

The background features a dark blue field with several stylized virus particles in light blue and red. A prominent light blue line graph with multiple peaks and valleys is overlaid on the scene. A semi-transparent grey rectangle is positioned in the upper-middle section, containing the title text.

# The impact of COVID-19 on cybercrime trends

**Prof. Dr. Fernando Miró-Llinares**

# The impact of COVID-19 on cybercrime trends

## 0. Introduction

## 1. What happened during pandemic

- Adaptation
- Shift of opportunities
- How cybercrime changed during pandemic?

## 2. Something new? A passing trend?



A horizontal teal brushstroke with a textured, watercolor-like appearance, spanning the width of the slide. The stroke has irregular edges and some darker shading, giving it a hand-painted feel.

# What happened during Pandemic?

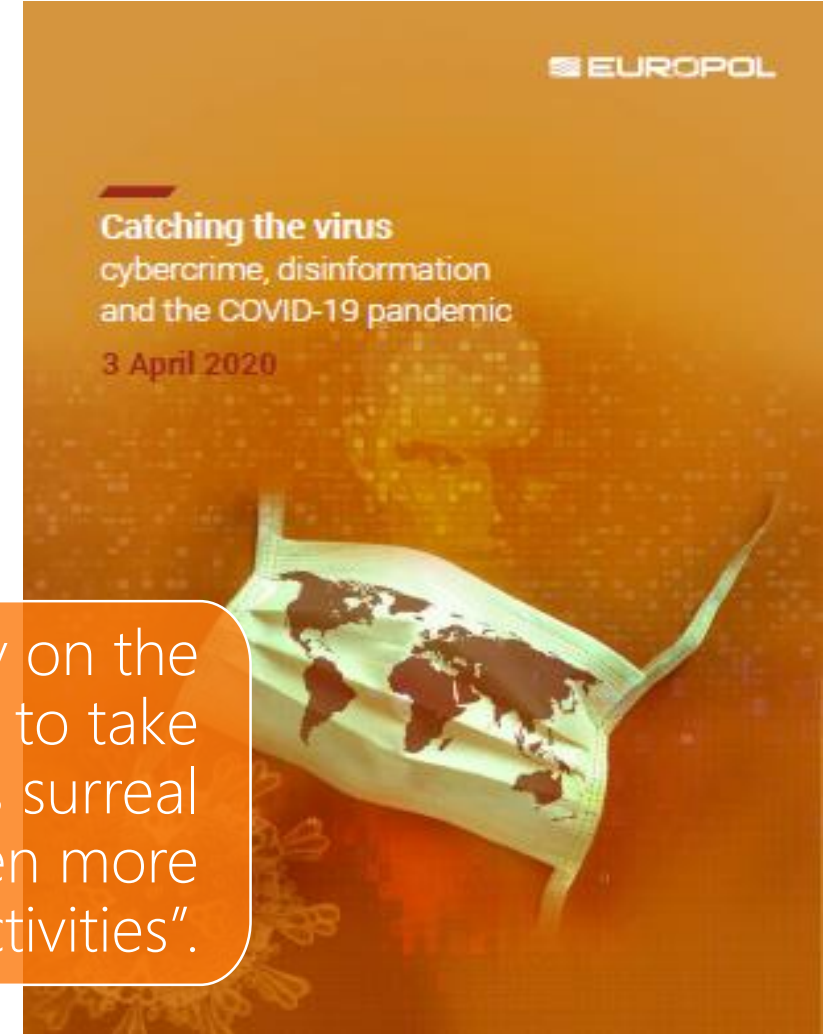


# First alerts on cybercrime during COVID-19

How cybercrime “should” change during Covid-19

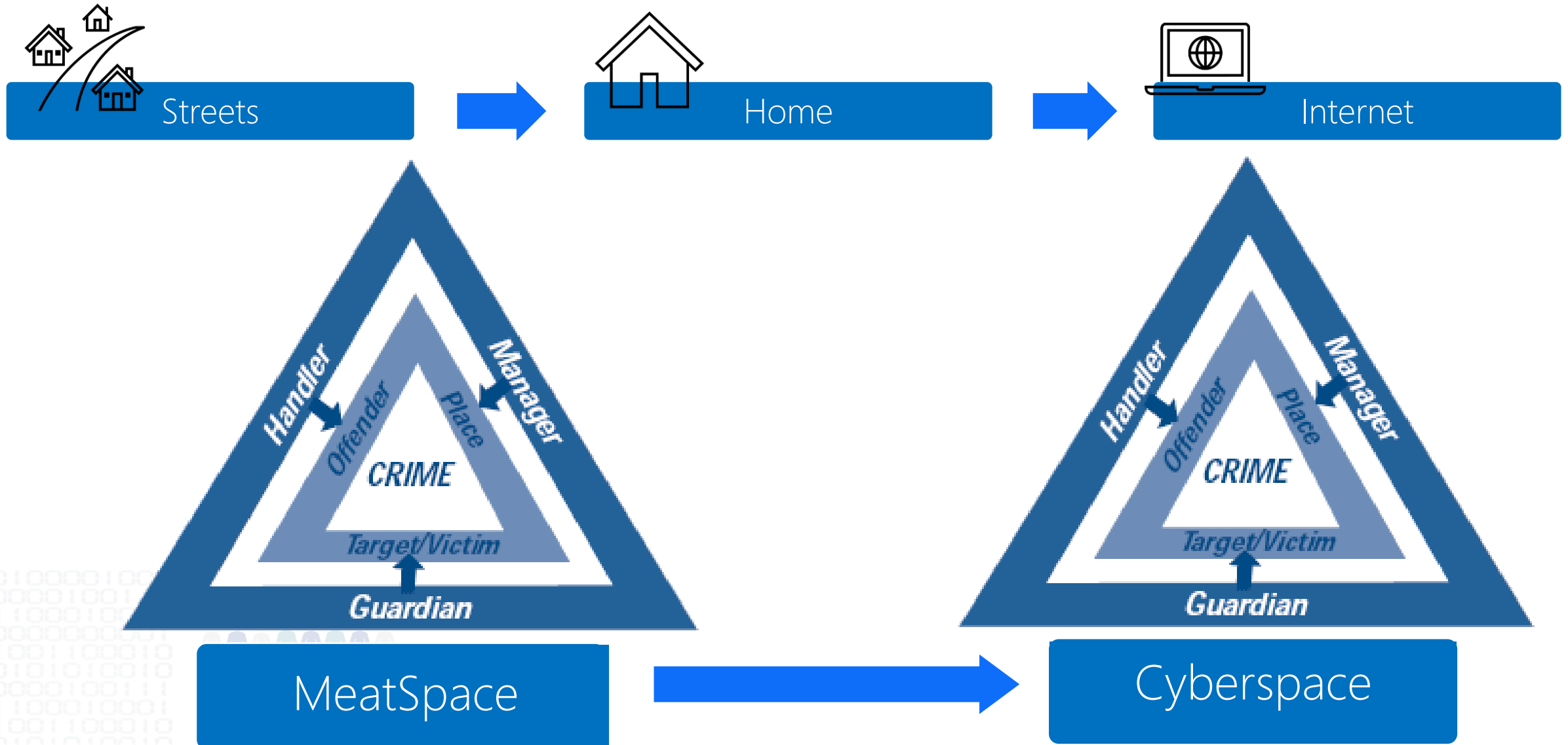


“The number of cyber-attacks is significant and expected to increase further”.



“Cybercriminals prey on the opportunity to take advantage of this surreal situation and focus even more on cybercriminal activities”.

# But why?



# From streets to cyberspace?

If offenders and victims spend their time on the Internet, it will be where they converge and where opportunities to offend will arise.



# Opportunity and opportunism inside the Internet

facebook



zoom

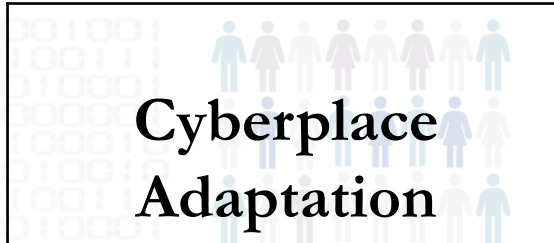


# Adaptation



# Adaptation

How do cybercriminals adapt?

<b>Typological Adaptation</b>	Cybercriminals respond to the blockage of a certain type of criminal activity by committing completely different crimes.
<b>Target Adaptation</b>	Cybercriminals are discarding attacks on well-protected targets and focusing their efforts on more vulnerable ones.
<b>Technical Adaptation</b>	Cybercriminals improve their attacks and use new tools to overcome the new barriers.
 <b>Cyberplace Adaptation</b>	Cybercriminals change the place in cyberspace from which they carry out the attack or the name of the website from which they act criminally.

# Adaptation

How do cybercriminals adapt?

What kind of adaptations can be facilitated by the pandemic?

<b>Target Adaptation</b>	Cybercriminals are discarding attacks on well-protected targets and focusing their efforts on more vulnerable ones.
<b>Cyberplace adaptacion</b>	Cybercriminals change the place in cyberspace from which they carry out the attack or the name of the website from which they act criminally.

# Target adaptation

Health system as a new target



HOME > NEWSROOM > CORONA CRIMES: MULTI-MILLION FACE MASK SCAM FOILED BY POLICE ACROSS EUROPE

## CORONA CRIMES: MULTI-MILLION FACE MASK SCAM FOILED BY POLICE ACROSS EUROPE

14 April 2020  
Press Release



[Home](#) / [About WHO](#) / [Communicating for health](#) / [Cyber security](#)

## Beware of criminals pretending to be WHO



### Public Service Announcement

FBI & CISA

13 May 2020

PEOPLE'S REPUBLIC OF CHINA (PRC) TARGETING OF  
COVID-19 RESEARCH ORGANIZATIONS

EN v

Q

≡

INTERPOL

Cybercriminals targeting critical healthcare institutions with  
ransomware

4 April 2020

COVID-19  
FRAUD  
ALERT

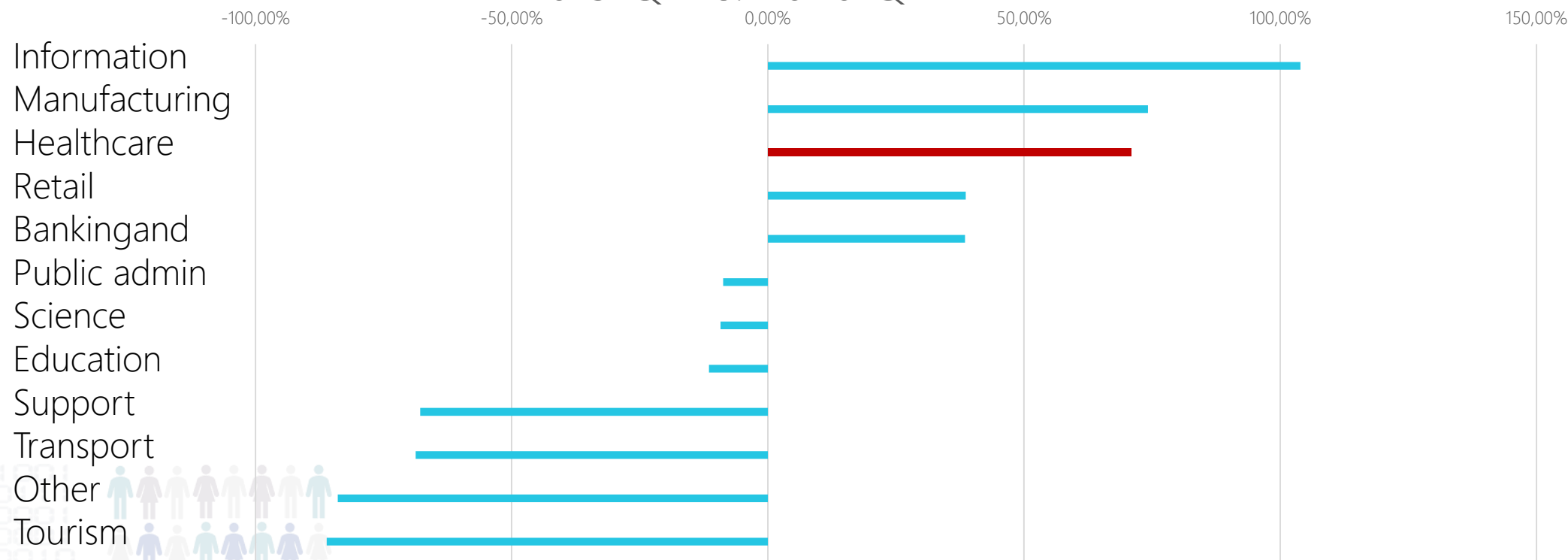


INTERPOL assisting member countries to mitigate and  
investigate attacks against hospitals

# Target Adaptation

## Shifts of main targets

Percentage change in number of violations by sector affected,  
2019 Q1 vs. 2020 Q1



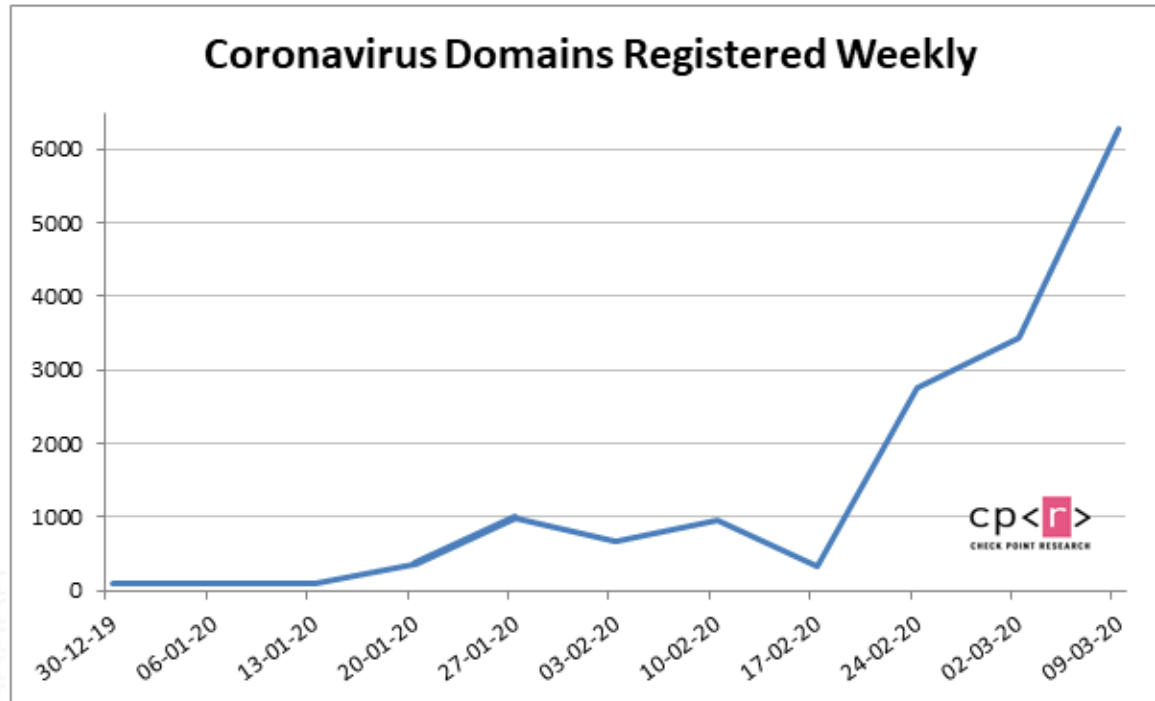
Source: Own elaboration from the atlasvpn



# Cyberplace adaptation

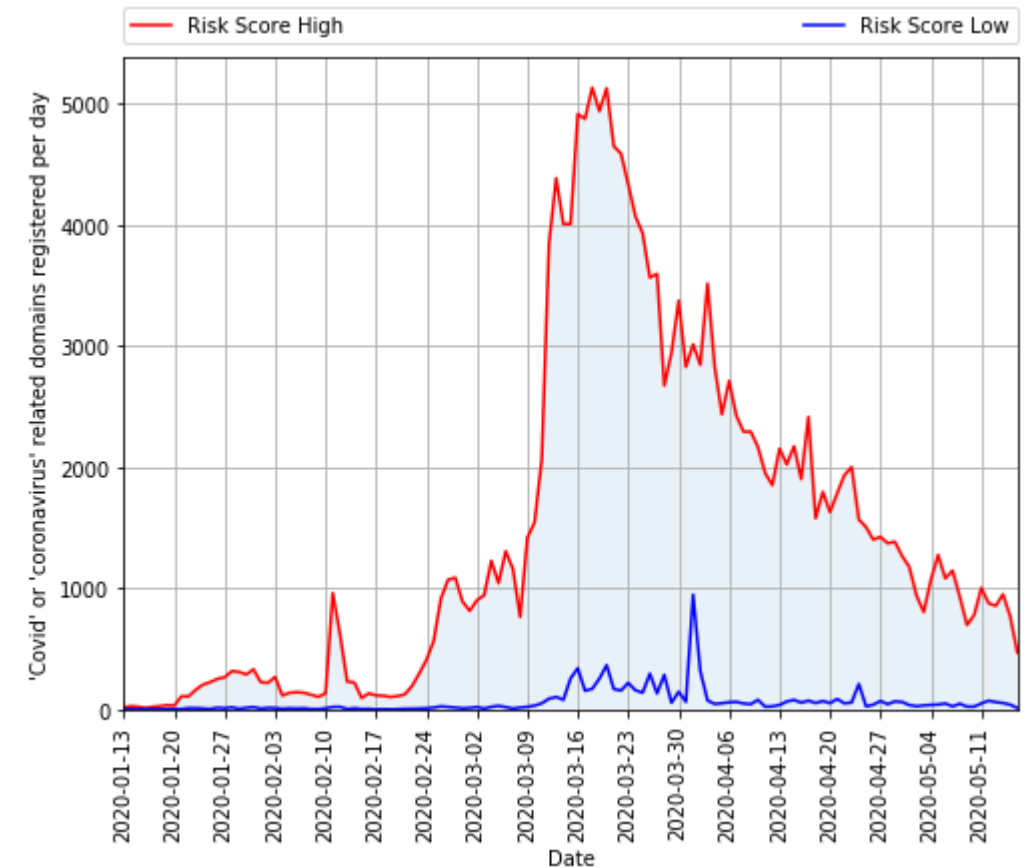
## New covid-19 related domains

The growing interest in the virus was reflected in the creation of domains related to Covid-19.



Source: Checkpoint

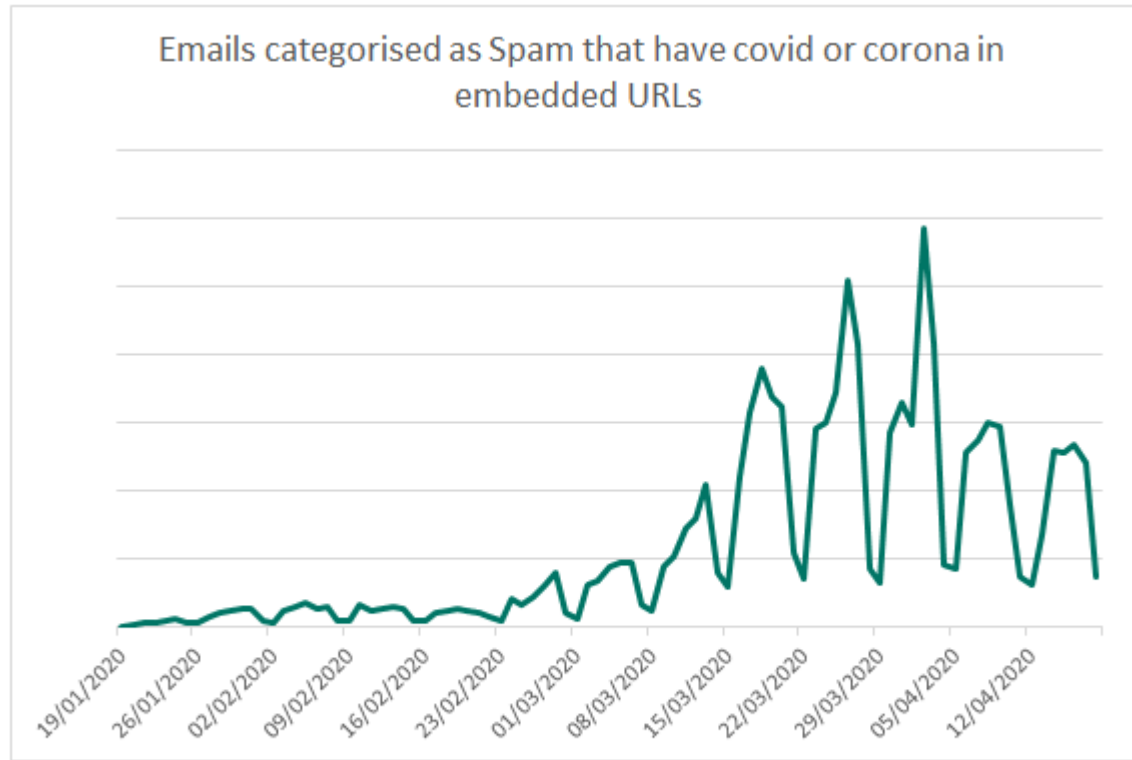
The creation of legitimate domains was accompanied by the creation of malicious domains.



Source: Domaintools

# Cyberplace adaptation

## Thematic Covid-19 scam, spam and malicious domains



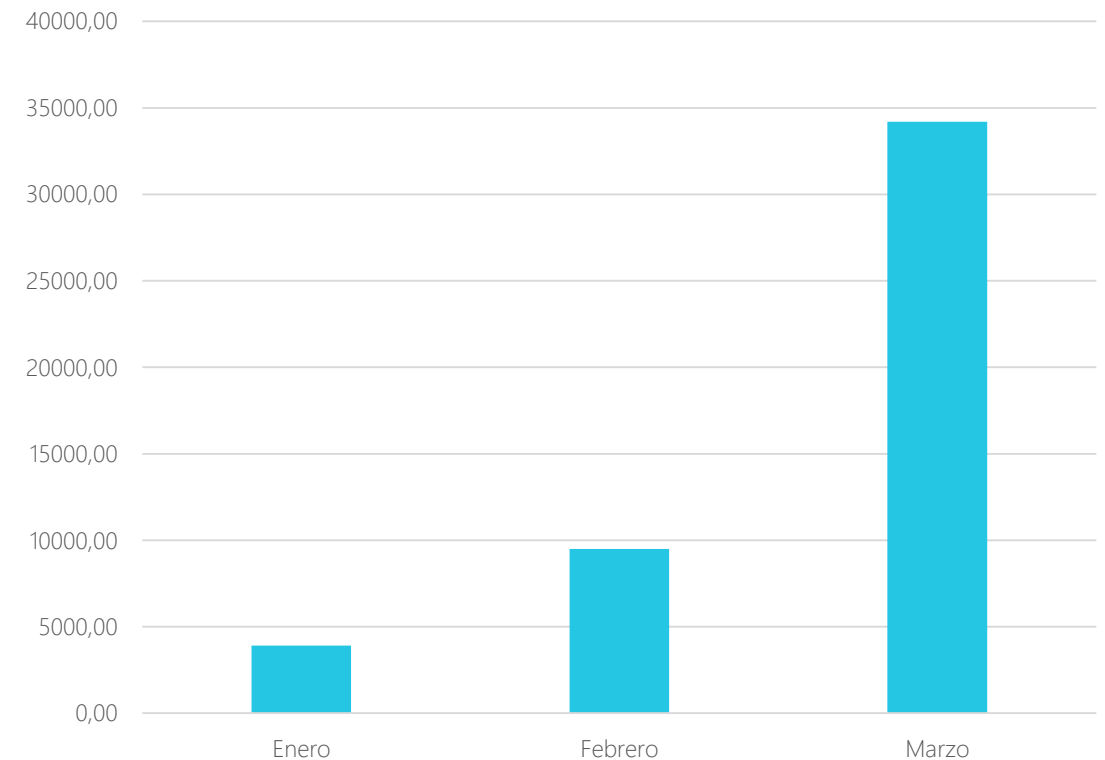
Spam emails that included COVID or Coronavirus-themed embedded URLs



Source: Forcepoint

Access to malicious domains related with "covid-19"

Source: Trendmicro Enero-Marzo 2020



Source: Own elaboration (Data Trendmicro)



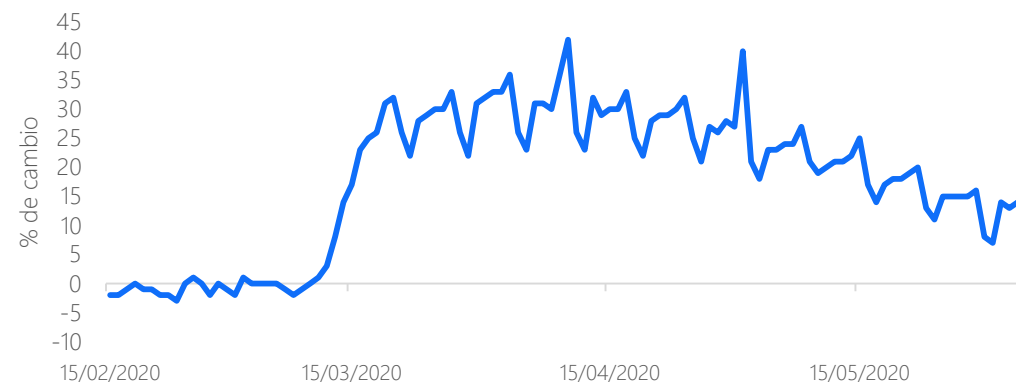
Shift of opportunities

# Shift of opportunities

## Changes in mobility

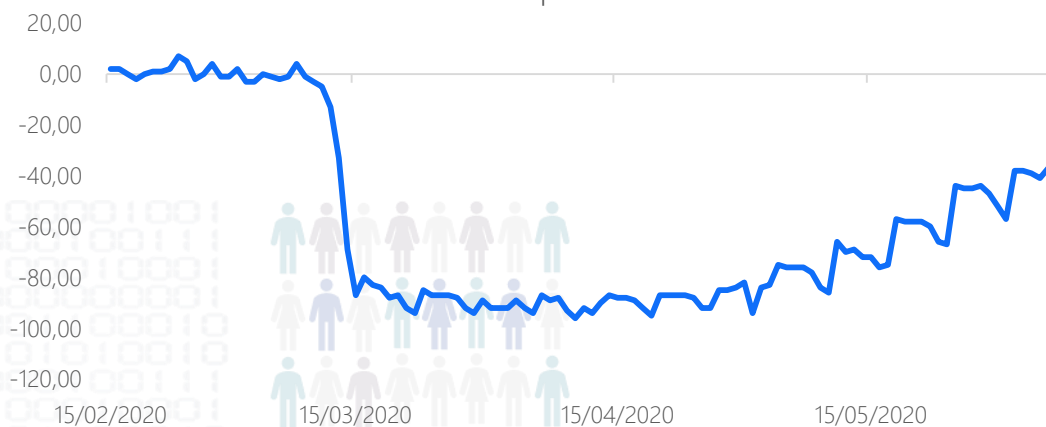


Percentage change in mobility in residential areas in Spain from baseline



Source: own elaboration (data from Google Trends)

Percentage of change in mobility in commercial and leisure areas in Spain from baseline



Source: own elaboration (data from Google Trends)





# Shift of opportunities

Changes in work, education, entertainment, shopping...

## The New York Times

### Websites

Facebook.com

**+27.0%**

170M

**Feb. 29**  
First U.S. Covid-19 death

Average daily traffic

120M

Jan. 15

March 24

Netflix.com

**+16.0%**

28M

16M

YouTube.com

**+15.3%**

200M

160M

### Apps

Facebook

**+1.1%**

348M

Netflix

**+0.3%**

120M

YouTube

**-4.5%**

32M

340M

118M

29M

Source: The New York Times

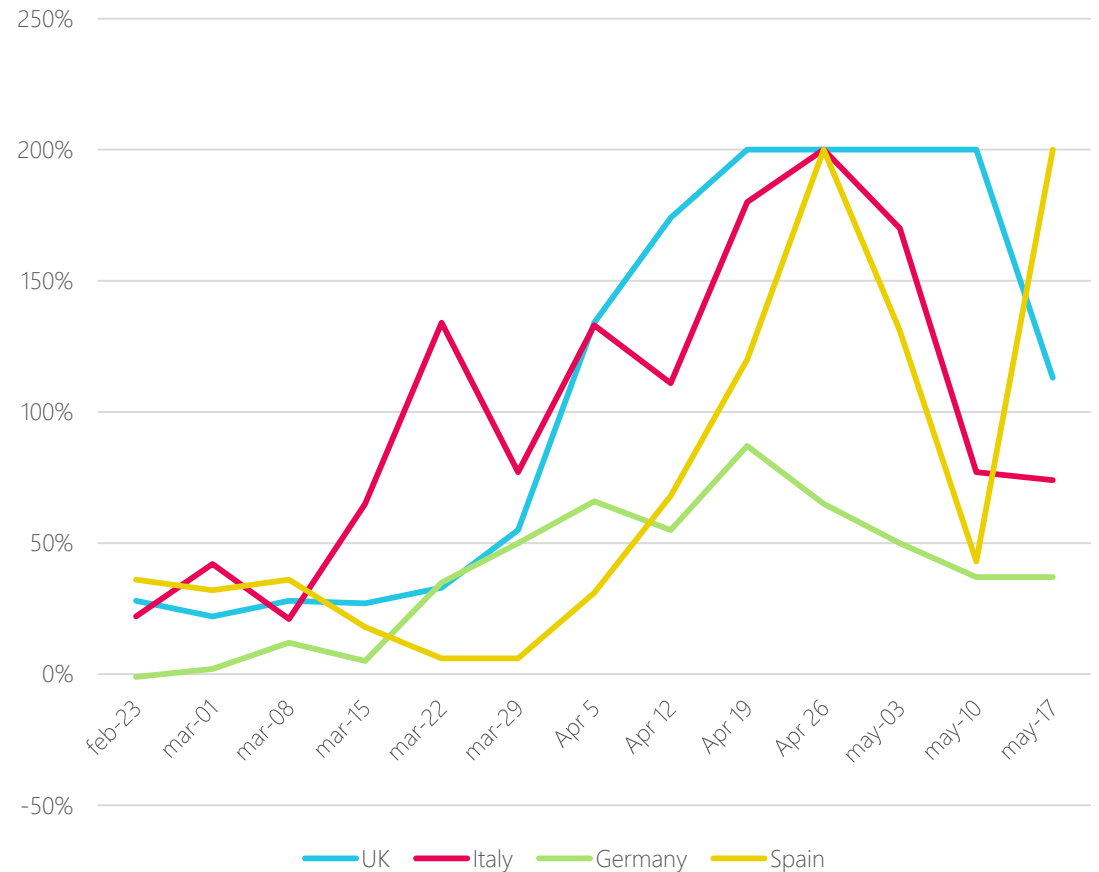


# Shift of opportunities

Changes in work, education, entertainment, shopping...



Growth in weekly online orders in the retail industry.



Source: own elaboration (data from Statista)

# The expansion of cyberspace



Today we are witnessing a shift of social relations and everyday activities from physical space to cyberspace.

More and more activities are taking place in cyberspace.

Some activities are starting to take place only in cyberspace.

Opportunities in physical space are reduced

Criminal opportunities in cyberspace are expanding

A horizontal teal brushstroke with a textured, watercolor-like appearance, spanning the width of the slide. The stroke has irregular edges and some darker shading within the teal area.

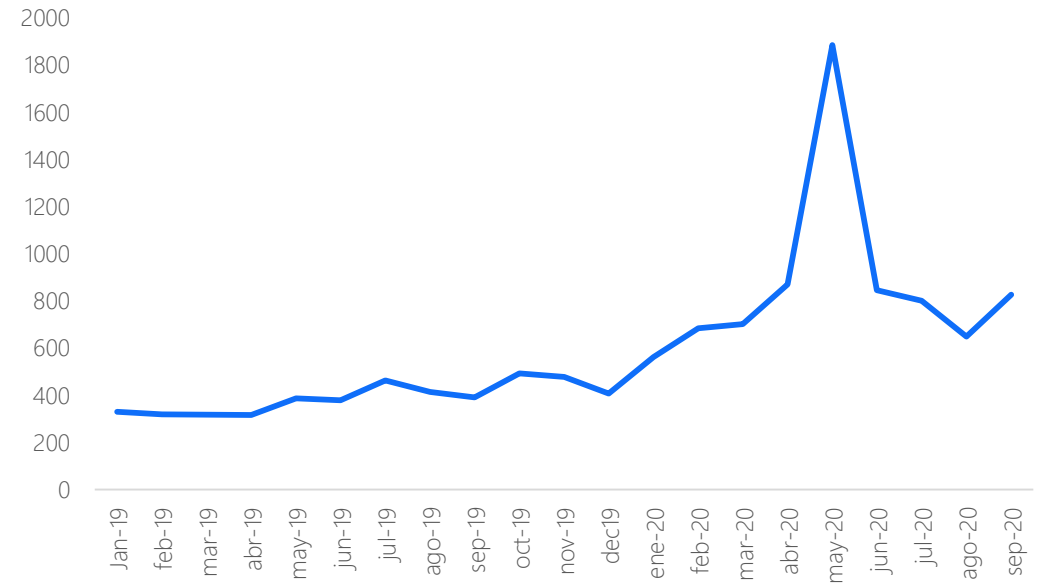
# How cybercrime changed during pandemic?



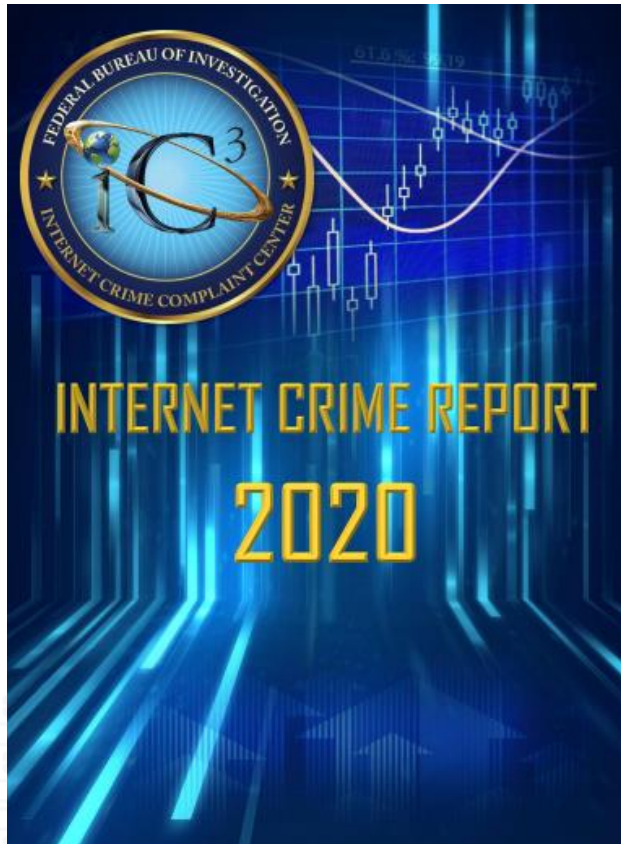
# Covid-19 national reports and monthly statistics



Registered cybercrime in the Netherlands



# Annual reports



CRIME	2020	2019	2018	2017	2016	2015	RC 15-RC 19-20	RC 19-20
Confidence Fraud/Romance	23751	19473	18493	15372	14546	12509	90%	22%
Crimes Against Children	3202	1312	1394	1301	1231	1348	138%	144%
Extortion	76741	43101	51146	14938	17146	17804	331%	78%
Harassment/Threats of Violence	20604	15502	18415	16194	16385	14812	39%	33%
Health Care Related	1383	657	337	406	369	465	197%	111%
IPR/Copyright and Counterfeit	4213	3892	2249	2644	2572	1931	118%	8%
Misrepresentation	24276	5975	5959	5437	5436	5458	345%	306%
Non-Payment/Non-Delivery	108869	61832	65116	84079	81029	67375	62%	76%

# Academic papers

## Violent and property crime

- PAYNE, J; MORGAN, A. (2020).
- PAYNE, J.; MORGAN, A.; PIQUERO, A. R. (2020)
- ASHBY, M. PJ. (2020)
- HODGKINSON, T.; ANDRESEN, M. A. (2020)
- MOHLER, G., et al. (2020)
- HALFORD, E., et al. (2020)
- PIQUERO, A. R., et al. (2020).
- FELSON, M; JIANG, S; XU, Y. (2020)






## Cybercrime

- HAWDON, J.; PARTI, K.; DEARDEN, T. E. (2020). Cybercrime in America amid COVID-19: the Initial Results from a Natural Experiment.
- BUIL-GIL, D, et al. Cybercrime and shifts in opportunities during COVID-19: a preliminary analysis in the UK
- KEMP, S, et al. Empty streets, busy Internet. A time series analysis of cybercrime and fraud trends during COVID-19. 202

# Has cybercrime increased during COVID-19?

European Societies in the Time of the Coronavirus Crisis

## Cybercrime and shifts in opportunities during COVID-19: a preliminary analysis in the UK

David Buil-Gil , Fernando Miró-Llinares , Asier Moneva , Steven Kemp  & Nacho Díaz-Castaño 

Received 29 Jun 2020, Accepted 28 Jul 2020, Published online: 11 Aug 2020

	Count in May 2019	Count in May 2020	Relative change (%)
Computer virus/malware/spyware	742	648	−12.67*
Denial of Service attack	14	18	28.57
Hacking – Server	24	25	4.17
Hacking – Personal	270	479	77.41***
Hacking – Social media and email	939	1,449	54.31***
Hacking – PBX/Dial Through	9	7	−22.22
Hacking combined with extortion	313	251	−19.81*
Online fraud – online shopping and auctions	5,619	8,482	50.95***
All cybercrimes	7,930	11,359	43.24***

\*\*\* $p$ -value < 0.001, \*\* $p$ -value < 0.01, \* $p$ -value < 0.05.

Source: own elaboration (data from Action Fraud UK).

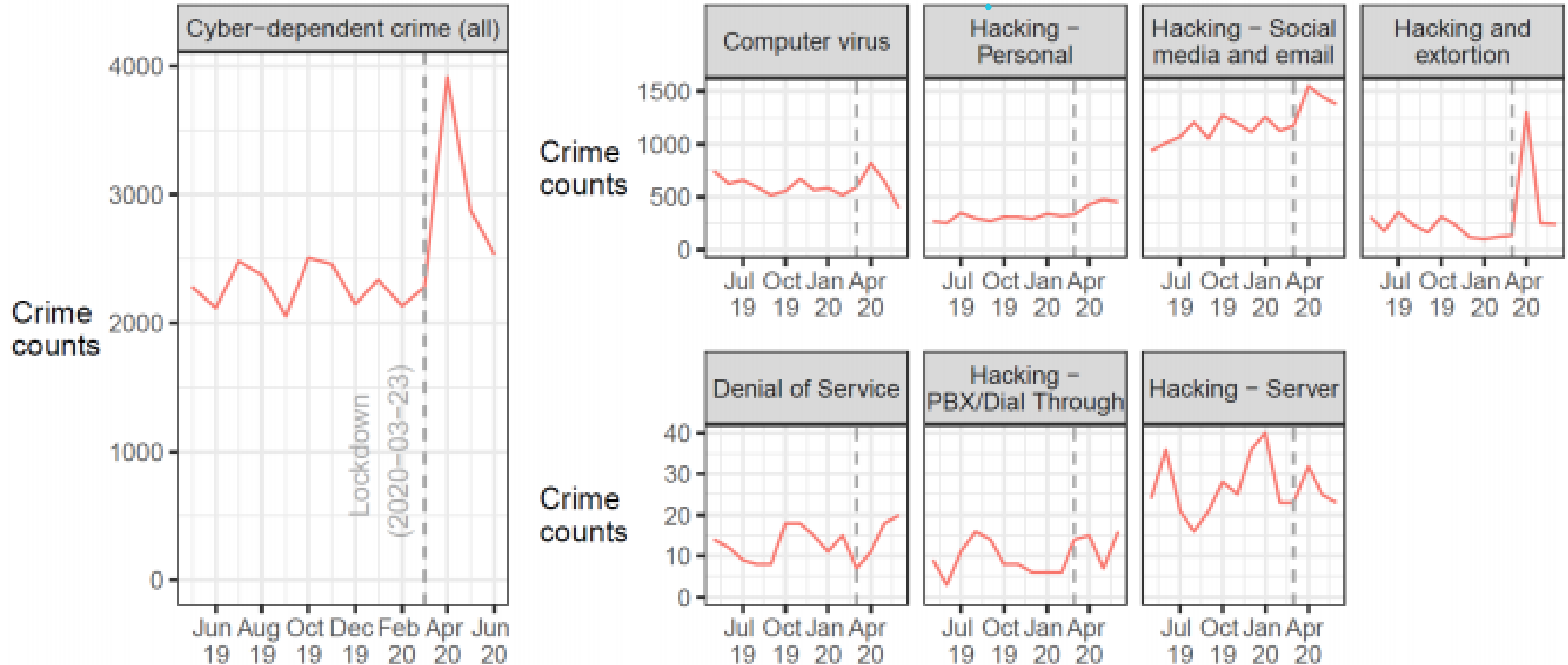
Source: Buil-Gil et al, 2020



# How has cybercrime changed during Covid-19?

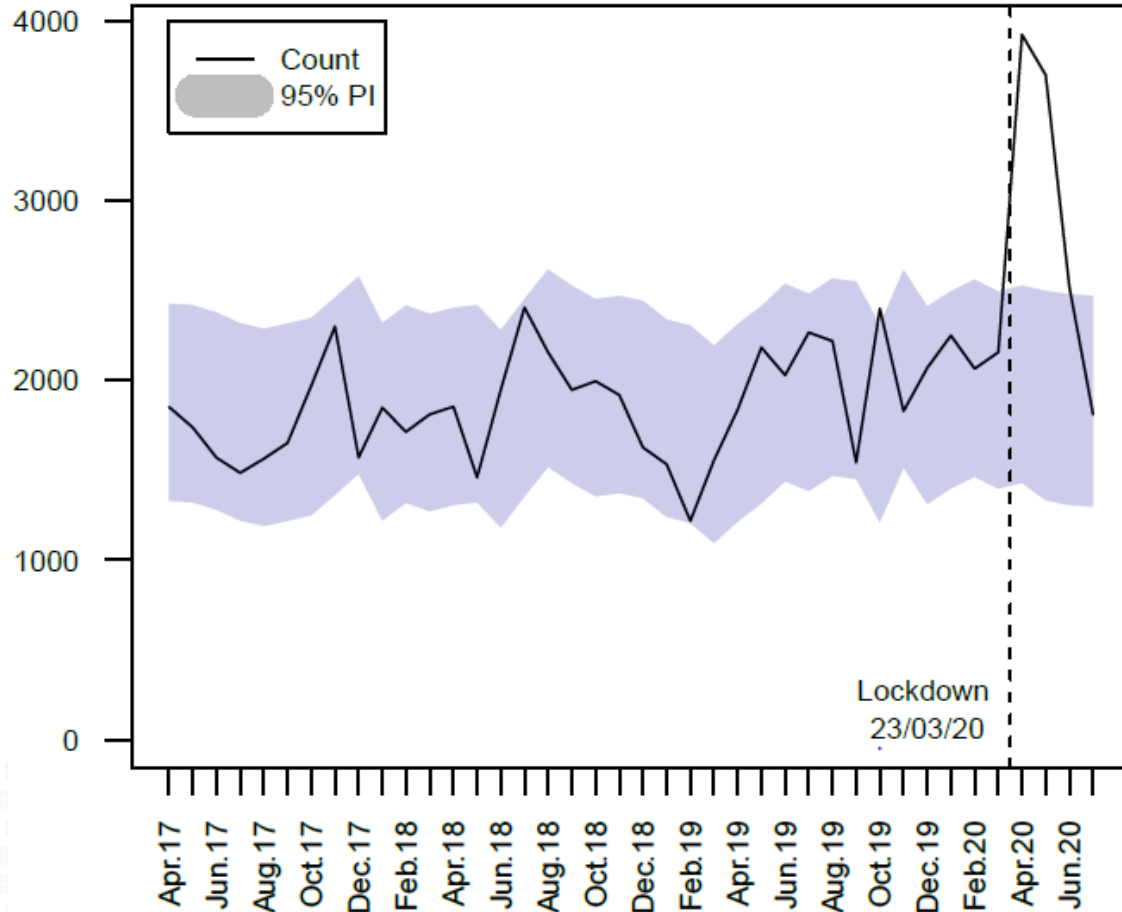
**Fig.1**

**Trends in cyber-dependent crimes by crime type**

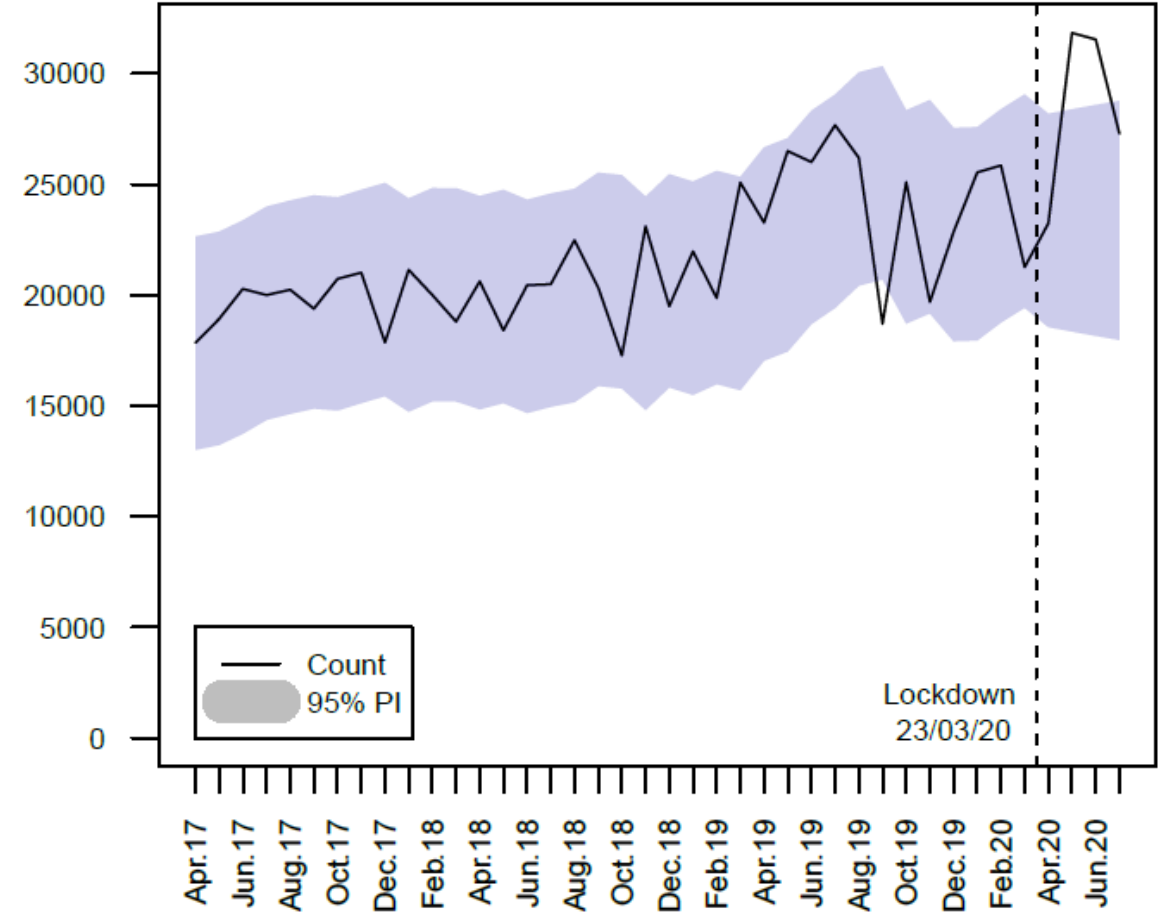


# How has cybercrime changed during Covid-19?

2a – Recorded Cybercrime and 95% Prediction Intervals



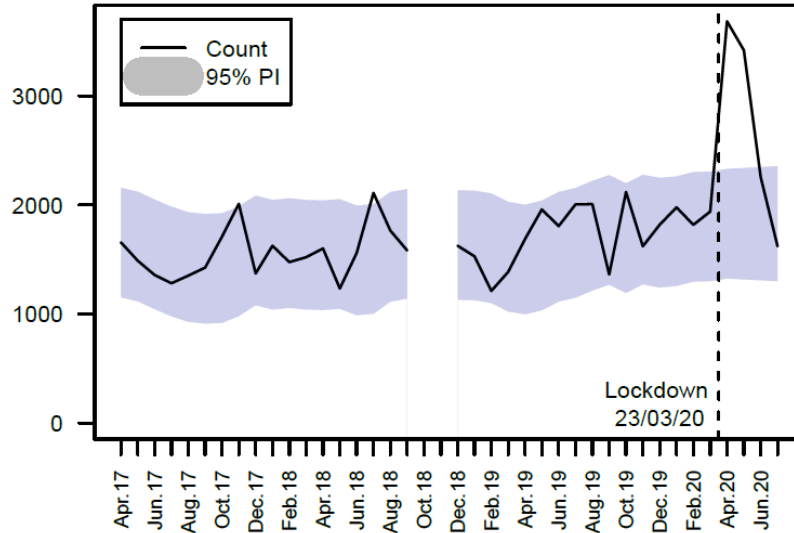
2b – Recorded Fraud and 95% Prediction Intervals



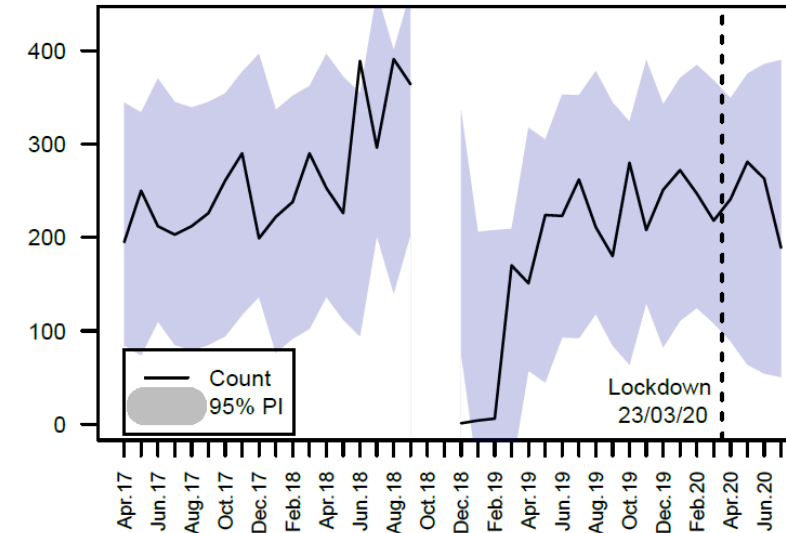
Source: Kemp, S et al, 2021

# How has cybercrime changed during covid-19?

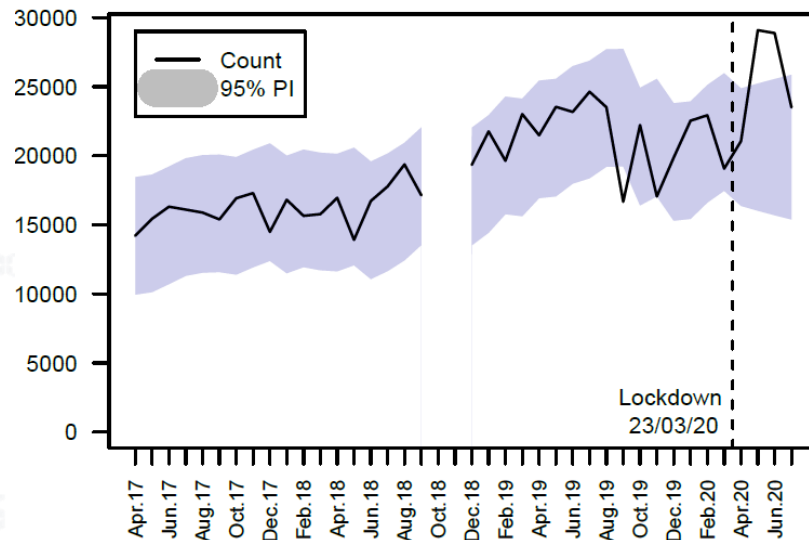
5a – Cybercrime (Individual Victims)



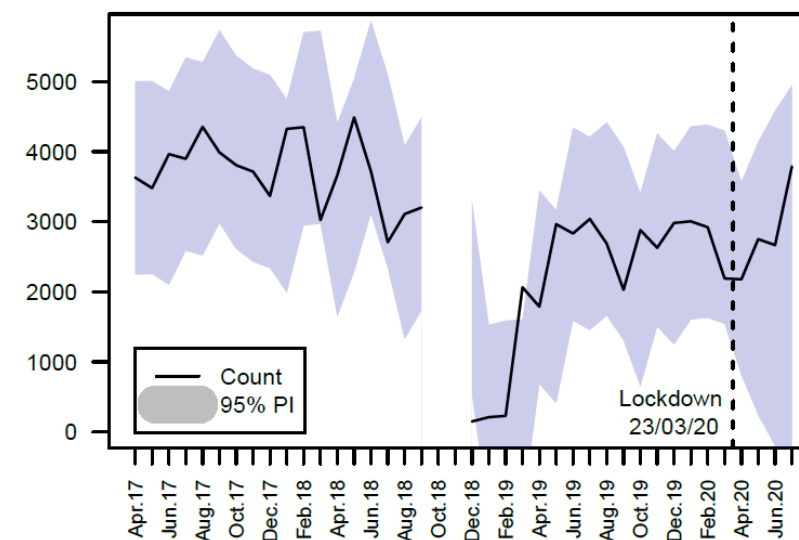
5b – Cybercrime (Organisation Victims)



5c – Fraud (Individual Victims)



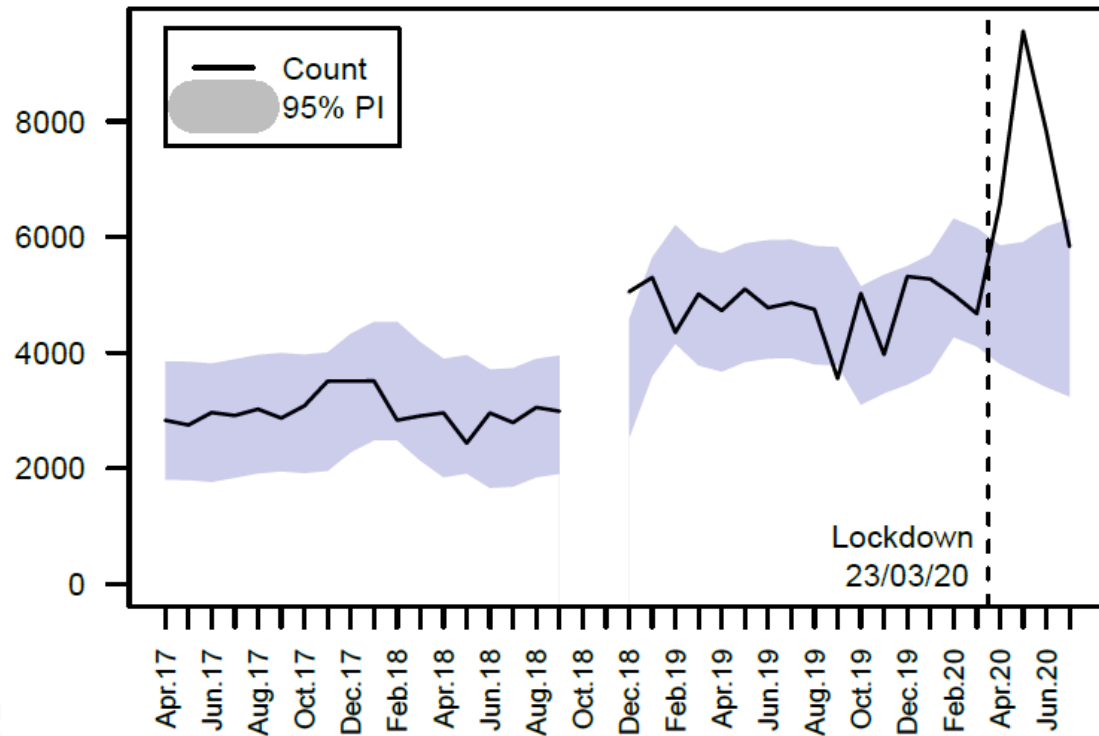
5d – Fraud (Organisation Victims)



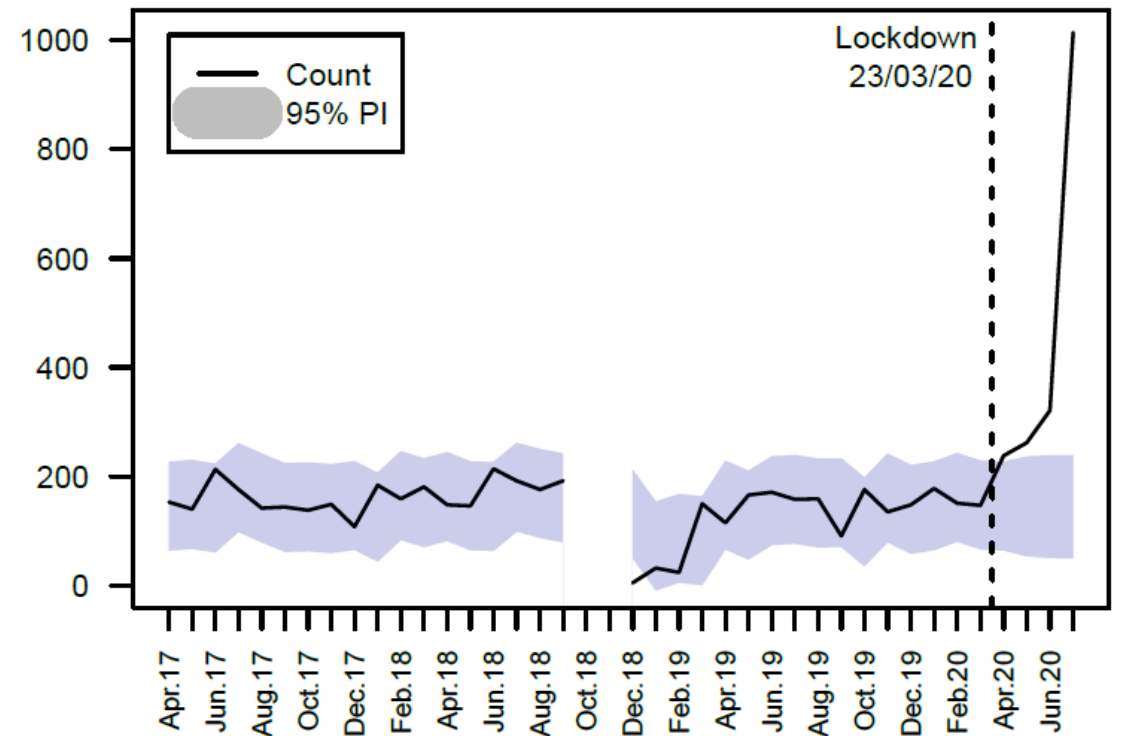
Source: Kemp, S et al, 2021

# How has cybercrime changed during covid-19?

**5e – Online shopping Fraud (Individual Victims)**



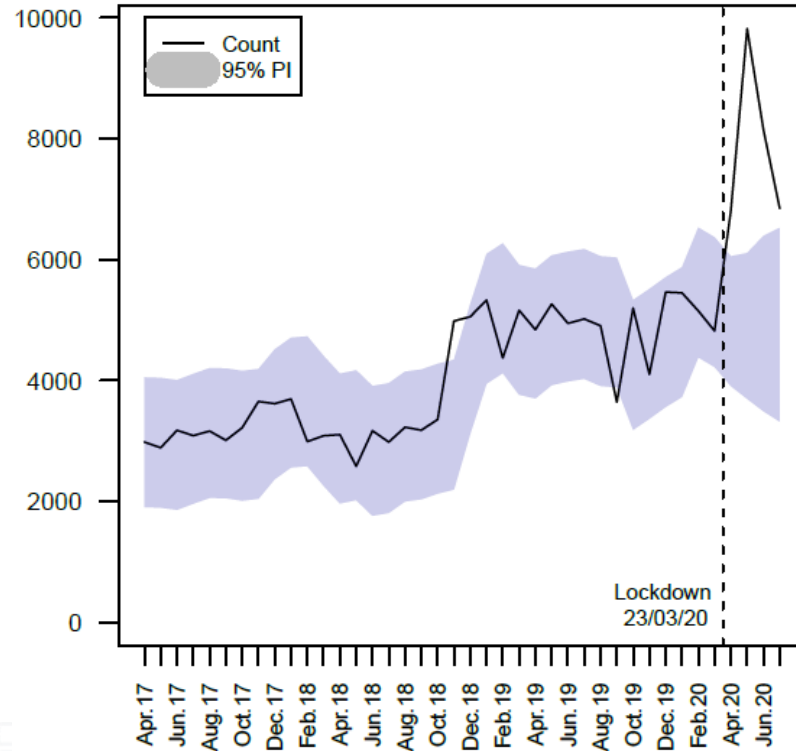
**5f – Online shopping Fraud (Organisation Victims)**



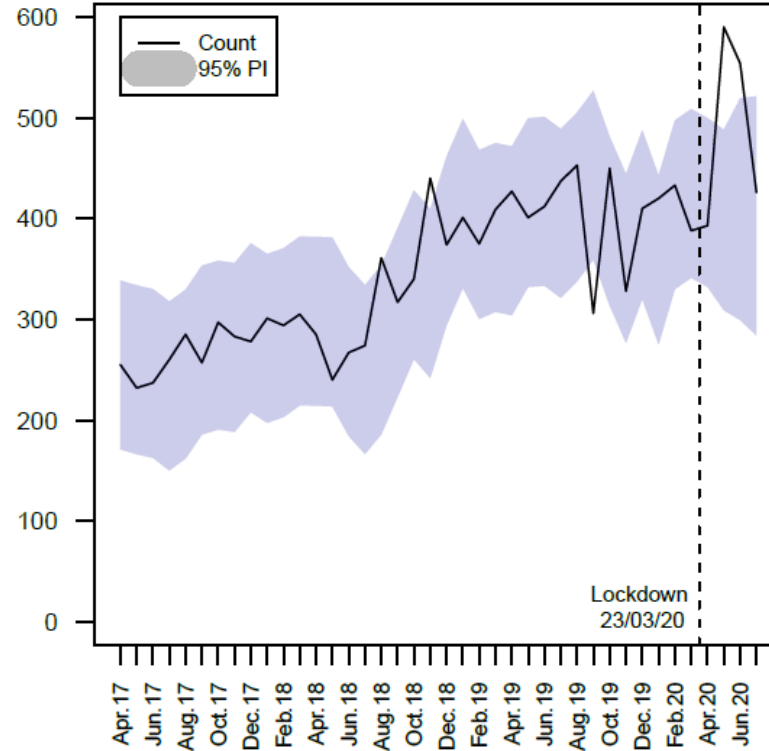
Source: Kemp, S et al, 2021

# How has cybercrime changed during Covid-19?

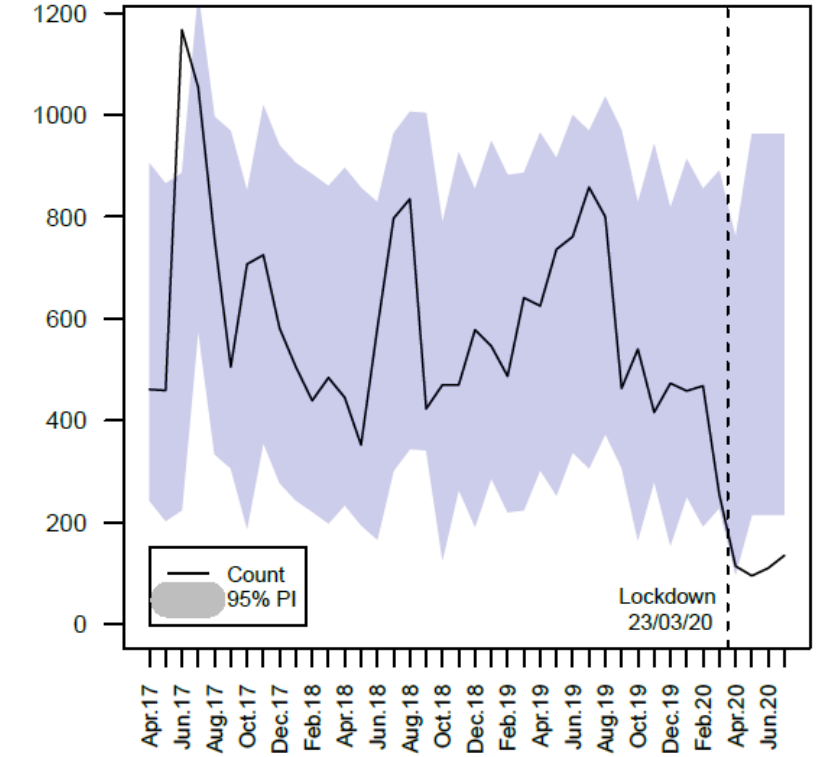
3a - Online Shopping Fraud, 95% PI



3b - Dating Fraud, 95% PI



3c - Ticket Fraud, 95% PI



Source: Kemp, S et al, 2021







**Is this trend totally new? Is it a passing trend?**

# An increasingly digital world

The shift from physical to digital is not new.

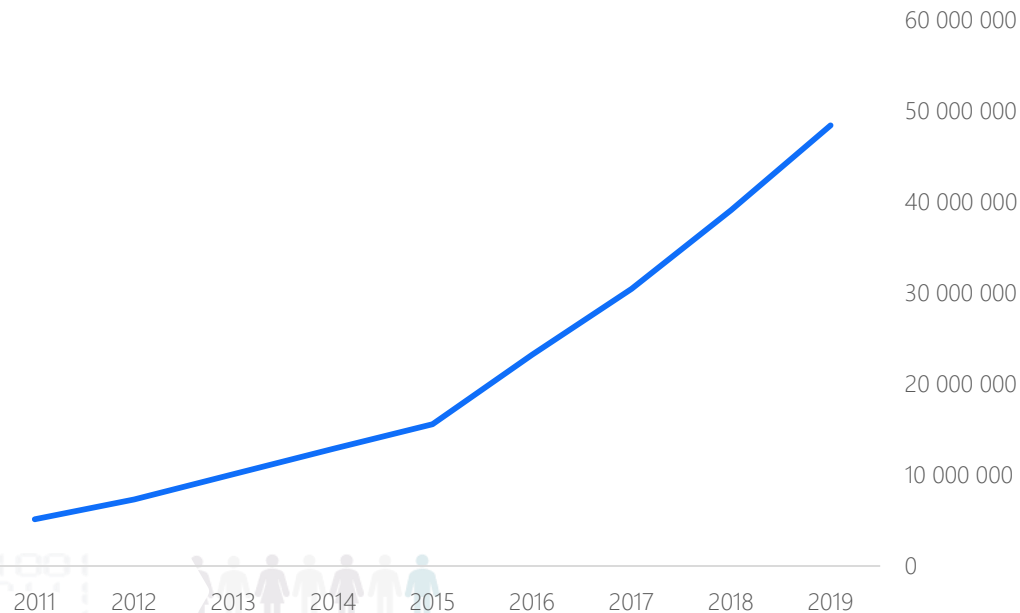


# An increasingly digital world

The shift from physical to digital is not new.

## Growing spending in video streaming platforms

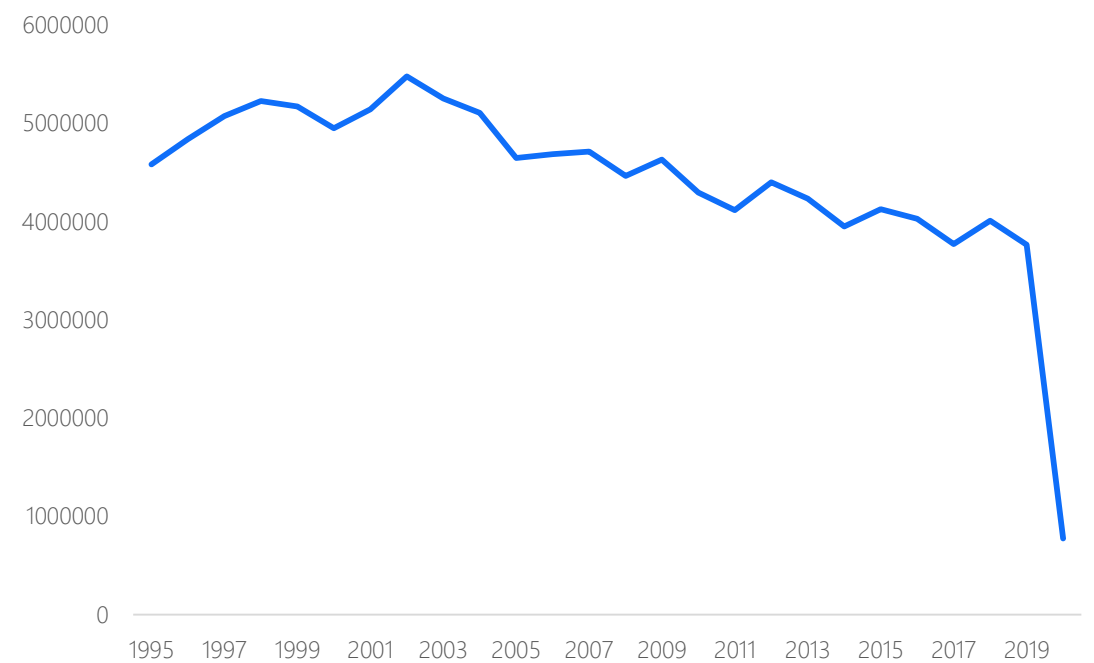
Netflix revenue per 1.000.000 inhabitants



Self-elaboration. Source: businessofapps.com

## Reduced spending in cinemas.

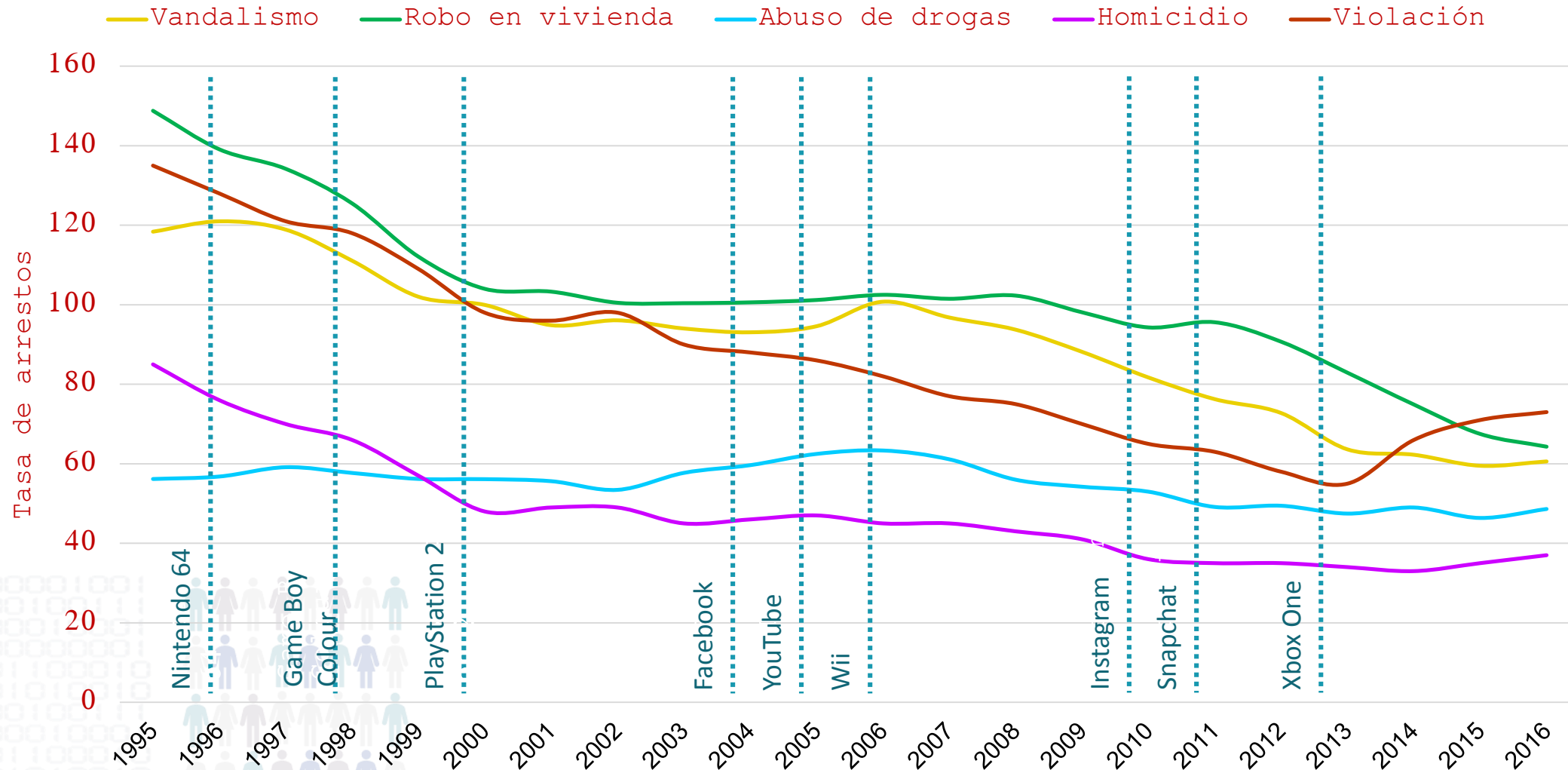
cinema revenue per 1.000.000 inhabitants



Self-elaboration. Source: the-numbers.com

# Crime drop and technology

The crime drop is not new either.



# Crime drop and technology

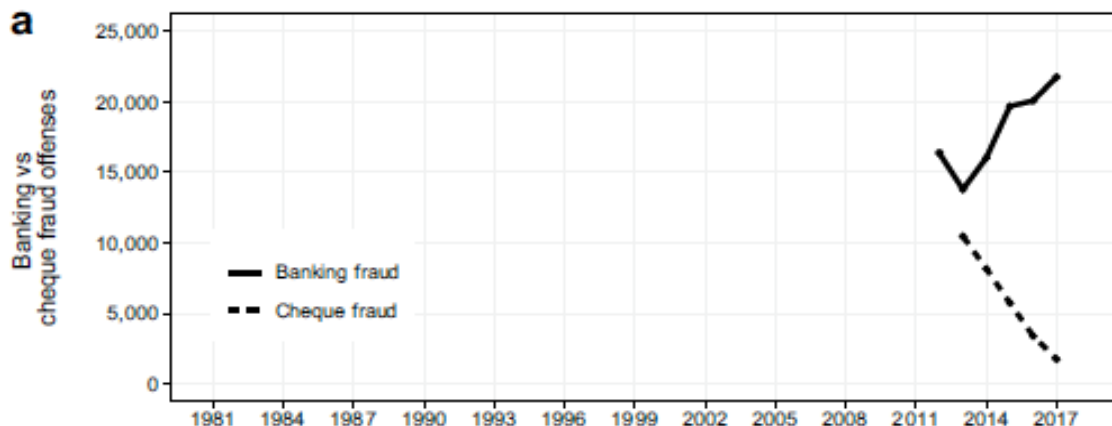
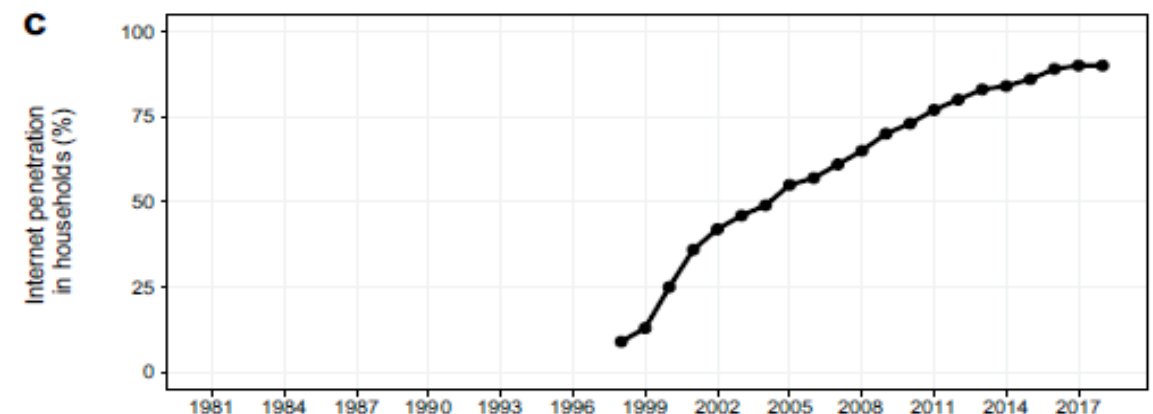
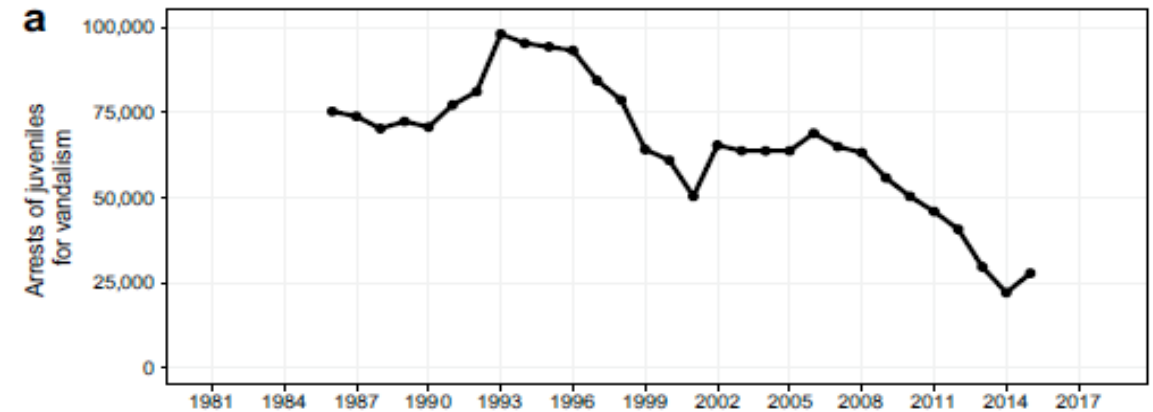
The crime drop is not new either.

Short Contribution | [Open Access](#) | Published: 21 October 2019

What about cyberspace (and cybercrime alongside it)? A reply to Farrell and Birks “Did cybercrime cause the crime drop?”

[Fernando Miró-Llinares](#) & [Asier Moneva](#) 

[Crime Science](#) **8**, Article number: 12 (2019) | [Cite this article](#)





# 20 years of digitalization and its impact on crime sentences about dual crimes in Spain

Trends in different crimes that can occur in the physical and online space based on the sentences available in the **Aranzadi** database analyzing the presence and evolution of the cyber component in them.

The cyber component has been conceptualized as the presence of any of the following keywords:

**Internet - smartphone - computer - cyberspace - online - email - WhatsApp - Facebook - .Instagram - Twitter - Google - digital - YouTube - web - forum - electronic - link – chat**

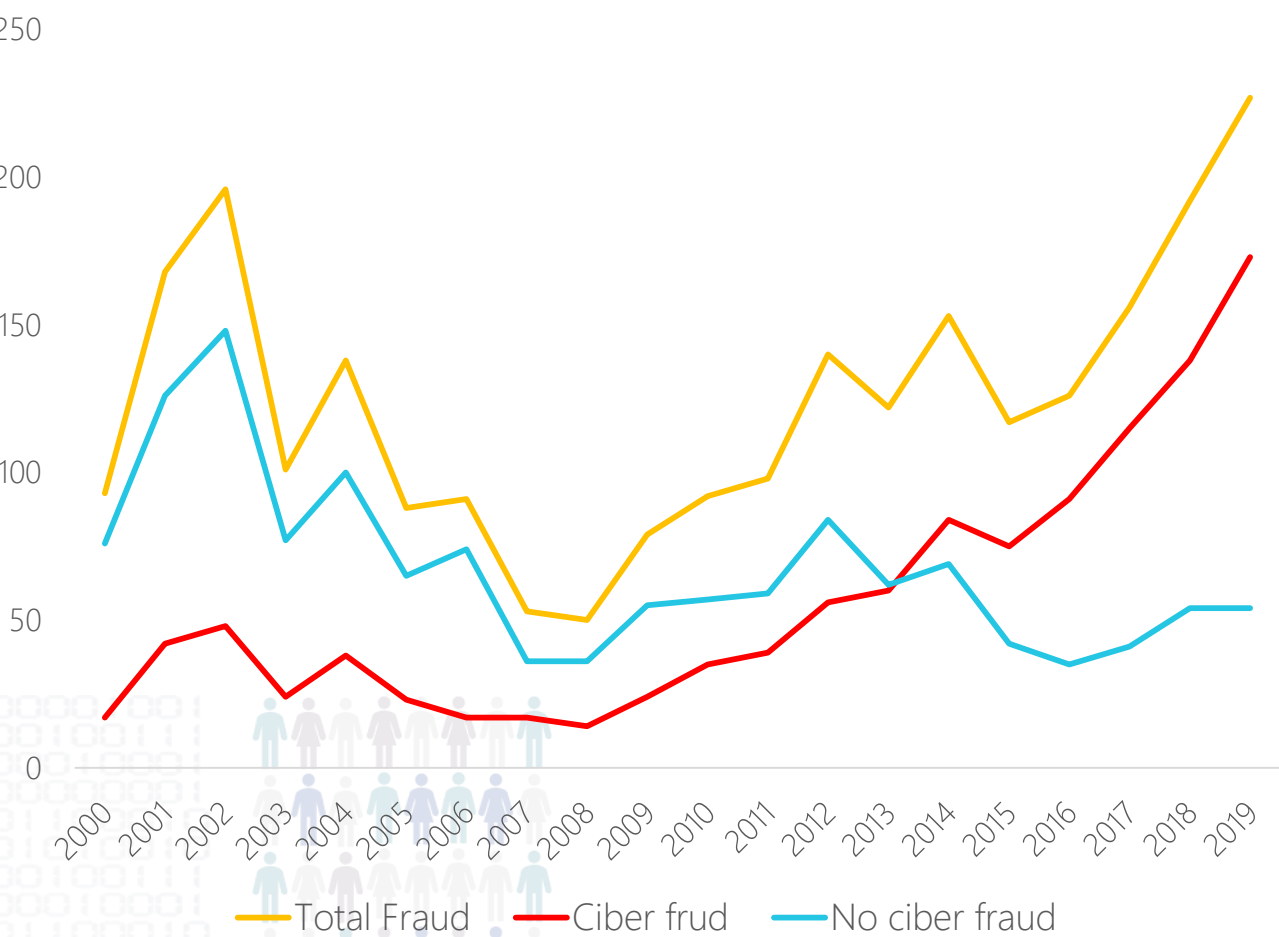
We are currently conducting a manual analysis of the sentences to confirm the cyber component.

Defamation	343
Duress	1155
Sex abuse	1825
Privacy	535
Copyright	2570
Fraud	2576
Total	9004

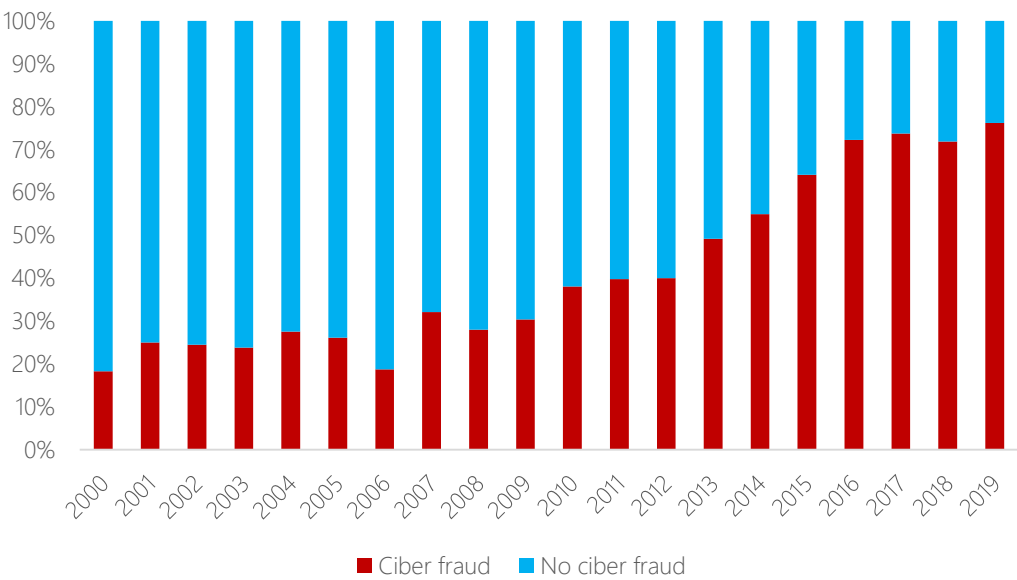
# Research on sentencing trends for dual crimes

## Fraud

Count of fraud sentences



% of cyber and non cyber fraud sentences

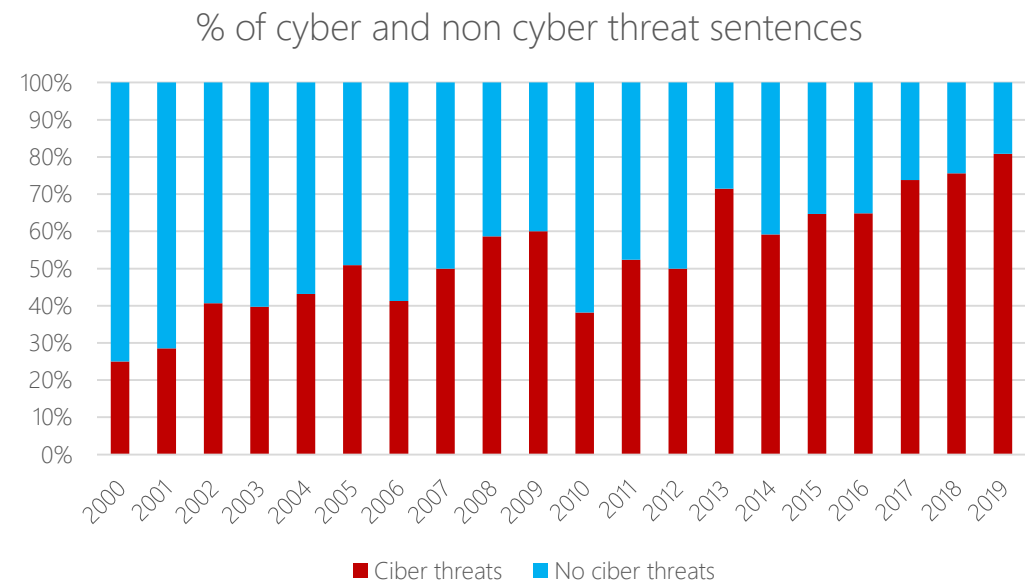
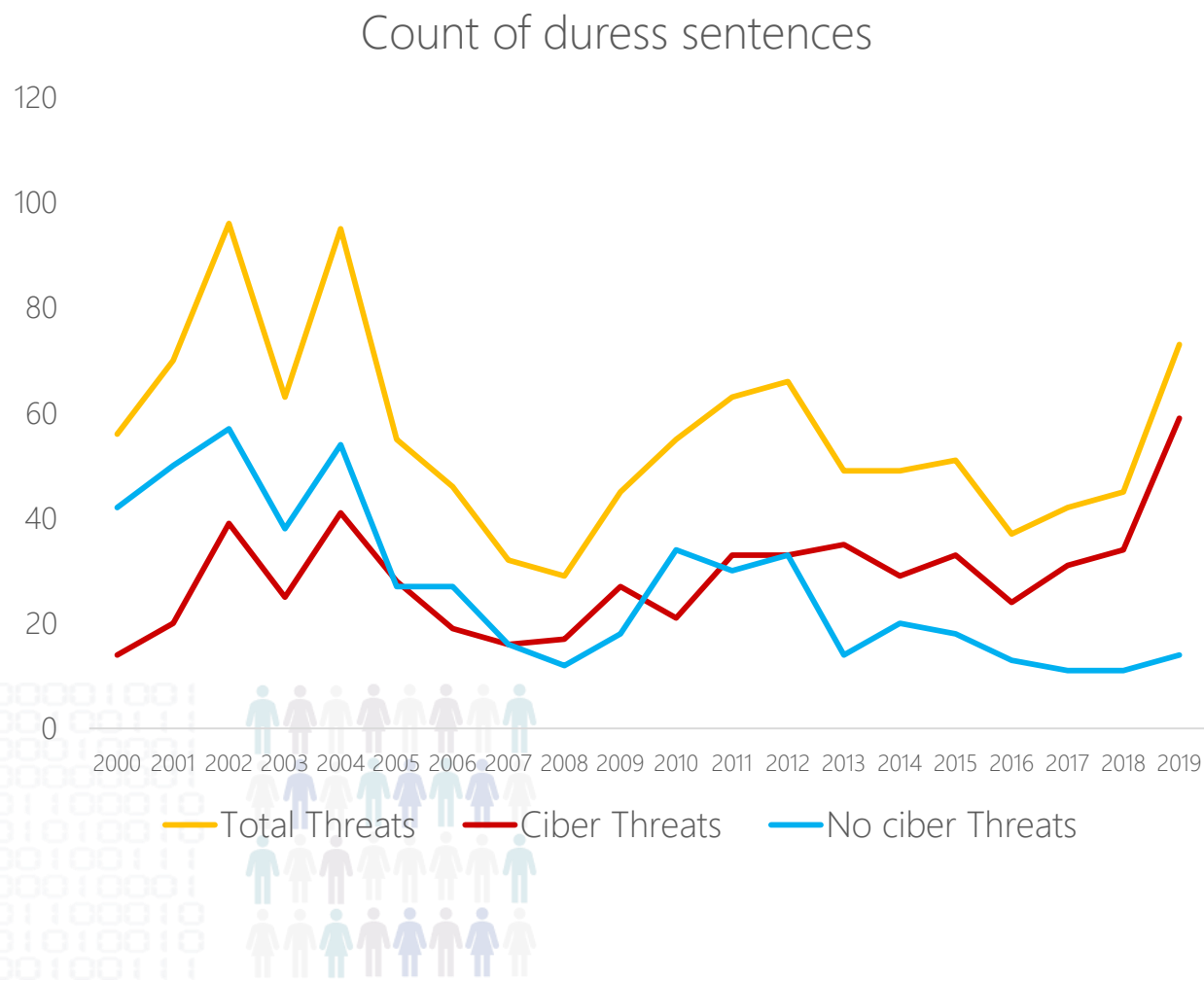


	2000	2019	Relative change
Total	93	227	144%
Ciber	17	173	918%
No ciber	76	54	-29%

	Mean 00s	Mean 10s	Relative change
Total	105,7	142,3	35%
Ciber	26,4	86,6	228%
No ciber	79,3	55,7	-30%

# Research on sentencing trends for dual crimes

## Coercion (threats of violence)



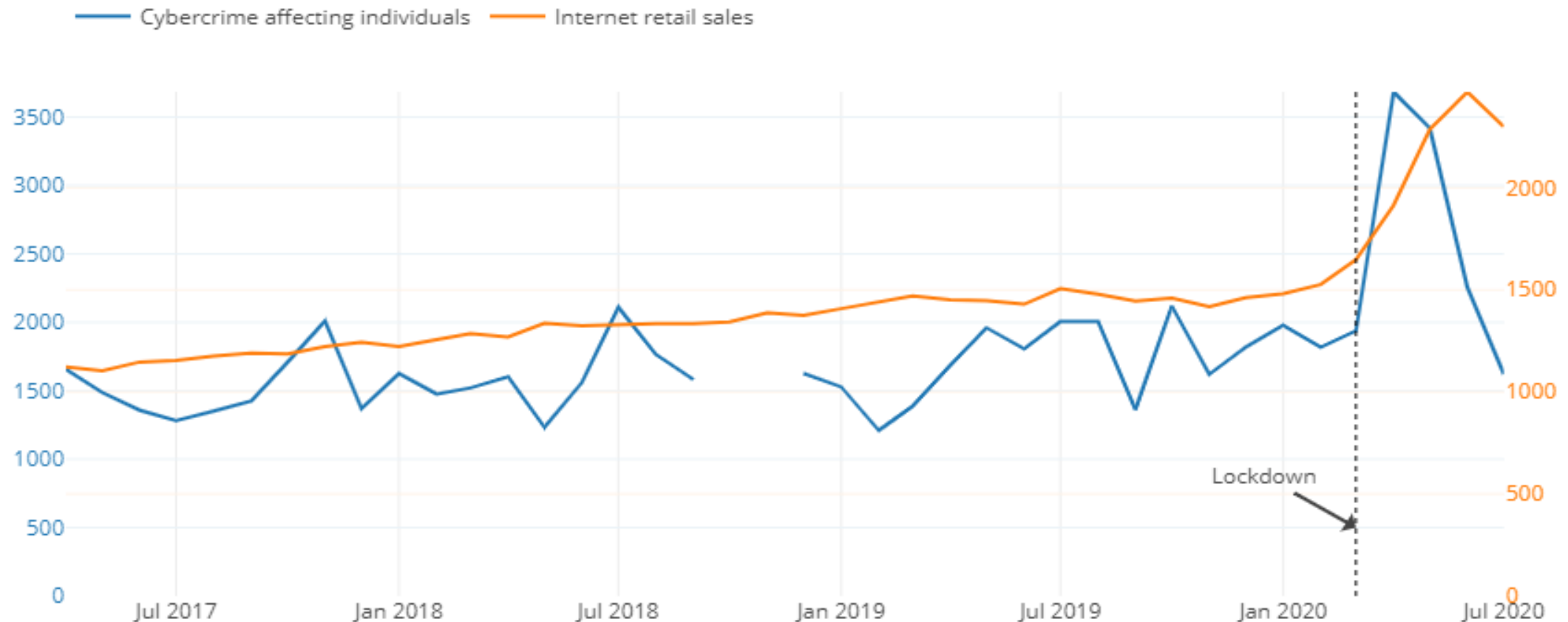
	2000	2019	Relative change
Total	56	73	30%
Ciber	14	59	321%
No ciber	42	14	-67%

	Mean 00s	Mean 10s	Relative change
Total	58,7	53	-10%
Ciber	24,6	33,2	35%
No ciber	34,1	19,8	-42%

# COvid19 as an accelerator of digitization and its consequences

# Changes ?

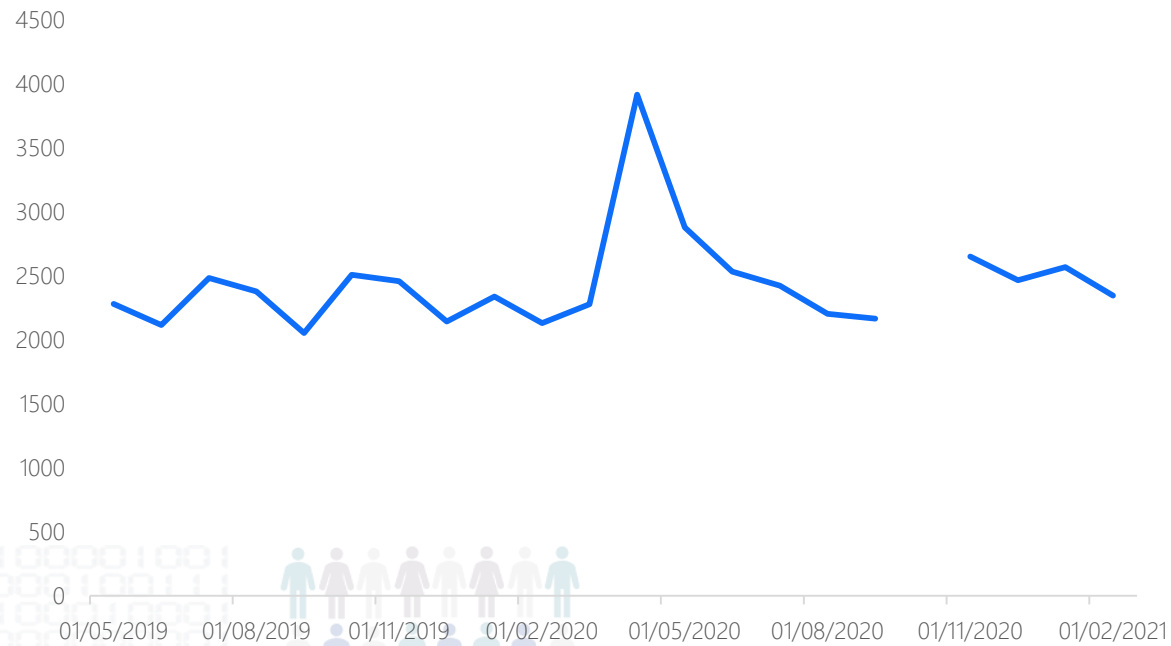
changes in crime will depend on whether we return to doing everyday activities as we did in the past.



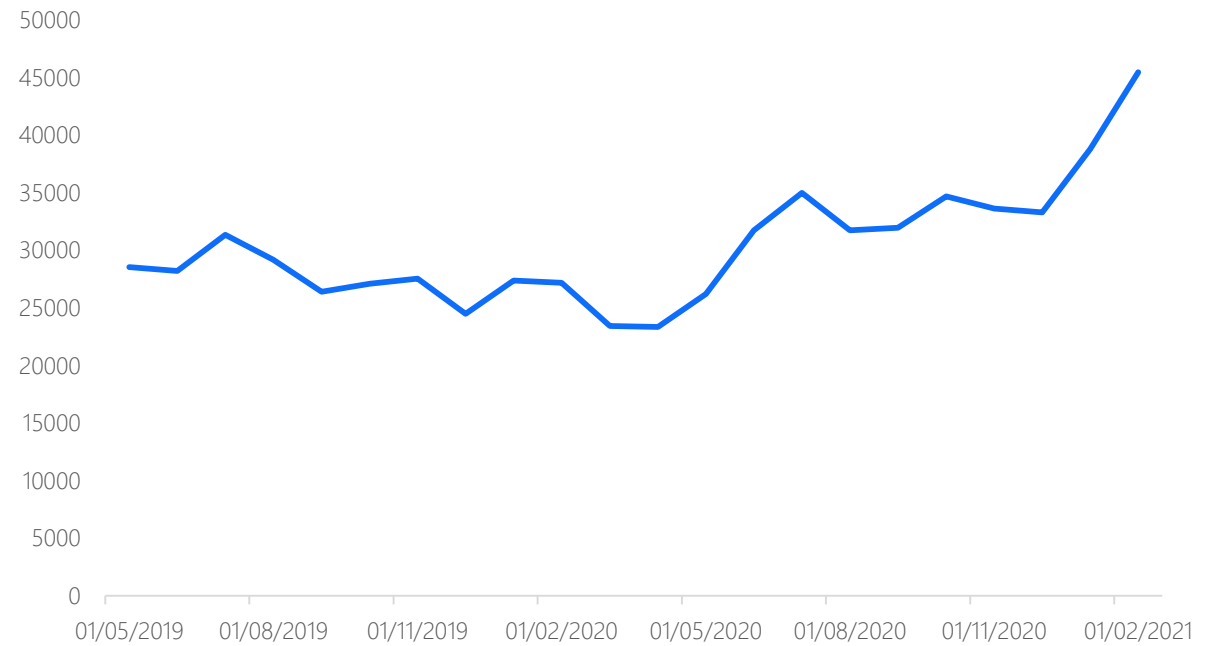


# What is happening now?

Cyber dependant (all)

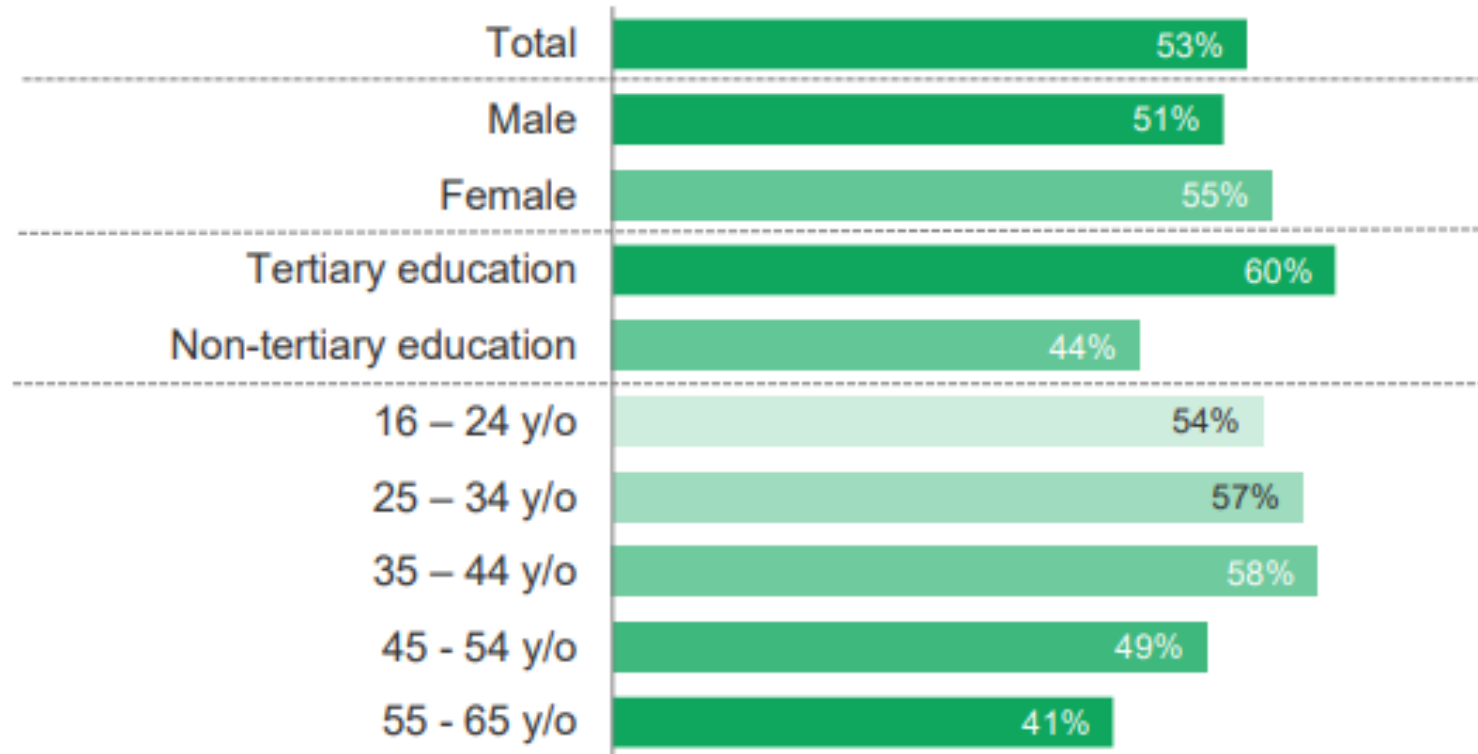


Cyber Fraud (all)



# Change in online shopping are expected to continue

Q: How likely do you think it is that you will continue to adopt the habits adopted during the COVID-19 emergency outbreak after this period?



Source: unctad.org

Will routine activities change in the long term?

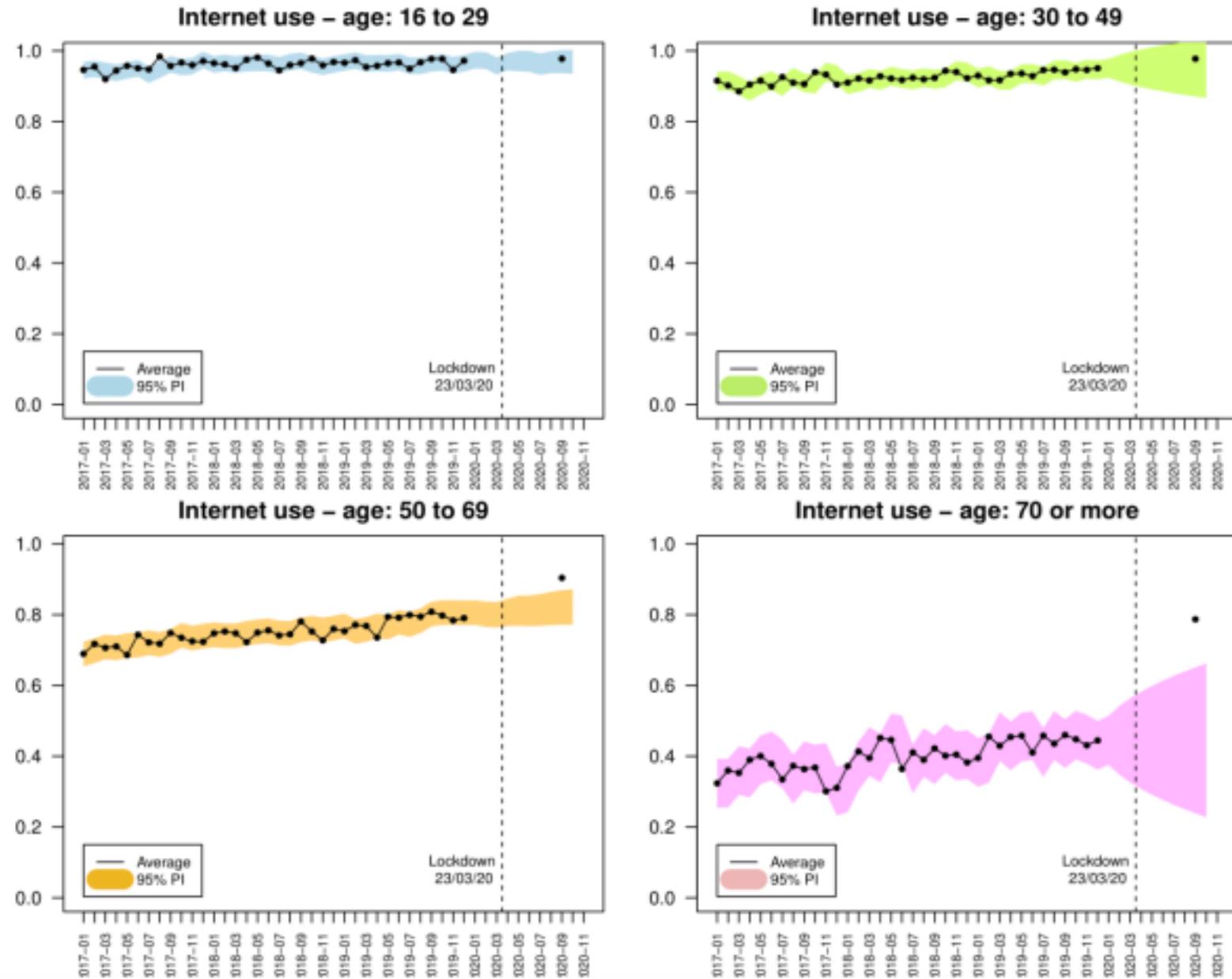
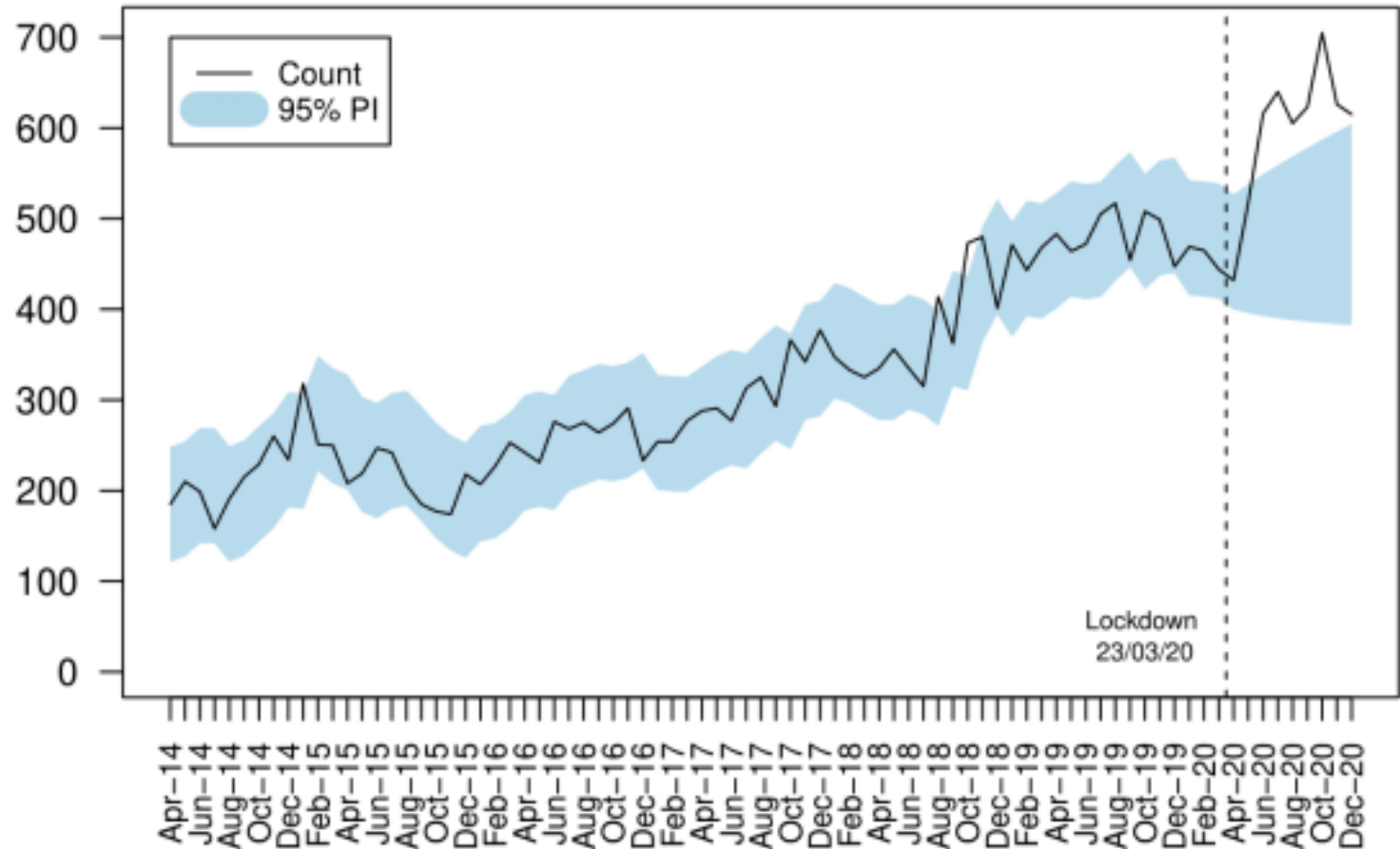


Figure 4. Proportion of respondents who use the internet daily and 95% prediction intervals

Source: Buil-Gil, D and Zeng, Y (2021)

Will routine activities change in the long term?

**Romance fraud and 95% Prediction Intervals**



Source: Buil-Gil, D and Zeng, Y (2021)

# Thank you for your attention

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