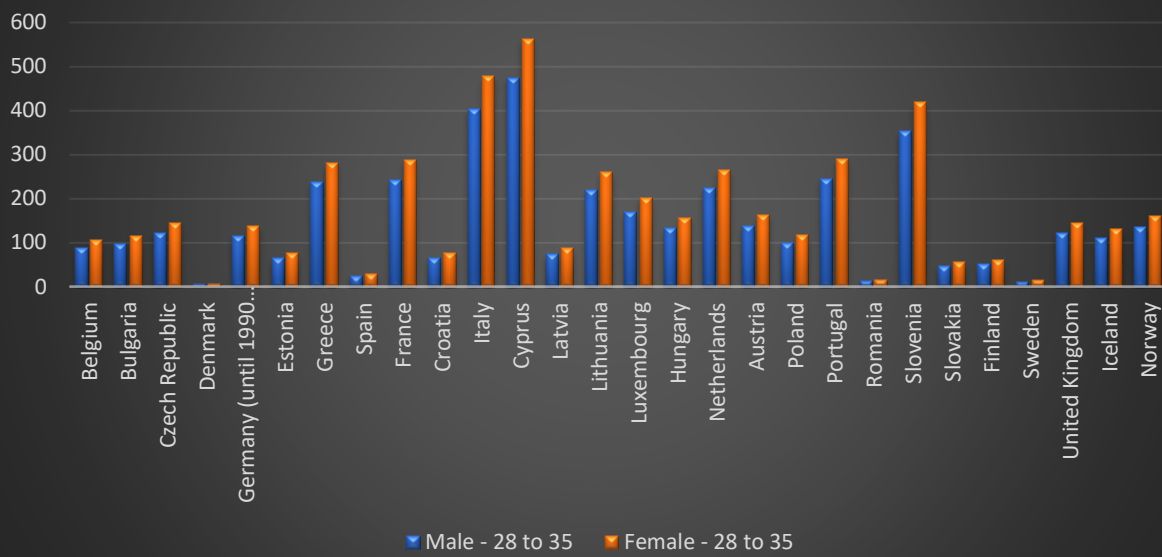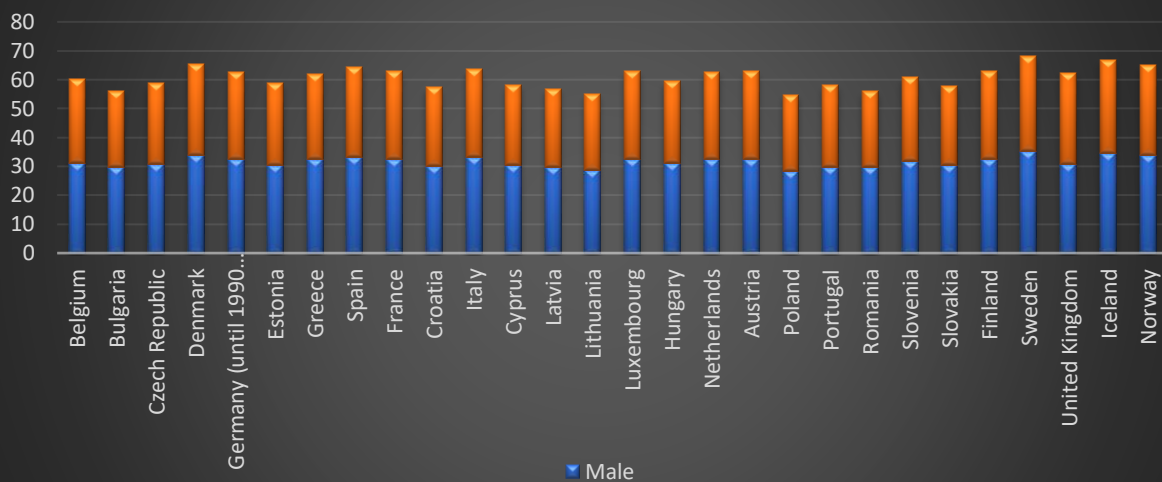
16 to 19 Years
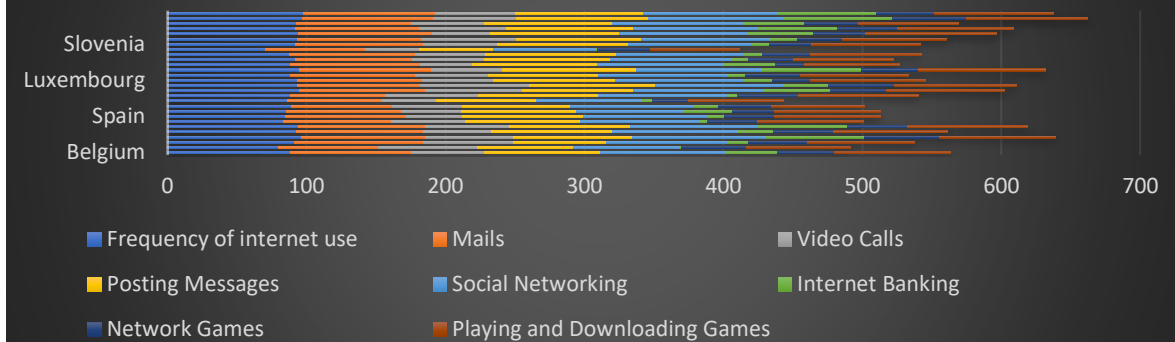
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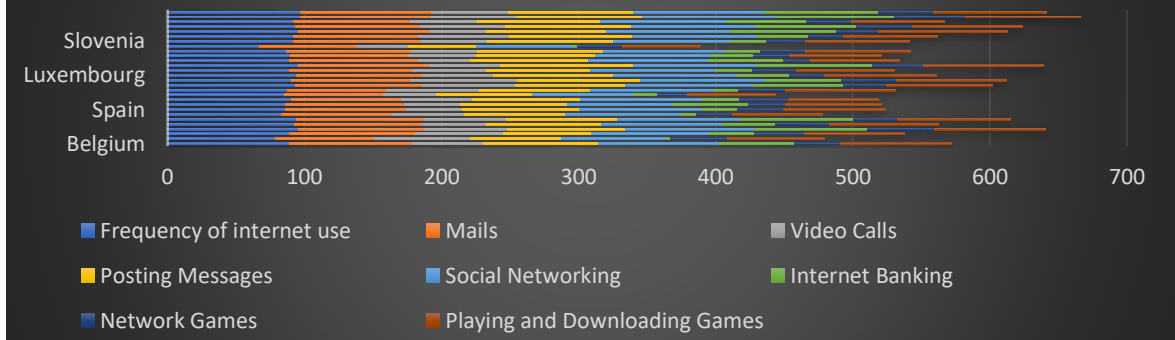
30 to 35 Years

CDRvs CMR

Male vs Female: Divorces - Age group: 28 to 35 years

Mean age of First Marriage - Male vs Female

Description and interpretation of the obtained results:

From the data and infographics, we can clearly see some pattern for countries like Iceland, Norway and Denmark etc.., which have more than 90% of population using internet on a daily basis and correspondingly have high to CDR/CMR ratio i.e.., number of people getting married is far less than number of people getting divorced. We can also observe a contradiction of the above-mentioned observation for countries like Italy, Poland, Cyprus and Romania etc.., where even when there is less percentage of people using internet on daily basis, the number of divorces is far greater than other countries which leads us to a conclusion that amount of internet usage is not always positively correlated with divorce rates.

We also observed that number of hours spent on internet on a daily basis has an impact on number of divorces, example: countries like Italy and Poland, on an average have over 6 hours of time spend on internet accordingly number of divorces are on the rise in these countries especially around ages between 32 and 35 which is close to mean age of first marriage in most of the countries over the period of last 10 years.

As of now, we don't have solid base to back up our conclusions on internet addiction vs increased divorce rates as it is really difficult to find direct indicators which contribute to internet addiction but with the data we gathered these are the conclusions and inferences that we are able to make. More details on this subject in our presentation.

Conclusion and road ahead –

Cyber addiction leads to many problems. It might affect our social life, personal life or the professional life. The way we handle the emerging technologies is all matters at the end of the day no matter what type of data we take, what type of statistical methods we use to drawn conclusion, it is because we as data scientists want to prevent the bad from happening by doing the route cause analysis. As everyone believes "prevention is better than cure" we predict the situations based on historical data and propose better solutions to prevent the root causes by doing better correlation of indicators. Cyber addiction is common now-a-days, almost all of us are addicted or dependent on internet one way or the other, but if we have a clear awareness on the level of impact internet has on our lives if things go overbroad we will be in a position to make well informed decisions. Marriage is like a life time promise, just because of the negligence or lack of awareness many people are breaking that promise. So, in this paper we tried to figure out how cyber addiction is also a reason for the divorce, at what age people are addicting to internet, there by how it affects their married life. By observing these statistics which we performed, we can see in which country the divorce and cyber addictions are more and the country which is healthy (not much cyber addiction and divorce rates). This level of analysis is inadequate to draw some useful conclusions but having said that we as a group feel that we can extend this project to other direct and indirect indicators of internet addiction and propose better workflows to deal with side effects of over usage of internet.

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