Is the influx of digital devices in our homes good or bad?

# Abstract

## The amount of digital devices in our daily lives is increasing. This doesn’t just include smartphones, laptops and desktop computers but rather encompasses a whole range of IoT devices (mainly smart appliances) as well. IoT devices are devices that can connect to the internet, have a specific purpose, use embedded systems with a Harvard architecture and can’t easily be reprogrammed to have a different function. Harvard architecture is where the data and instructions stored in main memory are separate from each other and usually don’t share the same memory properties as each other. As with all technology, there are benefits and there are also issues. One benefit is the ability to automate daily tasks or speed them up through the technology available. One example of this is that a smart washing machine can know the perfect temperature to wash the clothes at and is much faster than washing clothes by hand for larger quantities of clothes. Also they can help regulate daily life such as thermostats monitoring the temperature of the house and turning on the central heating when the temperature reaches a set temperature and turning off when it reaches a set higher temperature. However, there are issues. One ethical issue would be involving the capture of data from people’s houses such as video recordings, sound recordings and heart rate readings. This could also have legal implications under data protection acts.

## **Introduction**

## The purpose of this essay is to detail the advantages and disadvantages of having lots of digital devices in the house. First of all, there are many benefits of digital devices. They help to complete daily tasks quicker such as washing clothes or warming up food. They can also be used to monitor daily life such as smartwatches monitoring heart rate, steps walked and more. Digital devices includes computers, laptops and smart phones, which have many uses from academic to commercial uses, however the focus will be more on IoT devices such as smart appliances in this essay. On the other hand, there are also problems, both ethical and environmental, associated with these devices. For example, spying on people through camera-enabled and microphone enabled devices, hackers stealing people’s personal data, possible breaches of the Computer Misuse Act 1990 (OGL, legislation.gov.uk), recycling/disposing these devices as they can contain dangerous materials and also all that electricity required to run them or batteries used to maintain them.

# Related work

## **About these devices, Buck, Iqbal, Shi, MacDermott, & Baker state:** “These devices vary in technological complexity and storage capabilities, and range from smart phones to smart watches, smart toys, gaming consoles (Xbox One, Sony PlayStation - PS3 and PS4), health wearables and drones” (The Internet of Things: Challenges and Considerations for Cybercrime Investigations and Digital Forensics, 2020) **They also state:** “The Internet of Things (IoT) represents the seamless merging of the real and digital world, with new devices created that store and pass around data” (Buck, Iqbal, Shi, MacDermott, & Baker, 2020)

**About the use of devices Ruder writes:** “It’s not how long we’re using screens that really matters; it’s how we’re using them and what’s happening in our brains in response’, says Rich, director of the [Center on Media and Child Health at Boston Children’s Hospital](https://cmch.tv/), associate professor of pediatrics at HMS, and associate professor of social and behavioral sciences at the Harvard T.H. Chan School of Public Health.” (Screen Time and the Brain, 2019)

**About concerns involving IoT devices used to spy on people, JPMorgan Chase and Co write:** “Cybercriminals can put even the most innocent-seeming devices to nefarious uses:

A home thermostat could reveal you are not at the house during the week and only home on the weekends when the temperature has been remotely set higher. A smart vacuum can create a map of your home layout and share the data back to the manufacturers, potentially giving insights to thieves. Fitness equipment could be used to listen to your conversations, as well as capture and share your personal health information.” (Your house may be spying on you. Save yourself., 2023)

## **In terms of social issues to do with IoT devices, Manwaring K and Hall C say in their input paper called** *Legal, Social and human rights challenges of the Internet of Things in Australia*: “Some attributes in IoT devices can remove or impede customers' freedom of choice. For example, an IoT device with significant autonomy may make decisions that cannot be overridden (or not easily so) or are not even obvious to the user due to the invisibility of the device or the decision-making process.” (Legal, social and human rights challenges of the Internet of Things in Australia, 2019)

# History/Background

## The use of digital devices in homes is not new, it’s been over a decade since it first started. However, with recent advances in technology and the arise of smart home appliances, their popularity has risen in recent years. This comes under the topic of internet of things. What is internet of things?

## How to Control and Manage IoT Devices 🡨Figure 1 (How to Control and Manage IoT Devices: Everything You Need to Know, 2023)

## It includes almost every specific purpose digital device in your house. Such as washing machines, dishwashers, digital alarm clocks, digital radios etc. These devices connect to the internet, use embedded systems and are unlike general-purpose devices e.g. smartphones, laptops, desktop computers. The term “internet of things” was first coined in 1999 by scientist Kevin Ashton. (IoT Technologies Explained: History, Examples, Risks & Future, 2021) Nowadays, there are countless IoT devices in mostly every house.

# Digital Devices in our homes

## Harvard ArchitectureCurrent statistics show that there are currently 15.14 billion devices connected to IoT around the world. (Number of IoT Devices (2023)) This translates to roughly 2 in 3 devices worldwide as IoT devices. (Duarte, 2023) Also, approximately 57% of homes include at least 1 IoT device. (2019 Smart Home Survey)

## IoT devices usually have an embedded system. They use a Harvard architecture which contains separate memory locations for data and instructions. This way the memory for instructions can be made read-only and this doesn’t impact the data as is often the case. The instructions are usually hard-coded into the system. Figure 2 🡪 shows how Harvard architecture works (Embedded Systems - Architecture Types)

## They are called IoT devices because they can connect to the internet and communicate over it.

## A diagram of a system Description automatically generatedThey can connect to IoT gateways -these act like central hubs for data to be transmitted across various local area networks (LANs)

## Figure 3 (internet of things (IoT) , 2023) 🡪

## The number of IoT devices is expected to double by 2030. (Number of IoT Devices (2023)) Also, 25.44 billion IoT devices are expected by 2030. (80+ Amazing IoT Statistics (2024-2030), 2023) Furthermore, by 2030, 75% of all devices are expected to be IoT devices. (Howarth, 2023)

## What does this projection entail for the future? What are the benefits of an increase in devices and what concerns are there?

# Advantages and Disadvantages

## Using digital devices (especially IoT devices) is usually beneficial. General-purpose devices can be used to discover new information and smart appliances can be used to speed up daily tasks. Most people use at least one digital device daily and it helps them. Smartphones help keep people organized, from calendar notifications to the notes app and many more features. Also laptops and computers have a variety of uses from personal business endeavours to academic research and homework, playing games and helping to destress. IoT devices such as smartwatches and thermostats regulate daily life. Dishwashers, washing machines and digital microwaves are just some examples of daily appliances that help with general life. Furthermore, digital devices keep people occupied. In addition, social media on digital devices can keep people connected and help to spread news faster.

## However, as with all technology, there are disadvantages, some social, some ethical with legal implications and some environmental. Some people believe that these devices can be used for spying. There are cameras on some devices, audio recordings, various other sensor readings etc. These can lead to data misuse or hackers causing data breaches. There is protection through the Computer Misuse Act 1990 (OGL, legislation.gov.uk). Contrary to this though, there have been many cases in the past where this has been breached and that has legal consequences. Also, environmentally, it is difficult to dispose of old devices. They can contain radioactive and dangerous materials such as uranium. Also, fossil fuels are burned to generate the electricity used to run devices. More sustainable ways of recycling/reusing old devices needs to be devised. Especially since numbers will increase, devices need to be made recyclable.

# Conclusion

So it has been explored that digital devices have benefits and also harms. They can have a negative impact on mental health. On the other hand, most IoT devices help automate daily tasks. It has also been explored, how these devices work and statistics to do with the increasing number of such devices.

I agree that IoT devices are better than non-IoT devices, especially for appliances and other home gadgets. I also agree that there are issues with spying, camera recordings, sound recordings and more and legislation is in effect to try to prevent this. However, there are still loopholes as it is an ever-evolving technology so new legislation is needed as time progresses. Also some things don’t go against the law so therefore can’t be legislated – they are just morally wrong. In addition, there are environmental issues with disposal becoming worse. They need to be disposed of properly so that dangerous materials don’t affect the environment and more sustainable ways of generating electricity for these devices needs to be devised, rather than burning fossil fuels and using non-renewable sources of energy.

Overall, I believe that an increase of digital devices is good, it can increase productivity, but only if used in the correct ways. This depends on the general usage on an individual basis, they should be used in moderation and possibly education needs to be adapted to highlight this.

# References

Alicia. (2023, July 28). *How to Control and Manage IoT Devices: Everything You Need to Know*. Retrieved from Reolink: <https://reolink.com/blog/how-to-control-iot-devices/>

Buck, P., Iqbal, F., Shi, Q., MacDermott, Á., & Baker, T. (2020). *The Internet of Things: Challenges and Considerations for Cybercrime Investigations and Digital Forensics.* Liverpool: IGI Global.

Duarte, F. (2023, February 22). *Number of IoT Devices (2023)*. Retrieved from Exploding Topics: [https://explodingtopics.com/blog/number-of-iot-devices](https://explodingtopics.com/blog/number-of-iot-devices%20)

Gillis, A. S. (2023, August). *internet of things (IoT)* . Retrieved from TechTarget: [https://cdn.ttgtmedia.com/rms/onlineimages/iota-iot\_system.png](https://cdn.ttgtmedia.com/rms/onlineimages/iota-iot_system.png%20)

Howarth, J. (2023, November 3). *80+ Amazing IoT Statistics (2024-2030)*. Retrieved from Exploding Topics: <https://explodingtopics.com/blog/iot-stats>

JPMorgan Chase & Co. (2023, April 11). *Your house may be spying on you. Save yourself.* Retrieved from J.P. Morgan: <https://privatebank.jpmorgan.com/latam/en/insights/wealth-planning/your-house-may-be-spying-on-you-save-yourself>

Merchant, N. (2021, March 31). *IoT Technologies Explained: History, Examples, Risks & Future*. Retrieved from World Economic Forum: <https://www.visionofhumanity.org/what-is-the-internet-of-things/>

OGL. (n.d.). *Computer Misuse Act 1990*. Retrieved from legislation.gov.uk: <https://www.legislation.gov.uk/ukpga/1990/18/contents>

RUDER, D. B. (2019, June 19). *Screen Time and the Brain*. Retrieved from Harvard Medical School: <https://hms.harvard.edu/news/screen-time-brain>

Smart Home Week. (2019, May). *2019 Smart Home Survey*. Retrieved from Smart Home Week: <https://www.smarthomeweek.co.uk/smart-homes/>

TutorialsPoint. (n.d.). *Embedded Systems - Architecture Types*. Retrieved from TutorialsPoint: <https://www.tutorialspoint.com/embedded_systems/es_architectures.htm>

## Manwaring, K and Hall, C (2019). Legal, social and human rights challenges of the Internet of Things in Australia. Input paper for the Horizon Scanning Project “The Internet of Things on behalf of the Australian Council of Learned Academies, [www.acola.org](http://www.acola.org)

## ***ChatGPT essay:***

## “The Influx of Digital Devices in Our Homes: A Double-Edged Sword

## In the contemporary era, our homes have become a digital landscape, populated by an increasing influx of technological devices. From smartphones to smart appliances, the digital revolution has transformed the way we live, communicate, and entertain ourselves. The question that arises is whether this surge in digital devices is a positive force, enhancing our lives, or if it brings with it detrimental consequences that warrant caution. This essay explores both the merits and demerits of the proliferation of digital devices in our homes.

## On the positive side, the integration of digital devices into our daily lives has ushered in unprecedented convenience and efficiency. Smart home technologies, for instance, allow us to control and monitor various aspects of our living spaces with a simple touch or voice command. From adjusting thermostats to managing security systems, these devices provide a level of control that was once relegated to the realm of science fiction. The interconnectedness of our devices creates a seamless ecosystem, offering a more streamlined and comfortable living experience.

## Furthermore, digital devices have revolutionized communication, connecting people across the globe in real-time. Social media platforms, video calls, and instant messaging have bridged geographical gaps, fostering relationships and creating a global village. In the educational realm, digital devices facilitate e-learning, granting access to information and educational resources irrespective of physical location. The democratization of information is a powerful tool for empowerment, allowing individuals to expand their knowledge and skills.

## However, amidst the myriad benefits, the influx of digital devices into our homes raises concerns about the potential drawbacks and impacts on human well-being. One of the most pronounced issues is the pervasive nature of screen time, especially among the younger generation. Excessive use of digital devices, particularly smartphones and computers, has been linked to various health issues, including eye strain, sleep disturbances, and a sedentary lifestyle. The constant connectivity also blurs the boundaries between work and personal life, contributing to stress and burnout.

## Privacy is another pertinent concern associated with the proliferation of digital devices. Smart home technologies, while enhancing security and convenience, raise questions about data security and the potential for surveillance. The interconnected nature of devices means that a breach in one can potentially compromise the entire network, posing threats to personal privacy and sensitive information.

## Moreover, the ubiquity of digital devices has altered social dynamics within households. Families find themselves grappling with the challenge of balancing face-to-face interactions with the lure of digital distractions. Quality time spent together is often diluted by the temptation of screens, leading to concerns about the impact on interpersonal relationships and family cohesion.

## In conclusion, the influx of digital devices in our homes is a phenomenon marked by both commendable advancements and formidable challenges. While these devices enhance efficiency, connectivity, and convenience, they also bring about concerns related to health, privacy, and social dynamics. Striking a balance between embracing the benefits of technology and mitigating its potential pitfalls is crucial. Responsible and mindful use of digital devices, coupled with effective regulations and guidelines, can pave the way for a harmonious coexistence with technology in our homes. The key lies in harnessing the power of digital innovation while safeguarding the well-being and values that define our domestic spaces.”

## REFLECTION ON THE CHATGPT ESSAY:

## Overall, the structure of the ChatGPT essay is slightly worse than the structure of mine. For example, it does not contain a clear abstract, rather going straight to the introduction. Also, it doesn’t explain techniques and methods if how smart home (IoT) devices work, instead making each paragraph an argumentative point, either for or against this influx of digital devices. Similarities are found in the advantages discussed and also the issues raised. For example, the benefit of connectivity and the use of the internet for educational purposes as well as the ability to regulate daily life through the use of IoT devices are mentioned and discussed in both essays. Furthermore, privacy issues are also discussed in both essays. One advantage of the ChatGPT essay over mine is that it explains more in depth about the benefits and concerns and also uses more higher-level language when explaining the points. However, as previously mentioned, it doesn’t even touch on how these devices work or what is the methodology behind them. To sum up, both essays are useful in their own means. If the reader wanted an argumentative essay explaining the benefits and issues to do with the influx of digital devices, then the ChatGPT essay would be appealing. On the other hand, if the reader wanted a more informative essay focusing more on IoT devices, then my essay would be more appealing. Ultimately it depends on what the reader wants from the essay and what they feel would be worth mentioning or emphasizing.