

The Dark Side of Digitalisation: Wealthier but Unhappier

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Abstract

Since the first industrial revolution, the world economy has passed a turmoiled path with many salient transformations that have shaped today’s human relations, commercial trades, innovation and governance. Now, humanity is going through the digital revolution, which seems to change the world even more rapidly than its predecessors. Despite the myriad of digitalisation advantages connected with this, one cannot neglect the downsides. Terms such as technostress, cyberbullying or technology addiction emerged to express the harm the accelerated digitalisation has brought into our lives. The present paper focuses on digitalisation’s effects on happiness, using a VAR model for the EU countries from 2017-2022. Despite the positive effect on economic growth underlined in the literature, a positive impulse in terms of digitalisation generates a persistent negative effect on happiness in the next three years.

Key words: digitalisation, economic growth, happiness, human relations, healthy and meaningful life

J.E.L. classification: I15, I31, O11, O38

1. Introduction

In the winter of 2022, on a train somewhere in the mountains.... a guy with a small boy, 5-6 years old, was watching the scenery. At some point, it began to snow. The boy looked amazed first at the snowflakes, and just after, he made strange gestures at the window. He was trying to zoom out what he considered a screen to see the snowflakes better and was disappointed and angry that “the device” was not working..... Some of us would smile imagining this scene, but this kind of reality distortion may raise some questions for some (true story that inspired this paper).

Digitalisation is one of the critical topics on the agenda of the European Commission. In a strict sense, digitalisation may be defined as converting information into a computer-readable, digital format for computerised processing. Nowadays, digital development includes new forms of communication such as social networks, smartphones and tablets, video games, new alternatives for data processing using big data, networked objects, regulation and new forms of computer-human interactions such as autonomous cars and voice-activated personal assistants.

Nobody could deny the positive transformation and progress that digitalisation has brought to our lives, and a substantial body of literature proves it. Among many others, digitalisation opens a path to enhance learning possibilities and developing skills, may diminish human errors in different decisions, increases flexibility in professional life, offers greater consumer choice and power, enhances the better flow of ideas, pluralism and innovation through greater exposure not limited to physical proximity (Gluckman and Allen, 2018). Digitalisation eases transactions and interaction at the corporation’s level, makes them observable and controllable in real-time, and lowers transaction and production costs (Varian, 2014). Sophisticated software and online platforms help firms to outsource more of their production of goods and services (Azmech and Nadvi, 2014; Körfer and Röthig, 2017), develop new products and services (Yoo et al., 2012) or enable tracking of each worker and the time dedicated to a specific task (Phoebe, 2018).

The literature focused on the adverse effects of digitalisation is scarcer. However, several studies have drawn attention in the last years to how digitalisation may impact different areas of happiness, including family life, education, mental and physical health, work relations, social cohesion, and personal and public security. For example, Behne and Teuteberg (2020), Wöhrmann and Ebner (2021) or Rohwer et al. (2022), and Turel et al. (2021) raised serious questions regarding the human ability to cope with the digital revolution's rapid, aggressive, status quo-shattering transformations. Humans are not computers, and their ability to adjust to the fast-moving rhythm the digitalisation imposed is limited. Humans must stay healthy, have a meaningful life, and connect with friends and family to be happy. Excessive digitalisation may lead to digital addiction, associated with loneliness, anxiety and depression (Peper and Harvey, 2018).

One may be optimistic or pessimistic about the changes induced by digitalisation in all aspects of our lives, but those changes cannot be neglected. To our knowledge, digitalisation's effects on national aggregated happiness in the last years, dominated by accelerated digitalisation, have not been studied yet. To fill this gap, the main aim of this paper is to assess the relationship between digitalisation and happiness in a period between 2017-2022, a period that, due to the COVID crisis, included the sharpest and forced increase in digitalisation one may see starting from the beginning of this pervasive transformation. Happiness is often considered the final goal of each individual. Extrapolating this at the macroeconomic level, happiness can be seen as the target for any economic and social policy. As Bentham said in 1776, "It is the greatest happiness of the greatest number that is the measure of right and wrong". This is why it is so important to see if this ongoing digitalisation process is leading us towards happiness or, on the contrary, is decreasing our happiness, so further policy measures are needed to shape the future of this process.

The paper is structured as follows. The second part is dedicated to the previous literature, structured using the framework proposed by Gluckman and Allen (2018) in evaluating the relationship between digitalisation and well-being determinants. The literature has pros and cons about how well-being and happiness may be defined and whether one may be used interchangeably. In this paper, we use the terms in their broad, interchangeable sense, in accordance with Seligman's (2002) view. The third part presents the research design: variables, data and method. The fourth part is dedicated to the results. The last section concludes.

2. Literature review

The digital revolution, humankind's most pervasive transformation, affects all the patterns of human activities and networks, institutions, governance processes and, as an outcome, economic growth and individual and aggregated happiness.

The previous literature seems to agree that digital transformation was able to help economies develop, create and exploit new opportunities, and increase innovation. New technologies allowed the creation of new business models, maximised the efficiency and productivity of traditional firms and overall determined an increase in economic growth. (Olczyk and Kuc-Czarnecka, 2022).

The relationship between digitalisation and happiness seems to be much more complicated. From ancient times, the individual's most precious desire was happiness.

Happiness is a complex, multifaceted state of mind affected by several factors. However, according to the framework proposed by Gluckman and Allen (2018), some of the most important are human development, including early childhood learning, physical and mental health, social inclusion and relationship, personal and public security and governance.

Human development, including early childhood learning

Digital technologies may be a helpful tool or a dangerous distraction in early childhood learning.

On the one side, digital media, including social media, offers direct and immediate access to an immense volume of information, ideas and networks, increasing connectivity. Also properly used and designed, some digital games may be used in classrooms to improve the children's interest and engagement in learning or to develop different social and emotional skills (Jabbar and Felicia, 2015; Clark et al., 2016).

Conversely, recent research pointed out that digitalisation may have several adverse effects. For instance, free and unlimited access to information and networks can also be associated with a high misinformation and manipulation risk. The so-called "influencers" often distribute false news and

information, leading their followers in the wrong direction. Different digital platforms use algorithms to collect, analyse and manipulate the data to influence individuals' attitudes and behaviours (Lanier, 2018). As a result of availability bias and herd behaviour, the child may adopt a radical position toward a subject without evaluating the reality of information or the downsides of his position, rejecting any alternative vision without arguments (Supovitz et al., 2017; Woolley and Howard, 2017). Digitalisation excess was associated with increased attention deficit, aggressive behaviour (Belanger et al., 2011) and a higher risk of cyberbullying (Gardella et al., 2017). The researchers also found that the significant periods spent playing video generated more disinhibition (Aiken, 2016), lower capacity to assess their behaviour and the effects of their actions, caused confusion between the video game script and the reality and increased aggressive behaviours by increasing the aggressive thinking (Carnagey and Anderson, 2005). Heavy use of digital media negatively influences the child's cognitive empathy, reduces the ability for self-control, leads to lower parent-child interaction and increases conflict propensity (Chassiakos et al., 2016)

Physical and mental health

Healthcare informatics has evolved tremendously in recent years, changing the health industry's picture. Remote diagnostics, portability of medical care through electronic health record-keeping, cellular technologies, the use of digital technologies to reduce human errors, and internet group support for different diseases are just a few examples of advantages and opportunities brought by digitalisation in this field (Reddy and Sharma, 2016).

Analysing the impact digitalisation has on health, one may also see the other side of the coin, the side effects. First, the time spent in front of a computer or other device increases sedentary behaviours, decreases sleep quantity and quality and increases the prevalence of junk food, all negatively impacting health outcomes. Vandelandotte et al.(2009) point out that individuals with high internet and computer use have the largest Body Mass Index (BMI) compared with other groups, and this was significantly associated with overweight and obesity. Video or computer game playing was associated with a higher prevalence of insufficient rest or sleep (Falbe et al., 2015). From a dietary point of view, social networks are often used by companies that sell junk food to promote their products and magnify the relevance of their marketing messages (Freeman, 2014).

On the mental health level, digitalisation is associated with different phenomena, starting from accentuated loneliness, technostress, technology addiction and depression. Even if we need human contact to be happy, the digital alternatives are often cheaper. Banks are replacing their tellers, most supermarkets have self-scan checkouts, teleworking has changed the labour market, and online commerce has experienced exponential growth. At the same time, people seem to have less time to see their friends and spend quality time in a face-to-face environment. All those changes have a substantial impact on loneliness and mental health. The internet may be considered a loneliness reducer if it enhances existing relationships. However, it has opposite effects if used to escape the social world and interactions (Nowland et al., 2018). Technostress and technology addiction complicate the scenario even more. The inability to cope with digital technologies healthily (technostress with all five components: techno-overload, techno invasion, techno complexity, techno insecurity and techno uncertainty defined by Ragu-Nathan in 2008) is associated with health outcomes such as exhaustion and satisfaction (Rohwer et al., 2022). Technology addiction is now a widespread phenomenon that includes some typical symptoms such as salience (all individual's thoughts and behaviours are run by technology), withdrawal (in the absence of technology, negative emotions emerge), conflict (due to the excessive use of technology other tasks are neglected), relapse and reinstatement (inability to decide oneself about reducing the use of technology), mood changes (technology is used to provide thrill and relief), tolerance (the technology use has to be extended to be able to produce thrill)(Turel et al., 2011). Lastly, in recent years, more and more symptoms of depression have been observed. A new form of depression is connected with social network sites as the „Fear of Missing Out” (FOMO) phenomenon arose. The users start to fear missing something vital if they are not continuously connected and do not receive instant confirmation from their internet community through likes, followers and comments (Haidt and Allen, 2020; Yoon et al., 2019).

Social inclusion and relationship

Internet and social media provide more significant opportunities for new groups and communities to form and grow outside their geographic boundaries, a proper incentive for well-being increase. Due to the digital revolution, the ability to establish and develop social interaction is unlimited.

However, the nature of the relationship between their members may be quite different and less satisfying than the one found in the real world, outside the virtual space. Social support may be less stable if it is not supported by real interaction, and the concept of „Friends on Facebook” seems very often a more shallow concept than one of Aristotelian friendship in all its four dimensions: reciprocity, empathy, self-knowledge and shared life (Vallor, 2012).

A significant concern is that aside from the potential positive outcomes, the development of social networks and the dark web allows the creation and proliferation of criminal groups with violent antisocial behaviour and the organisation of illegal actions and attacks (Marcu and Balteanu, 2014).

Personal and public security

Recent information technology advances improved data collection and the applications created to use this data, offering an essential tool for increasing personal and public security, with significant implications for well-being. Problems such as traffic congestion or increased noise and pollution have been addressed in the last years through advanced technologies due to the rapid growth of the urban population (Rizi and Seno, 2022). Aside from the obvious advantages, the extensive surveillance of public space may increase public safety feeling but raise critical questions about personal freedom, data and privacy protection. Is the general security more important than individual rights? Where do we have to set the line to meet the public goal without burdening human rights? This question is still debated, with many implications on individual and aggregate happiness. (Milanovic, 2015).

Governance

Digitalisation has brought a significant impact both on democratic processes and on the way governments are delivering their core services. Once the different online platforms emerged, a two-way communication channel between government and citizens was created. It is much easier nowadays for a citizen to voice views, request information and interact directly with policymakers due to digital technologies (Chen et al., 2021). Also, social media provide the needed tools for all levels of society to raise jointly their voice on specific topics of public interest. Considering the primary roles of the government, in the last decades, eGovernment changed the face of public services by rethinking organisations and processes, providing access to cross-border digital services and new communication channels for citizens and public bodies and their interactions. However, digitalisation is not free of risks since problems such as manipulating public opinion, data privacy, or cybersecurity governance still need to be mitigated.

Hence, the main research question concerns the nature of the relationship between overall happiness and digitalisation. We are interested in the nature of this relationship and, in extending the previous research, the effect of persistence in time.

3. Research methodology

The empirical analysis is based on a set of balanced data, with 27 cross-sections (for each EU country) spanning between 2017-2022. The study relies on the Happiness Index (HI) included in the World Happiness Dataset for overall happiness. At the same time, digitalisation is captured through the Digital Economy and Society Index overall index (DESIO).

Our central hypothesis is that the overall effect of digitalisation on happiness is negative despite the positive effect it might have on some variables connected with happiness. Since we were interested in the effect of a digitalisation variation in happiness and preferred to use stationary variables to avoid spurious results, the first difference of both variables was used in our model, denoted with $D(HI)$ and $D(DESIO)$ (stationarity in the row and adjusted variables was checked only with individual intercept since, due to hour short series of data we could not assume the existence of a trend, using Fisher-PP and Hadri tests, functional for such a short period).

Both variables depend on their previous variables, and simultaneously, both could represent an explanatory variable for the other. Present overall happiness is connected with prior happiness, and in terms of digitalisation, the overall present digitalisation depends on the progress the digitalisation has made in the past. The relation between variables may be considered a double-sense one, too. The previous literature offers substantial incentives to consider that digitalisation positively or negatively impacts happiness. At the same time, all technological advances, including digitalisation, are

enhanced by a positive, happy state of spirit, so we have reasons to believe that a correlation between happiness and digitalisation may also exist in the opposite sense.

This is why, to analyse the relationship between digitalisation and happiness, we proposed a VAR model with lag 1, based on the lag exclusion test (the results of the test are presented in the table below):

Table no.1. Lag exclusion test results

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-62.79676	NA	0.037784	2.399880	2.473546	2.428290
1	-54.33722	15.97913*	0.032039*	2.234712*	2.455710*	2.319942*
2	-51.04586	5.973206	0.032918	2.260958	2.629288	2.403008
3	-47.43157	6.291541	0.033454	2.275243	2.790906	2.474114

Where:
 Endogenous variables: D(HI) D(DEGIO)
 * indicates lag order selected by the criterion
 LR: sequential modified LR test statistic (each test at 5% level)
 FPE: Final prediction error
 AIC: Akaike information criterion
 SC: Schwarz information criterion
 HQ: Hannan-Quinn information criterion

Source: author's computation

The proposed model may be written as follows:

$$\begin{cases} y_{it} = c + \beta x_{it} + \delta y_{it-1} + \varepsilon_{it} \\ x_{it} = c + \sigma y_{it-1} + \vartheta x_{t-1} + \varepsilon_{it} \end{cases} \quad (1)$$

In the above system of equations, c is the intercept, the terms β , δ , σ , ϑ stand for the slopes of independent variables, x is the independent variable D(DEGIO) in the first part of the system, and the dependent variable in the second part, y reveals the independent variable D(HI) in the first part and the dependent variable in the second one, i denotes the country, t is the time while ε_{it} represents the error term which varies over both country and time.

4. Findings

As expected, the proposed model validated our hypothesis. Even if the correlation is not statistically significant when we analyse the second equation, one may see that digitalisation has an overall negative impact on happiness, statistically significant since the value of the digitalisation variable coefficient is higher compared with standard error and t stat has a normal value (see the results included in Table no. 2).

Table no. 2. VAR model results

Variables	D(HI)	D(DEGIO)
D(HI(-1))	0.208821	0.023253
	(0.10061)	(1.22049)
	[2.07554]	[0.01905]
D(DEGIO(-1))	-0.034873	0.529040
	(0.00914)	(0.11088)
	[-3.81542]	[4.77138]
C	0.157940	2.196099
	(0.03408)	(0.41346)
	[4.63399]	[5.31158]

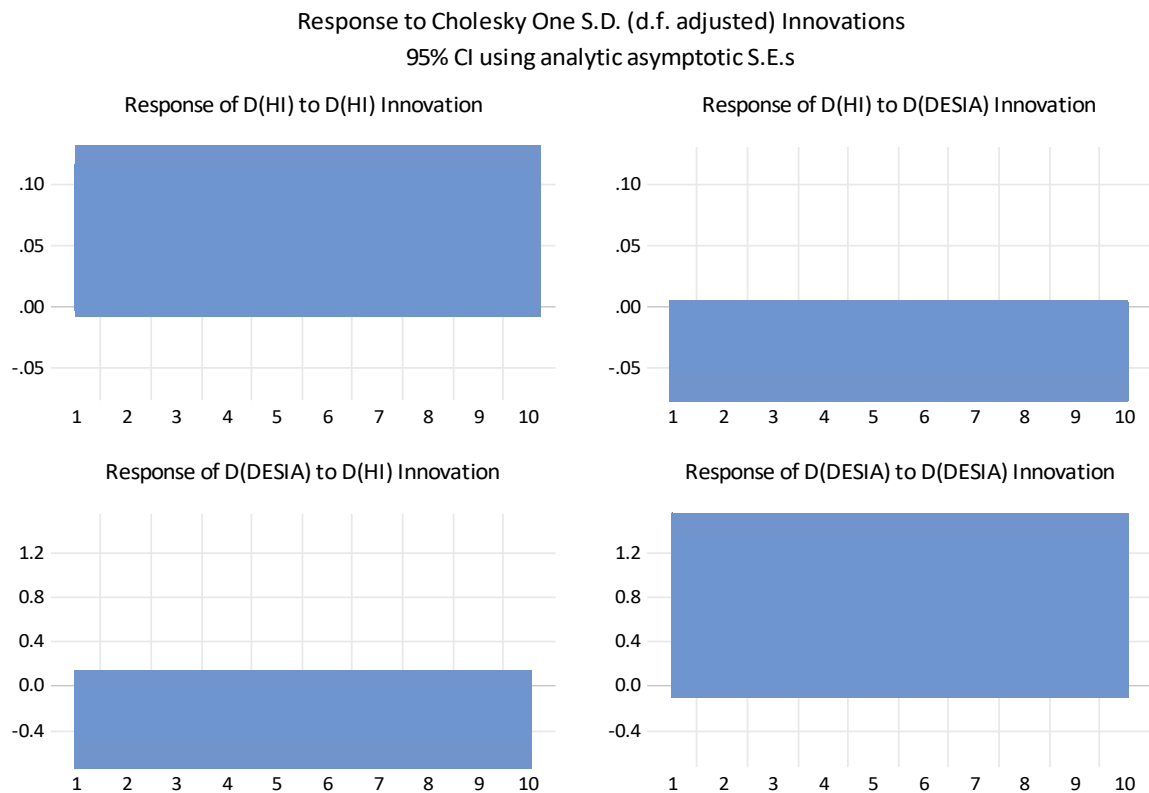
Standard errors in () & t-statistics in []		
R-squared	0.193659	0.189932
Adj. R-squared	0.178300	0.174502
F-statistic	12.60890	12.30939
Akaike AIC	-1.391106	3.600404
Schwarz SC	-1.316603	3.674908

Source: author’s computation

The model was tested for stability; no roots were outside the unit circle. In the next step, the robustness was checked through the VAR residual Portmanteau test for autocorrelation, VAR residual serial correlation LM and VAR residual Heteroskedasticity Test. All the results show that the VAR model with 1 lag is robust and stable.

As one can see in the following figure, current happiness and current digitalisation are positively correlated with their past values, and an impulse toward happiness or digitalisation is prone to generate a response in the same sense in the future. As we might expect, an impulse in digitalisation generates a strong negative response in happiness, persistent in the following three periods, validating our initial hypothesis. The response of digitalisation to happiness is not very clear since the confidence bands overlap the ox axis. However, since the primary goal of our analysis was to study the impact digitalisation has on happiness, the results shown by the impulse functions prove that despite the potential positive effects digitalisation may have on some aspects of life connected to happiness, the overall effect of an increase in digitalisation is a negative one, in other words, digitalisation may make us unhappy.

Figure no. 1. Impulse functions results



Source: author’s computation

5. Conclusions

As the results of the present study reflect, the overall impact of digitalisation on happiness is a negative one, not a positive, as the European governments expected when they put digitalisation on their priorities.

As a new step in the knowledge era, digitalisation should aim to increase the quality of life and well-being. According to European Commission declarations, the second priority for the 2019-2024 agenda, named “A Europe fit for the digital age”, aims to “**put the people first** by opening new business opportunities, encourage the development of trustworthy technology, foster an open and democratic society, enable a vibrant and sustainable economy, help fight climate change and achieve the green transition”. (European Commission website). Little endeavour is put on people's happiness. Digitalisation transforms how individuals interact with the world and changes their beliefs and attitudes toward themselves, the world, human interaction, and right and wrong.

Several aspects related to life quality are seen by the European Commission only in a positive sense. Digitalisation is, in the Commission's view, a valuable tool for better diagnosis and treatment, an enhancer of lifelong learning, a provider of trusted digital identity, a promotor of a cleaner environment, etc. However, the truth is more nuanced than this. It is true, for example, that by using digital solutions, better diagnoses and treatments may be provided. However, one cannot neglect digitalisation's negative impact on metabolic diseases associated with sedentary and junk food promoted by different media channels and, even more importantly, the skyrocketing increase in depression, especially in young individuals. It is true again that digitalisation may help life-long learning. However, there is clear scientific evidence that excessive digitalisation is more prone to impair than enhance student learning. One may see the Sweden example where the government reverses the process after aggressive digitalisation progress in schools because the effects seen are not expected. Cognitive skills, memory, and concentration seem to be impaired because of the distraction technology use provides. Also, quick gratification provided by technology changes the learners' patience and expectations, limiting their curiosity and ability to put some effort into their studies. In terms of a cleaner environment, only parts of the devices we use daily are recyclable; the others are polluting the environment in an irreversible and pervasive way. Those are just a couple of examples that we cannot neglect the dark side of digitalisation and see just its bright side.

Governments are responsible for national happiness, and more impact studies are needed before extending digitalisation's role in our lives. Digitalisation cannot be a purpose per se; happiness should be. If digitalisation is not increasing individual happiness, maybe our path is not the right one and other ways must be found.

6. References

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