

HAS TECHNOLOGY MADE LIFE TOO EASY? – TECHNOLOGIES EFFECT ON HUMAN DEVELOPMENT

Name: Vilde Skaarnæs

Student number: 2119936

Course: BA Product and Furniture Design

Wordcount: 5114

Tutor: Matthew Archer

Has technology made life too easy? – technologies effect on human development

“This invention, O king,” said Theuth,
 “will make the Egyptians wiser and will
 improve their memories; for it is an elixir
 of memory and wisdom that I have
 discovered.” [274c] (Martínez, 2014)

In this paper, I will discuss how the rapid
 development of technology has improved
 our quality of life, exploring the hypothesis
 “has technology influenced the quality of
 life for the better?”.

Using Klaus Schwab's book, *The Fourth Industrial Revolution* (Schwab, 2016) and his predictions for the future of technology, I will first discuss how technology has changed throughout history. Focusing on how humans and their relationship with smart technology have transformed, and how we might anticipate it evolving in the future. Continuing with smart technology advancements, I reach the example of technology developers such as Griffins Technologies with their home smart collection (Bencic, 2017), to get a further understanding of development issues made during the design processes of smart technologies, leading to why a product might become unsuccessful. Also exploring how we can change such outcomes leading to the exploration of the benefits and why drawbacks of smart home and city systems might happen. Looking into how technology will become interconnected with our built environment, interfering with our daily habits. thereafter, I will delve deeper into Nicholas Carr's infamous article "Is Google making us stupid?" to examine how technology is “tampering with his brain” (Carr, 2008) I will also be addressing the long-term effect

of technology use and their impact in children's cognitive abilities, referring to the article “*Growing up with google, how children's understanding and use of internet-based devices relates to cognitive development*” to further get an understanding of children's emotional understanding and comprehension of technology. I will lastly be looking into the theory of the “*hierarchy of needs*” by Abraham Maslow (Poston, 2009) to assess if technology has altered our lives and our behaviour in different ways. If it is improving or deteriorating the experience of human life and how technology has integrated itself into our basic needs, from video calling for communication to social media for self-esteem, and even Home CCTV systems for security.

With constant communication, we use technology to assist us to accomplish significantly more, in hopes of fulfilling our full potential. (Mishra, 2013) In this paper I want to peruse the reasoning of how technology is assisting us with our daily need, and if so whether technology has influenced the quality of life for the better?

The current level of urbanisation has been unprecedented in human history, and it is predicted that it will continue to increase. (Mishra, 2013) The increasing rate has resulted in 80% of greenhouse emission gas coming from cities. We need to have a clear understanding of current performance to develop a long-term approach, determining long-term goals to enhance services and seek out opportunities for growth.

The period following World War II is a good starting point for looking into an overview of technological development., as the war fuelled a multitude of technological advancements that would later interfere with nearly every aspect of our lives.

Has technology made life too easy? – technologies effect on human development

The word "revolution" refers to an abrupt and radical change, and the industrial revolutions have significantly altered the development of technology.

It is in the most recent industrial revolutions that human-machine relationships have rapidly changed, shaping society and the surrounding environments. (Schwab, 2016)

The development of the steam engine and the railroads, which indicated the start of mechanical production and a significant shift in human transportation, helped fuel the first industrial revolution, which began in the 1760s. The second industrial revolution is characterised by the advancement of machinery that enables mass production. The third revolution started in the 1960s, also referred to as the digital revolution and can be recognised by the development of semiconductors, such as personal computing in the 70s and later the Internet in the 90s.

But not all countries in the world have experienced the same industrial revolutions as we have in the West. Due to their continued lack of access to electricity, 1.3 billion people have yet to experience the second industrial revolution. The same is true of the third industrial revolution, as more than 50% of the world's population, mostly in developing nations, continue to lack access to the Internet.

The World Economic Forum founder and executive chairman Klaus Schwab, author of the book *The Fourth Industrial Revolution*, foretells that a fourth industrial revolution is approaching. This fourth revolution builds on the Digital Revolution, (Schwab, 2016)

Utilising the widely utilised digital technologies, merging our understanding of the digital, physical, and biological realms, and increasing the rate of technological advancement. This shift in innovation is foreseen to result in a vast ecosystem of connected, intricate and dynamic interaction between individuals

and the built environment. (Ross & Maynard, 2021)

In order to create a smart environment, the upcoming industrial revolution would therefore result in an increase in the number of connected devices or even objects. Through distributed intelligent networks of smart devices, it is possible to further extend and enhance existing fundamental services, which can significantly improve human quality of life. (Sharma & Tiwari, 2016) Smart and fully automated homes are implementing a large use of technology.

Smart home systems are services that are installed in homes with interconnected technology to monitor occupants, encourage independence, and/or maintain occupant health. According to *Statista*, about 20% of the population will adopt smart home systems into their households by 2023, worldwide. (Statista, 2022) Some scientists respond to this, predicting that humans will live under the rule of machines- letting them lead our lives. The automated home might help us with everyday tasks and help with memorising appointments and tasks, but the smart-sounding strategy it's also the most inhuman. (Norman, 2007)

The vision of fully automated homes isn't as far away, and smart home technology developers all over the world are adopting this innovative and effective strategy to automate the home.

Griffins Technology specialises in forward-thinking products that power and protects your technological devices. In 2017, Griffins introduced its home collection at the Consumer Electronics Show (CES), hoping to expand its smart home collection, bringing consumers simplified and enhanced utilisation of smart home technology. (Bencic, 2017)

The collection consists of a smart mirror, a toaster and a coffee maker, all connected via WiFi and Bluetooth. (Crist, 2017) The

Has technology made life too easy? – technologies effect on human development

Smart Mirror connects to your home WiFi, and is activated (or deactivated) when touched. Its reflective surface notifies you of missed notifications, the weather and local time. The information is displayed subtly and can be customisable through the connected app.



Figure 1 Griffins technology, smart mirror, demonstrating the smart devices notification display (CNET, 2017)

The mirror can be connected to the collection's smart coffee maker and Bluetooth-connected toaster. With only a few taps away your coffee will be perfectly brewed to your preferences saved in the application, all in the comfort of your bed. Alongside this you could connect to a full-featured digital toaster, offering personalised settings depending on the bread thickness, density and even dietary-specific bread like gluten-free. (Bencic, 2017)

Almost 6 years later the collection of products is nowhere to be seen, showing few signs that it was ever there, other than articles and off-brand retailers.

The product's failure to reach the market could have been caused by a variety of factors related, including strategy, process, market, and product characteristics. The product or service should offer properties that are appropriate for the service, such as cost, innovation, and the manager's

assessment of how the product will satisfy the consumer's need. Along with depicting the aspects of market potential, competition, and the turbulence occurring from the introduction of the new product.

(Henard & Szymanski, 2001)

The extent to which consumers are willing to pay for the products depends on their comprehension of the benefits and acceptance of the risk. If the customer has trouble seeing the product's potential, the price will always appear unfair to them. (Smith & Nagle, 2002) *CNET* explains the collection as luxury niche products, specifically created with the smart home enthusiast in mind. The product's price was high, making it inaccessible to the lower classes of society and the collection was missing any notable third-party integrations to get consumers excited. (Crist, 2017)

Griffins' technology is failing to incorporate the specifications of the consumers, in addition, 2017 might have been too early for its target market. We have seen this several times before, companies releasing products, to later pull the product off the market after assessing the consumer-product compatibility.

In 1999 Sony released its big hit product MS Walkman, the first portable music device taking advantage of the internet, which allowed the consumer to listen to music with headphones. With a low price, an innovative way to listen to music and the constant thrive to make the product better, the Walkman became a huge hit. Sony was not able to keep the production line up with the sales, retaining only half of its market in the 1990s. Walkman was not compatible with MP3, the factory standard, nor had the anticipated volume of consumers that enjoyed listening to music. What Walkman failed to assess is its consumer market and its future compatibilities with future products. Although the product was consistently

Has technology made life too easy? – technologies effect on human development

innovative, Sony lacked the same consistency with its business model.

During this time Apple had long been comparing Sony's business model to its own, following Sony's strategies, but more aggressively. After contacting Toshiba, Apple launched their very first iPod, a music device storing up to a thousand songs, a huge improvement from the Walkman, due to the Walkman's limited amount of storage. Sony had the assumption that consumers preferred the music content over the quantity of songs. Apple made iPod compatible with windows, gaining pc users and in 2003 opened iTunes music to accommodate the iPod allowing users to download thousands of songs onto their pocket-sized devices. Apple continued developing the iPod to fulfil the consumer's needs, a strategy Sony could not keep up with resulting in the Walkman's production ceasing in 2010. (Hasan, 2022)

Changes in the market like this are not new. Two companies with similar products and similar strategies could have completely different outcomes depending on their ability to optimize the product to consumer standards.

Griffins done similar to Sony preforming strategies, we need to avoid during this era of technological development, making assumptions about the consumers, instead, they should be paying attention to the needs of requirements for the product, rather than specialising the product for the consumer based on consumer specifications.

A new developer might take inspiration from Griffins technology, creating a similar product, more specified future consumers' needs, making the new 'iPod' of smart technology.

Technological development in the home is interfering with almost every aspect of our lives, and the atomisation of technology does not stop inside the household,

spreading from our commutes, careers and into our educational lives.

Today, Half of the world's population resides in urban areas, where the tremendous demand for city services and infrastructure is always on the increase. These cities then require significant capital expenditure and redesign. The advancement of technologies and the innovation process has given rise to a new city model, smart cities. Smart cities utilise technology to encourage innovation and knowledge management within that model of the city. Adapting to the citizens' needs, making it more liveable, functional, competitive, and modern.

Cities like these sound like science fiction, but Saudi Arabia announced their plans for a new 100-mile-long smart city in the middle of the desert. The smart city project looks to be managed by NEOM, a new-thinking organisation working to build a new model for sustainable living. (NEOM, 2022) The city is expected to inhabit 9 million people and will supposedly be a "high tech paradise", featuring high-speed rails and artificial intelligence such as autonomous AI technology services, flying taxis and an artificial moon. (Wright, 2022). The City is organised in dimensions to create communities, designed to provide a healthier, more sustainable standard of living, raising the quality of life. As an inhabitant, all daily needs will be met within a 5-minute walk, including business, health, education and more. NEOM's hope for the project is to create and automate efficient solutions to create a carbon-free city running on 100% renewable energy-dependent urbanization. The Line will lead to a revolution in human civilisation and urban living, focusing on the inhabitants. (NEOM, 2022)

Has technology made life too easy? – technologies effect on human development



Figure 2: illustrations demonstrating the plans for "The Line" in Saudi Arabia(HLN nieuws)

When the City was announced during a press conference in 2017 by the Saudi Prince, architects, economists and other professionals were questioning the project as they proclaimed technology like this does not yet exist. Fast forward to today, drone footage revealed that the initial construction has begun and is predicted to be complete in 2050. However, as the project only exists on NEOM's website, press conference challenges will arise. The project is seen as most controversial, as the ethical issues within the country arise, Saudi Arabia struggles to get international financial support, and the structural sides of the project are seen as impossible challenges they have to overcome before the technological feasibility of the project can even be assessed.

We have seen the same ambitions with "The World Islands" in Dubai (Billion Dollar Builds, 2022), as they hoped to add onto their man-made islands. In 2003 Dubai revealed a project managed by Nakheel properties was going to consist of nearly 300 artificially created islands to accommodate as a tourist paradise. The construction started within the same year, expected to be complete by 2008. But because of the economic crisis that shook the world in 2008, the islands are now, 20 years later, almost completely abandoned. (Trailblazers HQ, 2021)

The long-term economical concerns alongside the environmental challenges in these two projects are similar, as they are

both very ambitious projects for their time. Because of the uncertainty in the progress during the building process of the World Islands, investors and developers backed out, unfortunately, it looks like The Line could potentially have the same result. Regardless if The Line smart city will one day become a reality or not, future developers can take inspiration from their ambitions to create innovative and creative solutions to sustainably urbanize smart cities in the future.

The rise of smart technology, such as smart homes and smart cities can help us be more efficient. They can assist human development, but it requires humans to adapt and evolve. As a society, the largest challenge will be how to embrace certain aspects of the traditional moral framework while adapting to the new reality. The fourth industrial revolution puts several of our fundamental beliefs to the test, creating conflicts that could get worse if societies with strong religious beliefs stand up for their core principles. As individuals this development might lead to an increase in inequality, dividing the individuals that adapt and the individuals that resist this new technology. In addition to changing what we do, the fourth industrial revolution will also affect who we are. It will affect each of us individually, changing our identity, our privacy, perceptions of property or consumption patterns, the duration of time we spend working, how we enhance our jobs, and how we develop our capabilities. Smart technology impacts how we interact with others, how we build relationships, our health, and the power structures on which we depend. It may also result in human augmentation, which therefore calls into question the very basis of human experience.

In the article "Is google making us stupid", Nicholas Carrs expresses how he can feel it, the internet, and how it's changing his brain. He explains how he feels as "his brain has been tampered with" and its

Has technology made life too easy? – technologies effect on human development

neural mechanisms reconstructed, altering his memory and ability to read. He notices how the way he thinks is different, and how deep reading a book isn't coming as naturally, he becomes fidgety and struggles with maintaining concentration. He recognises this as a side effect of spending the last decade online.

But for Carr and many others, the internet is becoming a universal medium, standing for most of our immediate information flow.

The benefits of having this constant flow of energy are recognised and clearly articulated, but it has its price.

Carr references Marshall McLuhan's theory from the 1960s, theorising media is not only a passive channel of information, but can also provide the components needed for cognition and directing it. Making it seem like the internet is diminishing people's capability to concentrate and contemplate. (Carr, 2008) Some would argue that people spend more time looking for answers from computers and therefore less time looking for them from other people. Stating that prolonged exposure to technology reduces cognitive ability and intelligence, making us question if Google was the end of the dialogue (Danovitch, 2019).

Being sceptical of new technology isn't new. We can reflect on the well-known passage of Plato's dialogue *Phaedrus* (274c–277a), Plato reflects on his previous dialogue with Socrates, rejecting the invention of writing for the same reasons that would book would destroy human memory and crucial human abilities. (Martínez, 2014) Socrates argued that the book would destroy a person's ability to reason, fearing for dialogue, conversation and debate. Donald A Norman agreed with Socrates scepticality, stating that technology that gives no opportunity to debate, discuss or explain is poor technology. (Norman, 2007) And Socrates wasn't in the wrong, the effect of the new technology was as feared,

but he failed to see the opportunities the book would later give us. Today, the book is a representation of education. Writing and reading operating as a tool for disseminating knowledge, stimulating thought, and expanding human knowledge. (Carr, 2008)

Donald A. Norman wrote in his book *The Design of Future Things*, that people finding difficulty with technology will blame the design or that the technology is at fault, 'don't blame yourself, blame the technology kind of mentality. However, this isn't always correct.

Humans learn from making errors and mistakes, sometimes acknowledging and taking responsibility for their errors before putting technology at fault, is crucial for development. If the technology or product was at fault, the expected outcome would rapidly increase frustration and complaints from the consumers, and if it's a result of human error, they could acknowledge their errors, and learn how to work that technology.

In human-machine communication, it is important to make sure that the system's responses are understandable and interpretable - if the outcome differs from the expected, there should be an obvious action to get the desired response. (Norman, 2007)

We are constantly dependent on technology to navigate the world. Once it is absent, we are helpless and unable to perform everyday tasks. We are so reliant, that when we aren't provided this aid, we suffer. Through the use of technology, tasks that used to be mandatory for basic survival have now become areas of expertise. We are unable to harvest crops or capture animals and to produce clothing from animal and plant skins. In the western world, we expect to get this handed to us, but 200 years ago these were crucial skills for keeping your family alive, (Norman,

Has technology made life too easy? – technologies effect on human development

2013) and is still crucial in some parts of the world.

But even with the increased change in technology, human intelligence has not diminished. Instead, it freed the mind from worrying about the little things and allowed it to focus on the crucial and significant things. Norman writes in his book *Design of Everyday Things* that resilience to technology could be beneficial to humanity. That the brain does not get any worse or better following exposure to technology, instead it's the determined task that changes, forcing the brain to adapt. He expresses how the power of the untrained mind is overrated, and in collaboration with technology, humans can become smarter than ever. (Norman, 2013)

With technology and Internet-based devices interfering increasingly with our everyday activities, parents now allow their children to be exposed to mobile devices at an earlier age than ever. mobile devices are getting more accessible and affordable, and studies show that children are exposed to mobile devices before their first birthday and in some cases, have access to their device from the age of four - And some countries the majority of children are already online at the same age. How early they will have access and whether or not they know how to properly use their Internet-based devices are based on the caregivers' attitude towards technology, but it is also linked to parent characteristics and education. Children being extensively exposed to technology and devices does not necessarily implement that the child has the ability to use the device independently nor understand the workings of the device or navigate the Internet.

As the study presented in Judith H. Danovitch's article shows children as young as five years old, quickly understand the difference between computers and

living entities, recognising that computers are not alive and that machines do not experience mental states, desires or emotions. The findings also show that young kids understand that computers need electricity to function and depend on the corrected wires being plugged in for the device to operate.

Even though children understand how to operate the device, they continue to see devices as restricted to a limited range of functions after personal experiences with the device, limiting their knowledge of the capabilities of the device. This restriction might be the reason why children struggle to find these types of devices as multi-functional, and educationally beneficial. Even though the devices are widely accessible to children, they struggled to grasp the range of capabilities of the product resulting in children only using the devices for specific purposes.

This increased access to technology and Internet-based devices in children, makes us wonder does this access to exposure and use affects children's cognitive development. (Danovitch, 2019) We are still awaiting the results of extensive neurological and psychological studies that will provide a comprehensive vision of how Internet use impacts cognition (Carr, 2008), but internet-based devices are vastly used in education systems today. Further involving children in the technological boom of this fourth upcoming technological revolution.

To further understand how technology has affected our quality of life, for better or for worse, we need to look into what defines the "quality of life". Abraham Maslow discusses the theory of *the Hierarchy of Needs*. A pyramid consisting of deficiency needs and growth needs. The idea was inspired by Kurt Goldstein, a researcher who developed the idea of self-

Has technology made life too easy? – technologies effect on human development

actualization, pushing Maslow to later pursue this idea of humanistic needs.

The hierarchy is divided into five sections based on different needs to become your best self. At the bottom we find psychological needs and safety needs, these are deficiency needs like water, food, clothing, a roof over your head, good health and security.

It's first when the basic needs are met though it can start working on the psychological needs, being self-esteem, and love and belongings. These are based on your friendships and family, but also your self-esteem, respect and freedom. Both the basic needs and psychological needs fall under the category Maslow describes as deficiency needs.

The deficiency needs are when the quantity of something is insufficient. For instance, when an individual drinks something, their needs have been met and no longer serve as a driving force to obtain, creating a temporary satisfaction of the deficit.

It's first when all these needs are met, we can start to fulfil the last and top section, the internal concept referred to as self-actualization. These are needs that are all about achieving your absolute full potential and defining your place in the universe. This is categorised as a need of being. (Poston, 2009)

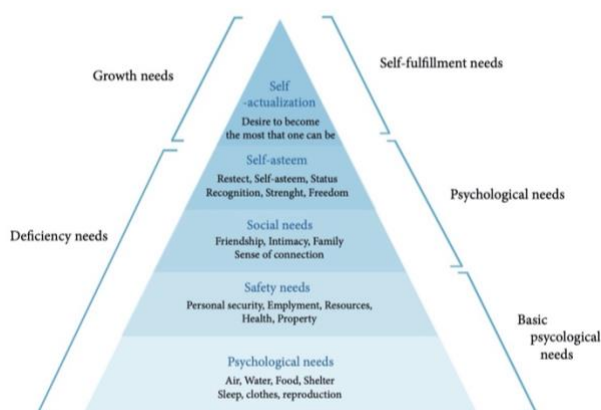


Figure 3: illustration demonstrating the levels of the Hierarchy of Needs, illustrated by Vilde Skaarnæs (author)

Technology has become so fundamental in our daily routines that removing access to it will leave individuals feeling deprived. Many people today find it difficult to imagine life without smartphones and the Internet. Many individuals will perceive technology as being equally as essential as food, water, and air, and might be individuals who value technology equally to security needs. However, there are still those who would place technology at the top of the pyramid as the highest level of human achievement. (Bold Buissness, 2017) An example of this would be Video calling. Gradually video calling has seeped into daily life in the last decade, but it was during the pandemic we got to experience the technological inventions true potential, cemented its future as a means to connect. Even after the pandemic had passed the pattern of working from home appears to continue, with huge businesses like Microsoft and Twitter stating workers might work from home indefinitely (Turner, 2021) , further highlighting the increasing need for technology.

Forbes performed a study asking participants to rank the importance of essentials in the workplace. The outcome showed that employees prioritised their laptops or device, outranking air-conditioning and heating, and clean bathrooms. Making it clear that digital needs have become a basic need for employees. (Link, 2018)

When Maslow wrote his paper in 1943, he did not anticipate the increased technological development of today, with thousands of applications using software to accommodate every human need, from the most basic to the most inconsequential. Technology will never overtake the love we receive from family and friends; however social media platforms do address some fundamental human needs such as love and esteem.

Has technology made life too easy? – technologies effect on human development

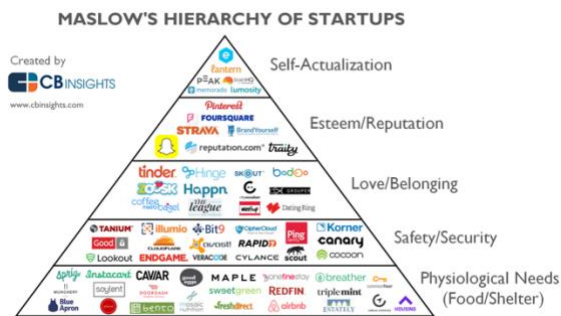


Figure 4 (CB Insights,2015b)

Figure 4, seen above, is displaying start-up

businesses in 2017 interfering with the daily lives that aid us to fulfil the requirement throughout all categories of the hierarchy of needs. Access to food and shelter is now more accessible than ever, via services such as DoorDash and CommonFloor, and contemporary digital era, where safety has become synonymous with solid online security as cyber programmes like CyberCloud the threats of identity and data theft, that has appeared as technology continue to evolve. Protecting yourself from outside threats used to be fundamental in the early stages of humanity, and protecting your sensitive information is now equally as crucial. Applications such as Tinder and social media, broadcast your achievements and meeting new people from all over the world has never been easier. They aid to fulfil our needs for love, belongings and self-esteem by giving us validation and affection. Lastly, we see companies like Lantern and Memorado that offer services such as life coaching, productivity hacks, and brain training in an attempt to assist you to achieve your full potential and help us fulfil your final need to achieve self-actualization. (CB Insights, 2015a)

A major technological change is currently underway. Up until recently, people were in charge, but technology has recently become more powerful and complex, we are less educated about how it functions and are therefore less able to predict its behaviours. But what does it then imply

when the question arises of the ability of human memory?

When we heavily rely on technologies that are continually reminding us of our pasts and futures. The usage of technology, from alarm clocks to meeting reminders, can be used to support the claim that technology is optimizing humans' capabilities. We can become lost and confused when technologies are not present, showing how dependent we become on computers and cell phones. But still we still believe that we are in charge. The machines are gaining control, despite their lack of human intelligence. They give us the appearance of being smart, but when we rely on these technological aids, we choose to ignore our mental functions; only time will tell what long-term consequences this will have on the human brain. (Norman, 2007)

We can also argue that Technology enhances cognitive function and aids with memory. Each day, technology impacts our visual recollections, our physical activities, and as a result, if these were to disappear, we would be worse off than if we had access. Can you remember the mobile phone number of your best friend? without peeping at your smartphone?

What if the technology malfunctions?

When things go wrong or when conflict arises overpower, – When unforeseen circumstances occur, the same machines that are beneficial could also decrease safety, comfort, and accuracy.

When creating a technological product, the designer possesses intelligence rather than the machine. The machine's designer provides it with the necessary intelligence to satisfy the desired need. Without taking into account unforeseen circumstances, the designer tries to anticipate any unexpected situations that might arise during the design process. How can we prepare for unforeseen circumstances?

The development of machine design practices needs to be improved. We design

Has technology made life too easy? – technologies effect on human development

for the behaviour we want people to display. A gap in experience occurs due to a lack of knowledge of human-machine interaction. We need to design for human behaviour, seeking out the consumers and paying attention to their needs. Instead, we rely on our assumptions about what people potentially demand. This has emerged as a fundamental problem in design.

Another issue causing frustration about machines and products today is the lack of common ground in communication between people and machines. Although we have many resources available to us to strengthen this relationship, technology are not fully developed yet, our we do not fully grasp the capabilities of technology. We haven't quite advanced far enough in technology with machines being completely dependent. Our lives have become more complicated by the reality that, despite our dependence to some extent, not everything works as we intend. As our homes and the built environment around us become more automated, technology will increasingly take over our lives.

In his book *The Design of Future Things*, Norman concludes that although technology has made life easier in many ways, it has not yet achieved its full potential.

acknowledging that technology's full potential has yet to be accomplished, but at the rate at which it is developing, technology is constantly improving and designed with the consumer in mind.

Through the implementation of services and applications that assist us in achieving our needs and goals more rapidly, technology has undoubtedly improved people's quality of life.

500 years ago, security could implement that you had a weapon to protect you and your family with. Today security is CCTV cameras and antivirus applications. It's not the needs that changed but the way it presented itself. As humanity changed with

technology so did the threats, therefore we need to design for the current hindrances in our lives. Technology has helped us adapt to current world affairs, and the threats they bring alongside, as the definition of our basic needs has changed, humans will have to adapt to overcome this, and as humans adapt so does our technology, we have stemmed from steam engines and reached the moon.

Has technology made life too easy? – technologies effect on human development

Reference list

Bencic, E. (2022). *CES 2017: Griffin showcases suite of connected appliances*. [online] Appliance retailer.com.au. Available at:

<https://www.applianceretailer.com.au/wp-content/uploads/Griffin-toaster-v2-740x432.jpg> [Accessed 14 Dec. 2022].

Billion Dollar Builds (2011). *Construction Begins On The Line Megacity. It's Actually Happening!* [online] www.youtube.com. Available at:

<https://www.youtube.com/watch?v=hBnVJjbP-ms> [Accessed 14 Dec. 2022].

carr (2008). Is Google Making Us Stupid? *Yearbook of the National Society for the Study of Education*, 107(2), pp.89–94. doi:10.1111/j.1744-7984.2008.00172.x.

CB Insights (2015a). *Maslow's Hierarchy Of Startups: How Tech Wants To Meet Your Every Need*. [online] CB Insights Research. Available at: <https://www.cbinsights.com/research/maslows-hierarchy-of-needs-startups/>.

Crist, R. (2017). *Griffin Technology Connected Mirror review: Griffin Technology takes a stab at the smart mirror at CES 2017*. [online] CNET. Available at: <https://www.cnet.com/reviews/griffin-technology-connected-mirror-preview/> [Accessed 14 Dec. 2022].

Danovitch, J.H. (2019). Growing up with Google: How children's understanding and use of internet-based devices relates to cognitive development. *Human Behavior and Emerging Technologies*, 1(2), pp.81–90. doi:10.1002/hbe2.142.

Hasan, R. (2022). *Strategy Pattern: The Evolution from Walkman to iPod*. [online] Research gate. Available at: https://www.researchgate.net/profile/Md-Hasan-188/publication/360561173_Revealing_Strategy_Pattern_The_Evolution_from_Walkman_to_IPod/links/627e0dc6107cae2919a1bfd4/Revealing-Strategy-Pattern-The-Evolution-from-Walkman-to-IPod.pdf.

Henard, D.H. and Szymanski, D.M. (2001). *Why some product are more successful than others*. [online] Sage Journals. Available at: https://journals.sagepub.com/doi/full/10.1159/jmkr.38.3.362.18861?casa_token=16PvLQEKNCMAAAA%3A.

HLN nieuws (2022). *IN BEELD. Waanzinnig bouwproject 'The Line' in Saudi-Arabië gaat van start*. HLN nieuws. Available at: <https://www.hln.be/buitenland/in-beeld-waanzinnig-bouwproject-the-line-in-saudi-arabie-gaat-van-start~ae85edd5/> [Accessed 13 Dec. 2022].

Link, J. (2018). *Council Post: How Digital Disrupted Maslow's Hierarchy Of Needs*. [online] Forbes. Available at: <https://www.forbes.com/sites/forbeshuman>

Has technology made life too easy? – technologies effect on human development

resourcescouncil/2018/07/30/how-digital-disrupted-maslows-hierarchy-of-needs/?sh=5fd9f3f860d5 [Accessed 14 Dec. 2022].

Martínez, A.M. (2014). *Plato rejects writing by the mouth of Socrates*. [online] History of Greece and Rome. Available at: <http://www.antiquitatem.com/en/origin-of-writing-memory-plato-phaedrus/> [Accessed 14 Dec. 2022].

NEOM (2022). *About*. [online] neom.com. Available at: <https://www.neom.com/en-us/about>.

Norman, D.A. (2007). *The design of future things*. New York: Basic Books.

Norman, D.A. (2013). *The Design of Everyday Things*. Massachusetts: Mit Press.

POSTON, B. (2009). *An Exercise in Personal Exploration: Maslow's Hierarchy of Needs*. [online] Association of Surgical Technologists. Available at: <https://www.ast.org/pdf/308.pdf> [Accessed Aug. 2009].

Ross, P. and Maynard, K. (2021). Towards a 4th industrial revolution. *Intelligent Buildings International*, [online] 13(3), pp.1–3. doi:10.1080/17508975.2021.1873625.

Schwab, K. (2016). *The Fourth Industrial Revolution*. [online] London: Penguin Random House. Available at: https://law.unimelb.edu.au/__data/assets/p

df_file/0005/3385454/Schwab-The_Fourth_Industrial_Revolution_Klaus_S.pdf.

Sharma, V. and Ravi, T. (2016). *A review paper on 'IOT' & It's Smart Applications*. [online] Fardapaper. Available at: <https://fardapaper.ir/mohavaha/uploads/2020/11/Fardapaper-A-review-paper-on-'IOT'-It's-Smart-Applications.pdf>.

Smith, G.E. and Nagle, T.T. (2002). *How much are customers willing to pay? - ProQuest*. [online] www.proquest.com. Available at: <https://www.proquest.com/docview/202681633?pq-origsite=gscholar&fromopenview=true>.

Staff Writer (2017). *Maslow's Hierarchy Of Needs: Tech On Top Of The Pyramid*. [online] Bold Business. Available at: <https://www.boldbusiness.com/human-achievement/maslows-hierarchy-of-needs-tech-on-top-of-pyramid/> [Accessed 7 Dec. 2017].

Statista (2022). *Smart Home - Worldwide | Statista Market Forecast*. [online] Statista. Available at: <https://www.statista.com/outlook/dmo/smart-home/worldwide>.

Trailblazers HQ (2021). *The World Islands Dubai | \$14 BILLION bet on Man-made Islands*. YouTube. Available at: <https://www.youtube.com/watch?v=tloN5cFSHu8> [Accessed 18 Mar. 2022].

Has technology made life too easy? – technologies effect on human development

- Turner, J. (2021). *The 6 Main Ways Technology Impacts Your Daily Life*. [online] Tech.co. Available at: <https://tech.co/vpn/main-ways-technology-impacts-daily-life>. arabie-gaat-van-start~ae85edd5/ [Accessed 13 Dec. 2022].
- Wright, L. (2022). *Saudi Arabia Announces Plans for 100-Mile-Long City in the Desert*. [online] Dornob | Architecture, Interior and Furniture Design. Available at: <https://dornob.com/saudi-arabia-announces-plans-for-100-mile-long-city-in-the-desert/> [Accessed 14 Dec. 2022].

Figure list

- CB Insights (2015b). *Maslow's hierarchy of startups*. [illustration] CB Insights. Available at: <https://www.cbinsights.com/research/maslows-hierarchy-of-needs-startups/> [Accessed 13 Dec. 2022].
- CNET (2017). *Griffins technology smart mirror*. CNET. Available at: <https://www.cnet.com/reviews/griffin-technology-connected-mirror-preview/> [Accessed 13 Dec. 2022].
- HLN nieuws (2022). *IN BEELD. Waanzinnig bouwproject 'The Line' in Saudi-Arabië gaat van start*. HLN nieuws. Available at: <https://www.hln.be/buitenland/in-beeld-waanzinnig-bouwproject-the-line-in-saudi->