



# Giga Entertainment

The Future Entertainment  
in the age of the Gigabit  
Internet, AI, IoT and MEC



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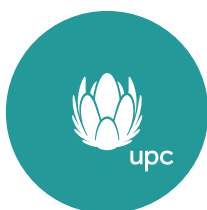
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# Table of Contents

4	Introduction
6	Expectations of Internet users regarding the future of television in 2017 and 2018
10	Point of departure – entertainment today
12	Entertainment in Poland according to Internet users – – based on own research
20	Factors of change
34	Areas of change
36	Internet users' readiness to use new technologies in selected areas
42	Immersive world
50	Human inter(net)action
58	Digital wellbeing
66	Unlimited knowledge
74	Digital journey
82	Connected culture
90	Summary

# Introduction

During this year's London Design Festival held at the end of September, I visited Gazelli Art House to see the exhibition entitled Enter Through The Headset 3. Thus, for the very first time I've had the opportunity to visit an art gallery with all of its walls empty, where all pieces were viewed exclusively in virtual reality. I may add that none of the exhibitions I've seen so far in art galleries have caused such a strong – and physical – response of my body (including vertigo, nausea, accelerated heart rate and quickened breath).

Is that what our future is going to look like? Empty physical world and all attractions available only in the virtual world? It's hard to say, but I don't think so. However, the so-called *immersive experience* is one of the directions in which our reality will develop, in particular entertainment in the broad sense. As a result of the development of such technologies as the Internet of Things, artificial intelligence, augmented and virtual reality, mobile edge computing, or 5G network, in the coming years everything we have known so far will change beyond recognition. Both the physical and digital world will gain new dimensions. We will be able to experience the latter through all of our senses, not only sight or sound, as we do now. Meanwhile, the physical world will gain a new, digital layer which – due to its quality and data transfer speed – will be difficult to distinguish from the real one. Here is where questions arise about how are Polish Internet users ready for this change today. Do they want it, or are they rather apprehensive? These are some of the questions we tried to answer in the report you are holding in your hands.



We focused on changes in six main areas – not only within the field of pure entertainment (immersive world), but also interpersonal contacts and relations (*human inter(net)action*), education (*unlimited knowledge*), health (*digital wellbeing*), tourism (*digital journey*) or culture (*connected culture*).

We hope that conclusions drawn from the report will provide you with knowledge about what directions and development trends are already visible, how popular a given solution becomes among its recipients, and that they will also constitute a valuable indication in estimating market potential for the discussed areas.

We hope you will find it an equally inspiring and enjoyable read.

Natalia Hatałska  
CEO, Head of Foresight  
infuture.institute

# Gigabit-speed Internet drives the development of digital entertainment

Never before has digital entertainment been changing as dynamically as today and never before has the entire notion expanded its meaning so quickly. The reason is simple: the development of gigabit infrastructure that provides constant access to high-speed Internet, which enhances the experience of digital entertainment, driving the development of its new forms and areas. The superfast gigabit Internet connection enables broadcasting the content in even higher resolution and better quality, as well as an increasingly broad use of new technologies, such as virtual and augmented reality, artificial intelligence, or 360° video.

As UPC Polska, we actively engage in the development of the future, consistently investing in gigabit-speed technology, increasing the cover of our network, increasing the average Internet connection speed for our customers and introducing higher and higher speeds, including the latest, ground-breaking 1Gb/s. We analyse trends and set the bar high for ourselves, to ensure the best customer experience for our clients.

This is how changes reach not only the world of entertainment that we know – digital television or computer games, but also areas of life that until recently have not been associated with digital entertainment, such as wellbeing, education or tourism. At the same time, consuming entertainment becomes an increasingly immersive experience i.e. an experience that enables the participant or the viewer to feel differently, more fully and intensely. Finally, entertainment becomes more and more inclusive – it can be experienced by everyone, regardless of the age, health condition or origin.

This report explains in what ways superfast gigabit Internet access changes the world we know and how our needs develop as an audience. The Gigabit Internet provides us with a whole range of new opportunities – it enables us to enjoy our favourite content without limits, without thinking about waiting time or delays. In future, it will enable voice control of home entertainment centres, and will help to “enhance” the use of entertainment thanks to technologies such as VR or 360° video.

I hope that the reading this report will inspire you and launch many fascinating discussions around its subject!

Robert Redeleanu  
CEO UPC Polska



# Expectations of Internet users regarding the future of television in 2017 and 2018

Last year, in April 2017<sup>1</sup>, for the purpose of the report “The future of television. Factors of change” we asked Polish Internet users what they expected from television in the future. It turned out that their expectations varied greatly. No single, dominant answer emerged, that would clearly indicate what future respondents see for television. The most frequently selected answer – the possibility of automatic, smart matching of programs to viewer’s interests – was chosen by 24%, and the least popular – the possibility of watching programs in VR goggles – by 16%. They are separated by mere 8 percentage points.

This year, we decided to repeat the same survey to discover whether any changes occurred within a dozen or so months in this rapidly changing area.

In 2018 we asked Internet users the same question: “What do you expect from the TV of the future?” This year there was no dominant answer either, but the differences between particular answers, although still not very significant, were greater than the year before (20 percentage points between the most and the least popular answer).

The highest ranking among the desired outcomes for the future television in 2018 was the need for even better quality of video and audio; it was indicated by a third of respondents (33%). Answers in the joint second place: the possibility of watching television in

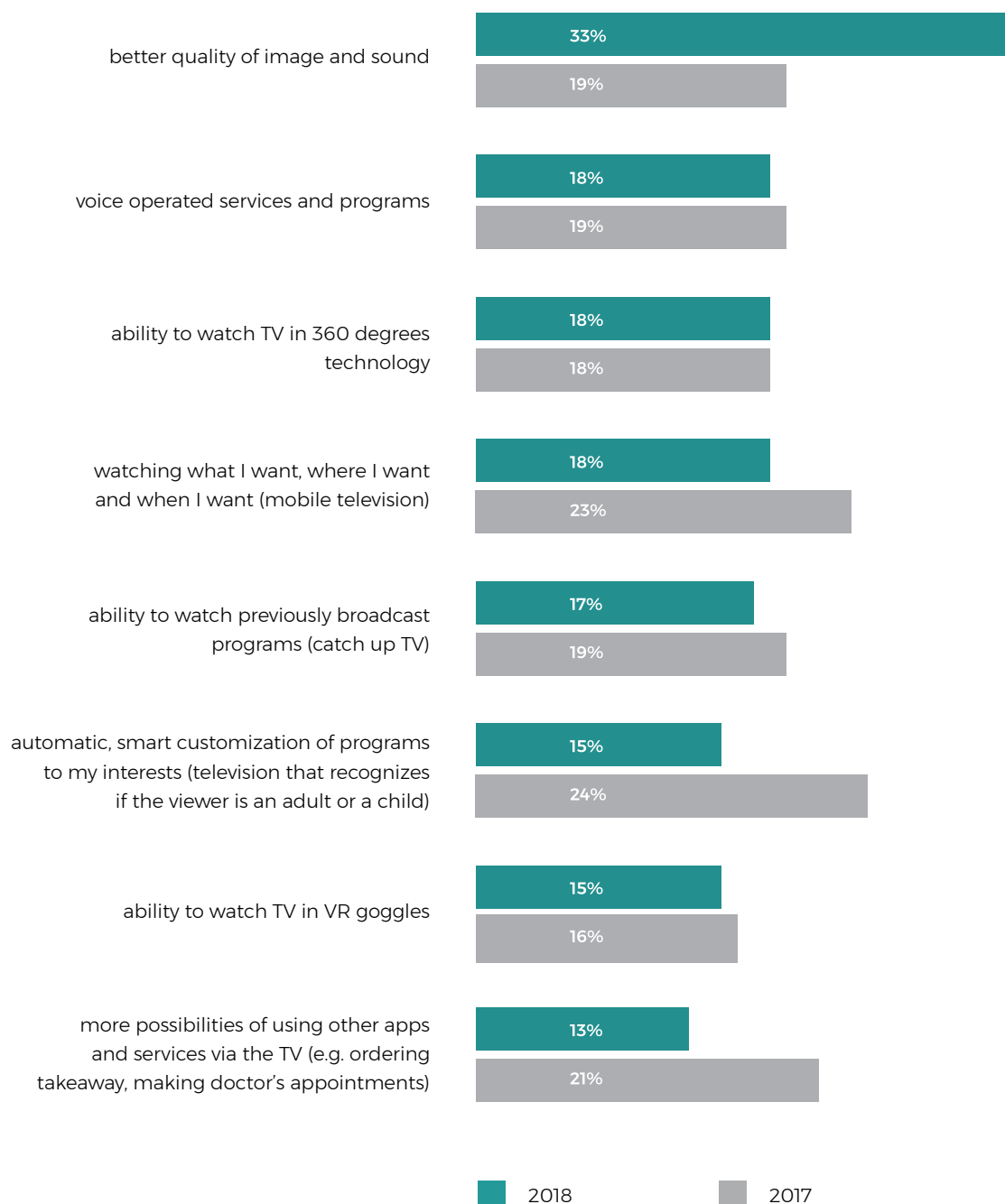
360° technology (18%), voice control of services and programs (18%) and the need to watch what we want, when and where we want, i.e. mobile television (18%). The possibility of watching previously broadcast programs – catch up TV – ranked third, but only by 1 percentage point (17%).



1. The survey was commissioned by the infuture hatałska foresight institute and conducted on the sample of 1153 Internet users by Mobile Institute with the use of the CAWI method (Computer-Assisted Web Interview).

Chart 1. **What do you expect from the TV of the future?**

Indicate 3 answers max.



Source: Internet survey (CAWI) conducted on a representative sample of Internet users, n = 1144, Mobile Institute, commissioned by the infuture hatajska foresight institute, September 2018.

Internet survey (CAWI) conducted on a representative sample of Internet users, n = 1153, Mobile Institute, commissioned by the infuture hatajska foresight institute, September 2017.





However, when the results from 2017 and 2018 are compared, a shift in the order of certain answers and expectations is visible. Better audio and video quality ranked fourth in 2017, and in 2018 it became the first among users' needs and expectations. The second place did not change. Both in 2017 and 2018 Internet users indicated they expect mobile television (what they want when they want it.)

Interestingly enough, this year the option that ranked second was the possibility of watching TV in 360° – an answer which took the penultimate, 7th place the year before.

Such a leap can attest to the progress and spreading awareness of this technology among Internet users within the last year. Voice control of services and programs (this year also in the second place), last year ranked fifth.

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Interesting is the fact that different age groups view the future of television (and TV sets) differently.

The most popular among the respondents aged 19–24 in 2017 was the answer that in future, television should be mobile (30%), and 25% of them expected to be able to get high quality audio and video. Today mobility becomes increasingly obvious, so in 2018 the most popular answer was the one expecting the guarantee of a better quality audio and video (33% of answers), which indicates the direction of young people's needs. Only slightly less respondents (29%) indicated the possibility of voice control of services and programs. It is, therefore, clear that the awareness of the possibility of voice-controlled devices increased significantly in this group.





In 2017, respondents aged 25–34 most frequently (25%) answered that the TV set should intelligently match programs to the viewer's taste and know whether it is an adult or child watching; it should also be voice-controlled (22%). In 2018, the most popular answer in this group was the need for a better audio and video quality (28%) as well as the possibility of watching in 360° technology (23%). Respondents clearly care for an increasingly better quality of image and sound which provides a sense of immersive viewing. Their answers also clearly concern the areas which are now more broadly discussed (e.g. in media) so the higher the awareness of a given technology in society, the more respondents declare they expect these solutions in their homes.

The group of respondents aged 35–44 answered in 2017 that they want television to match programming to their interests (27%), and in 2018 the most popular answer was the need for a better audio and video quality.

Among 45–54 year olds, in 2017 the most respondents declared that they want to watch 360° technology in future. In 2018, the most popular answer was the need for a better audio and video quality (32%) with catch-up TV landing in the second place. So, in 2018 we can see a clear increase in the awareness of and the need for watching 360° technology programming and voice-controlled devices. Interestingly enough, what ranked third in 2017 was the conviction that future television will provide more possibility for using various apps and services via a TV set (e.g. ordering food, making doctor's appointments). In 2018, the same answer dropped to the last place on the list. It could mean that the TV is expected to be used for entertainment only, and not become the heart of the means of managing the home.

# Point of departure. Entertainment today

In 2010, 43% of Poles browsed the Internet every day or almost every day. In 2017, this number rose to 64%<sup>1</sup>. Today, surrounded by mobile devices, we are online almost constantly. A smartphone becomes an extension of our hand, we have a laptop or a tablet on us at all times (in a bag, a purse, on our desk, on the table at home, or even on holidays). According to research, delays in buffering videos lasting several seconds can cause the same spike in anxiety levels as watching a horror film<sup>2</sup>. Therefore we can see that the status quo of entertainment undergoes a transformation. Constant shifts in our society, on the technology and economic market (growing role of the cooperation or sharing economy) affect human behaviour, communication and the way we discover the world. We want to be up-to-date at all times which leads to us living in the so-called nanosecond culture. We can't stand

the thought of anything passing us by, and the phenomenon of FOMO (*Fear Of Missing Out*) is already being described by physicians and psychologists. Solutions based on new technologies (e.g. virtual reality, augmented reality, the development of the so-called GigaApps or increasingly big screens) provide users with completely new experiences, and thanks to the Gigabit wireless connection, they become available anytime, anywhere. AI and haptic technologies are also in the phase of rapid development which will slowly transform consuming entertainment into a new dimension of experience based on sensory synaesthesia or customized expectations. The popularity of streaming services has already led to the provision of single large doses of content, contributing to the growth of subscription economy. 90% of millennials in the USA already declare that they binge watch TV shows, devouring several episodes one right after the other<sup>3</sup>.

Consuming entertainment increasingly often takes the form of a solitary experience, although the popularity of spending communal time online grows as well (see: a case study concerning Facebook Spaces or e-gaming). Children start to systematically and daily use the Internet on average at the age of 9. From that moment on, a smartphone or a laptop often becomes the first or one of the first sources not only of knowledge about the world, but also the way of spending time online on entertainment<sup>4</sup>. Various



1. "Cyfrowy Polak", Kantar Public, 2018.

2. "Mobile i digital w 2018 roku w Polsce i na świecie", MobiRank, 2018.

3. "Global TMT Predictions 2018", Deloitte, 2018.

4. Report from the research "Nastolatki 3.0", Pracownia Edukacyjnych Zastosowań Technologii Informacyjno-Komunikacyjnych NASK 2017.



spheres of life, previously unavailable to a certain group of users, thanks to the superfast (gigabit) Internet and VR or AR, become increasingly inclusive and enable joining the social life also for previously excluded people. Solutions (see below, p. 83) give e.g. senior citizens or people with disabilities the opportunity to attend concerts, visit museums (more in case studies of Virtual Kremmer Museum or No Isolation).

The report reveals how through new technologies and the development of gigabit Internet, (*giga connectivity*) entertainment entered various areas of our lives. While working on this report, we have adopted the premise that every experience that engages (and engagement is possible, among others, thanks to the development of new technologies and innovation in Internet speed), contains elements of entertainment. The In-

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future hatalska foresight institute team distinguished six areas visibly influenced by the development of connectivity that also affects the development and transformation of entertainment. These include:

*immersive world, human inter(net)action, digital wellbeing, unlimited knowledge, digital journey and connected culture.*

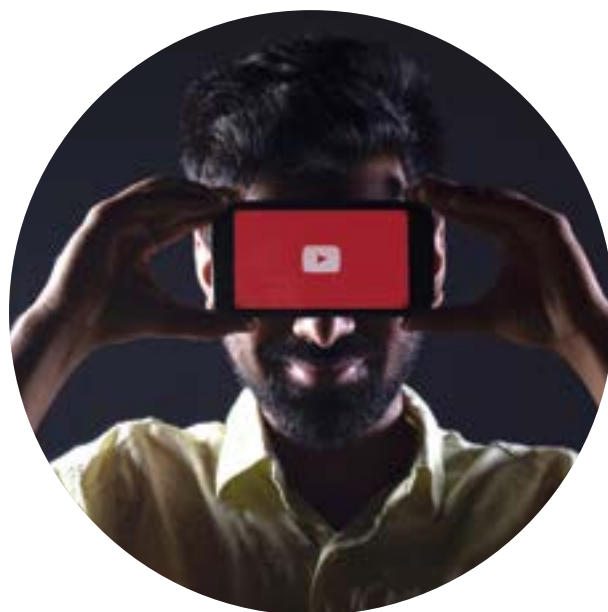
In each area there are case studies confirming the relationship between the particular area in the context of engaging immersive experiences and entertainment.

Within the study, we also asked people connected to selected areas to comment some examples of new technology applications in the future of entertainment. Additionally, 10 factors of change (technological, social and economic) were distinguished which indicate directions of digital entertainment development.

# Entertainment in Poland according to Internet users – based on own research

As recently as several years ago, to break away from everyday chores, people would read books, play chess or listen to the radio. They would wait the entire week for the next episode of their favourite TV series. Children would run out of the house and disappear for the entire day. Theatre, cinema or opera outings were exceptional, long-awaited events. Visiting exotic places involved a long, expensive journey. Access to the Internet and the dynamic development of technologies changed our world, including the world of television and entertainment. Studies conducted for the purpose of this report indicated that today almost one in four Polish Internet users (22%) believe that changes to come will be positive for television. However, one in five people (19%) declared that they believe the development of AI, AR and VR will not affect using television in any way. These data may result, among others, from the fact that the awareness of AI, AR and VR solutions is still not very high, so the knowledge concerning the consequences and changes that these technologies may cause is not great. It means, among other things, that not only do we need to explain what AI, VR and AR are, build the awareness of the technology development and indicate concrete evidence of how these technologies impact particular categories and areas of entertainment (hence numerous examples below). Interestingly enough, as many as 16% of respondents believe that this impact may be negative, and the dynamically growing number of new solutions may replace traditional television. As many as 43% do not have an opinion about how these technologies will affect using television.

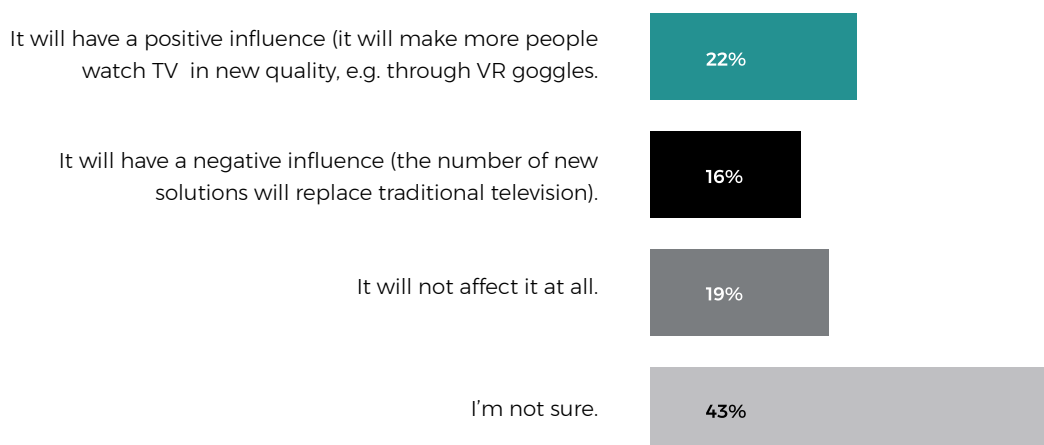
Furthermore, the awareness of the influence of superfast (gigabit) Internet on everyday functioning is still not clear to the surveyed sample. The majority (56,5%)



Source: Unsplash.com / Rachit Tank

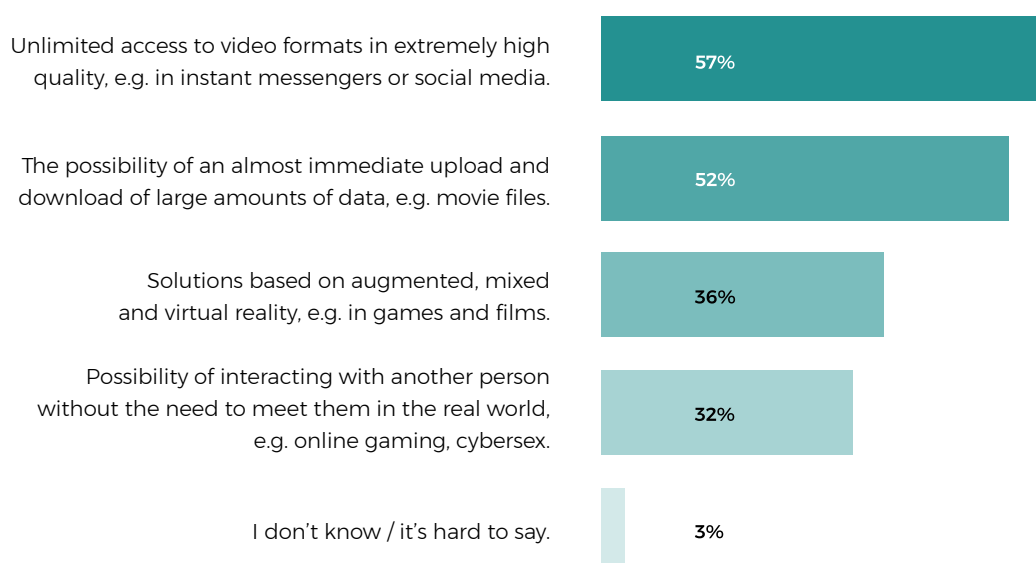
of respondents declare that they do not know how it will affect and what it will change in their surroundings, everyday use of devices or technology. Over a half of people who claim to know the advantages of this change (57%) awaits unlimited access to video formats in extremely high quality, e.g. in instant messengers or social media. Half of respondents (52%) declares that what is important for them is the possibility of an almost immediate upload and download of large amounts of data, e.g. movie files. 36% of respondents claim that such a change would be very useful in using solutions based on augmented, mixed and virtual reality: in video games and films. 32% of them declare that superfast Internet access will facilitate interactions with another person without the need to meet them in the real world (e.g. online gaming, cybersex).

Chart 2. **How do you think the development of VR, AR and AI will influence using television services?**



Source: Internet survey (CAWI) conducted on a representative sample of Internet users, n = 1144, Mobile Institute, commissioned by the infuture hatałska foresight institute, September 2018.

Chart 3. **Superfast gigabit Internet access will cause a range of changes in the area of entertainment. Which of the following are the most useful to you?**



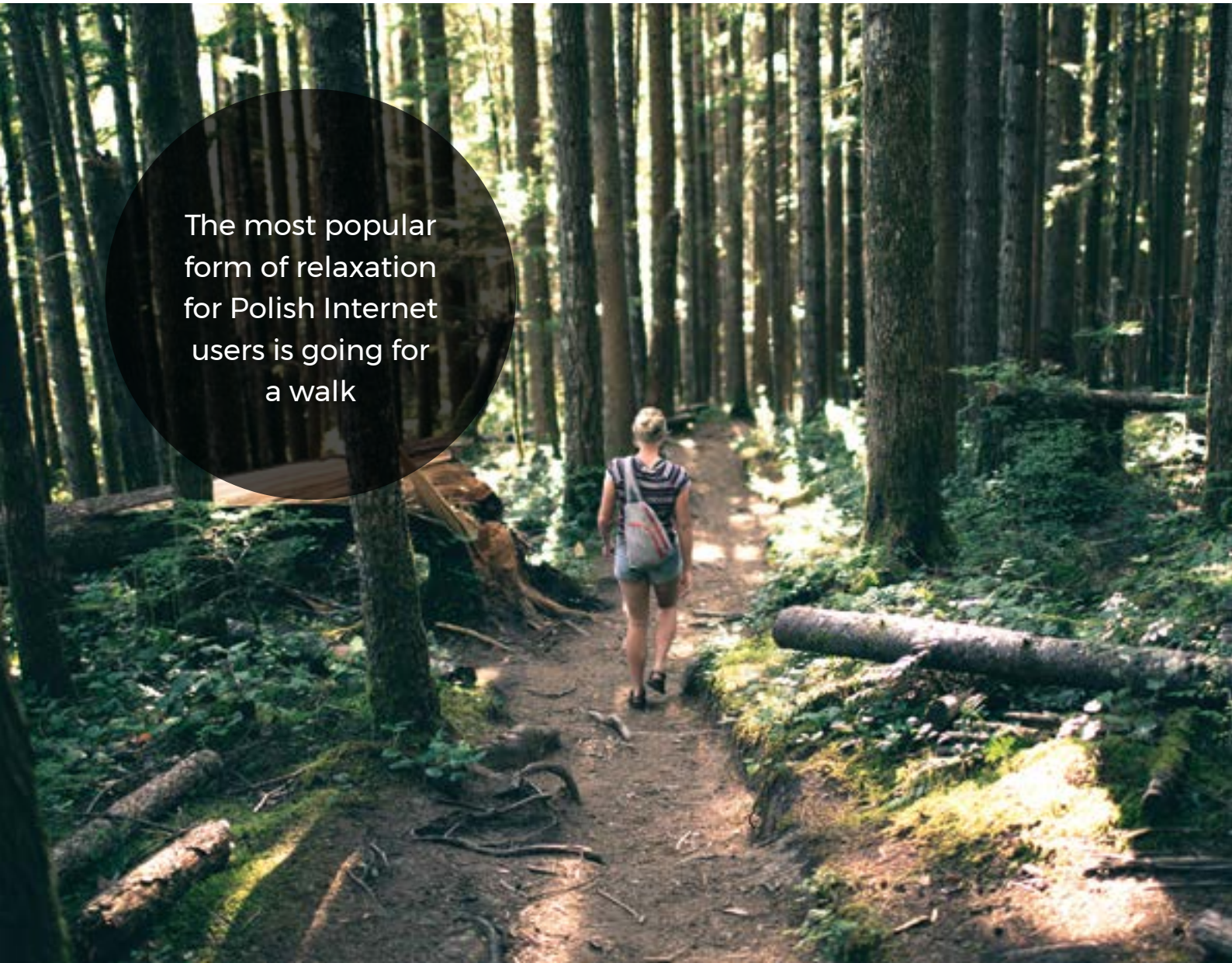
Source: Internet survey (CAWI) conducted on a representative sample of Internet users, n = 1144, Mobile Institute, commissioned by the infuture hatałska foresight institute, September 2018.



Studies indicate that the most popular form of relaxation for Polish Internet users is going for a walk (this activity is selected by one in four respondents). Subsequent places, with small percentage difference between one another, were occupied by more stationary activities. Reading books (24%) and listening to music (24%) ranked second, then they browse the Internet (21%). One in five relaxes in their free time by watching television (20%) or films (20%). A similar number of respondents goes to the cinema, theatre or exhibition, 18% meet their friends and 17% does sports.

8% of the surveyed Internet users relax while doing arts, crafts and other DIY activities. 8% play computer games. The same number of people (8%) declares they do not do anything. 6% play board games, and 4% claim they do not have time to relax at all.

Source: Unsplash.com / Garrett Parker

A photograph of a person walking away from the camera on a dirt path through a dense forest. The path is surrounded by tall, thin trees and lush green undergrowth. Sunlight filters through the canopy, creating dappled light on the ground. A large, dark, circular graphic is overlaid on the left side of the image, containing white text.

The most popular  
form of relaxation  
for Polish Internet  
users is going for  
a walk

Chart 4. **How do you relax?**

Indicate 5 answers max.



Source: Internet survey (CAWI) conducted on a representative sample of Internet users, n = 1144, Mobile Institute, commissioned by the infuture hatałska foresight institute, September 2018.





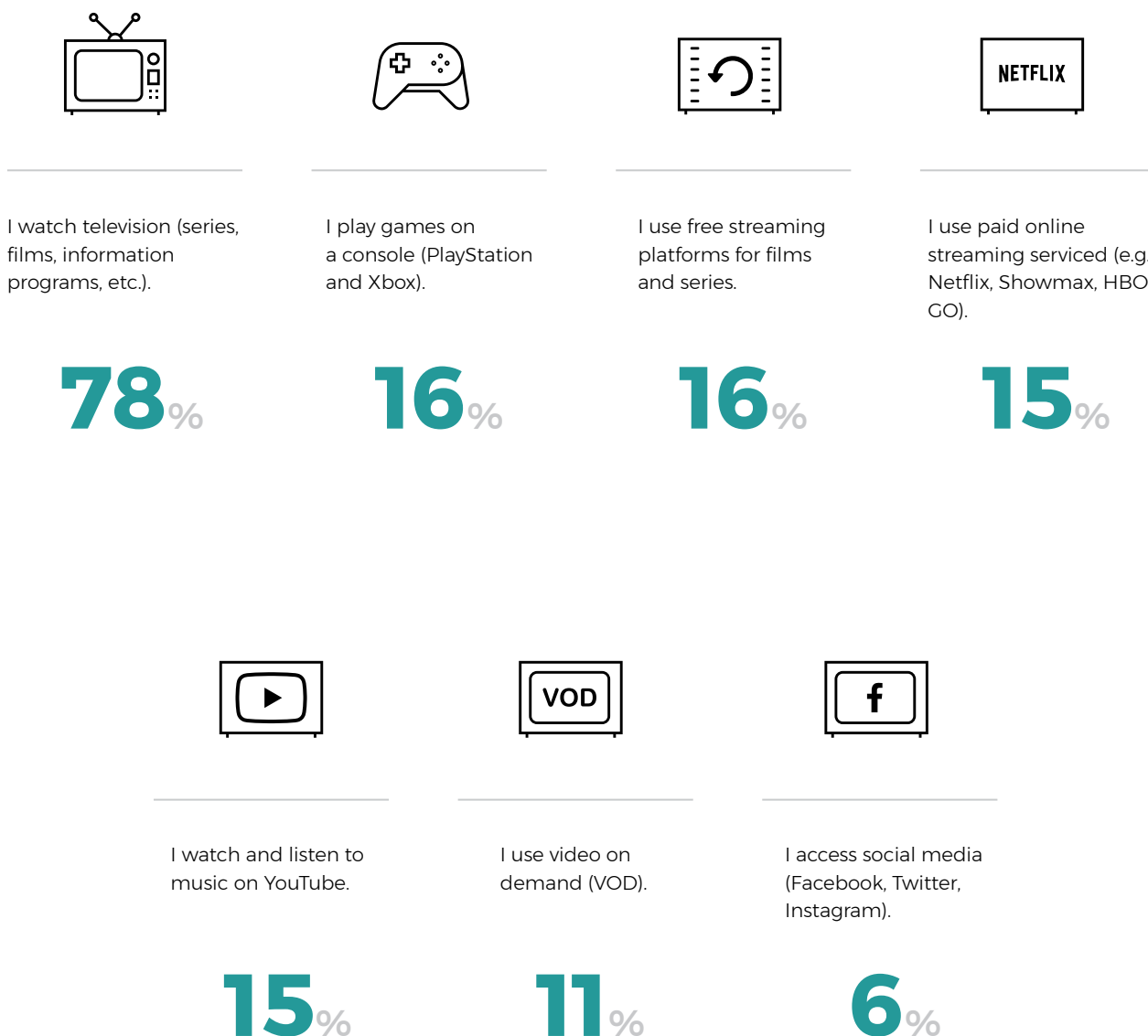
Although watching TV is still the most attractive form of entertainment for one in five people, in the survey conducted in September 2018, only 64% of respondents answered “yes” to the question “Do you own a TV?” It means that as many as 36% of them declare they do not own a TV (sic!). Among respondents below the age of 35, 58% claim they own a TV, and 42% that they do not. In the group over 35, almost three fourths (74%) declare they have a TV.

Internet users most often use a TV to watch TV shows (series, films, information programs, etc.) – this amounts to as many as 78% of answers. The subsequent are as follows: using free streaming platforms for films and series (16%), playing on a game console (PlayStation or Xbox – 16%), using paid online streaming services like Netflix, Showmax, HBO GO (15%), watching and listening to music via YouTube (15%) and using video on demand – VOD services (11%) 6% of respondents say they access social media via a TV (Facebook, Twitter, Instagram).

1. According to data of the Polish Main Statistical Office, in 3.2% of households there is no TV set. It should be emphasised that such a high percentage obtained in the survey conducted by the infuture institute stems from the specificity of the drawn sample and the applied research method. The infuture institute research concerns individual people (Internet users) and not households. It is possible that young people, living with parents, do not have their own TV yet, but there is one in their household. Furthermore, lack of a TV set does not mean foregoing watching TV entirely, and only changing the device where it is displayed (e.g. on a laptop or smartphone screen).

Chart 5. **How do you use the TV?**

Please mark all applicable answers

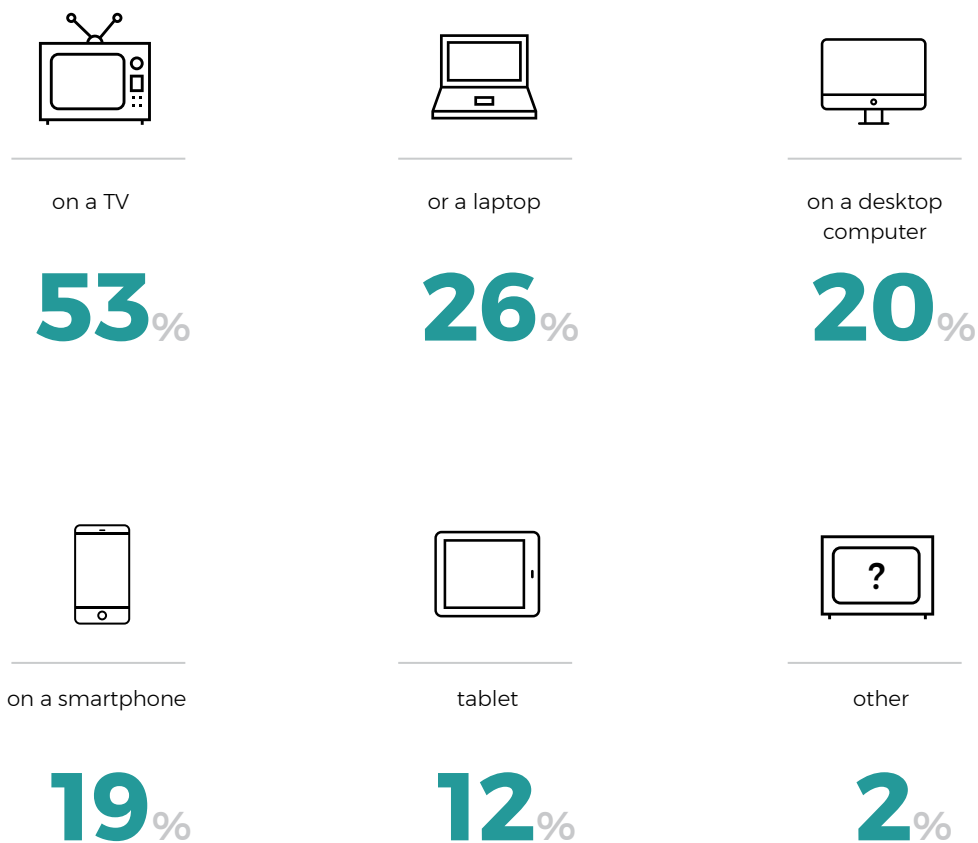


Source: Internet survey (CAWI) conducted on a representative sample of Internet users, n = 1144, Mobile Institute, commissioned by the infuture hatałska foresight institute, September 2018.

For watching television content today, apart from a TV set (53% answers), laptop is also used (indicated by every fourth respondent – 26%). One in five watches television content on their computer (20%), 19% of respondents on a smartphone and 12% on a tablet.

Chart 6. What devices do you use for watching television content?

Please mark all applicable answers

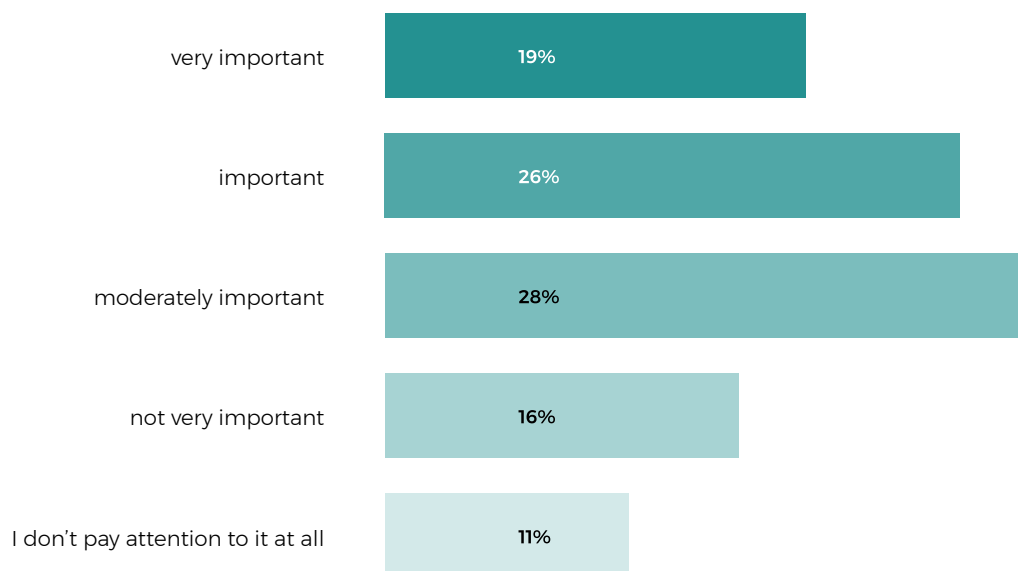


Source: Internet survey (CAWI) conducted on a representative sample of Internet users, n = 1144, Mobile Institute, commissioned by the infuture hatajska foresight institute, September 2018.

It is a fact that nowadays entertainment is consumed mainly online. There is also a growing need for an increasing quality of audio and video content available online, which enables watching it on very big screens. Almost half of respondents declares that the quality of image and sound is important or very important for them (45%). It is moderately important for one in four respondents, and not very important for every fifth person (16%). Only 11% declare they do not pay attention to this aspect at all.

It should be remembered, however, that apart from its basic function (providing engaging experiences) entertainment today enables also gaining knowledge, exploring the world and culture, thus becoming an integral part and an increasingly immersive part of our lives.

Chart 7. **How important is the high quality of audio and video of various content available online (enabling e.g. watching on a very large screen)?**



Source: Internet survey (CAWI) conducted on a representative sample of Internet users, n = 1144, Mobile Institute, commissioned by the infuture hatałska foresight institute, September 2018.





factors of  
change

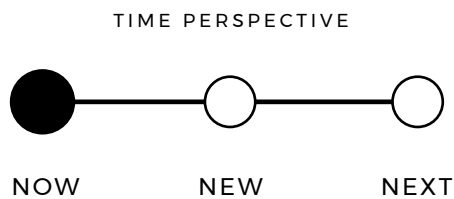




Factors of change described in this part are a kind of signal or a pointer indicating what currently has the most impact on the development of entertainment. Factors listed below are not the only ones, but in our assessment they have the most impact for this area in future.

# Technological factors

## Large screens



Nokia 3310, a cult mobile phone had a screen smaller than a matchbox. First screens served only for entering phone numbers, displaying reception and battery status. Today, consumers' expectations are quite different. First came the possibility of displaying images and with it, the possibility of showing pictures, playback and watching films. Current smartphone producers race one another to manufacture the larg-

est possible screen. Frameless smartphones become increasingly popular. 18:9 screens are offered today by, among others, Samsung, LG, Apple and Huawei. Along with the increase in popularity of wireless communication, smartphones became a multimedia extensions of our hands. They make our work easier and more optimized. Smartphones are also the first thing for which we reach when we get bored. The high resolution of a mobile phone display enables watching films and TV shows without the sense of quality loss. This revolution concerns also TV and movie theatre screens. Technology enables creating screens with enormous surface and incomparable image quality. In 2017, in Lotte Cinema World Tower in Korea, Samsung produced and installed Cinema LED Display, the first LED screen in a movie theatre in the world. More and more information appears about the latest line of QLED 8K TVs which was introduced to regular sales on some European and American markets. 8K is a technology which is supposed to deceive the human eye to the point where it is not able to distinguish between the screen and the real world, taking entertainment to a whole new level. At the beginning of the year, Koreans presented LG OLED 8K, and in May, the first 8K video was featured on YouTube. Apart from improving the quality of our home entertainment, large screens can also find applications in building surrealist sets, replace outdoor screens during concerts or set a new standard for broadcasting sporting events.



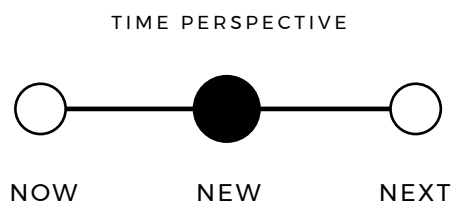
Source: Unsplash.com / Andrae Ricketts





Source: Unsplash.com / Kevin O'Connor

# Superfast wireless connection



The development of superfast wireless connectivity became an inseparable element of entertainment. Even today, the gigabit Internet enables ultrafast download and upload of files as well as using multiple devices at the same time, without reducing the quality of the connection. In 2017, Poles spent in front of a computer, smartphone or tablet as much as 57%<sup>1</sup> of their time. In future, the need for fast access to the network will continue to rise. Daily number of human interactions with devices connected to the web is estimated to reach 4800 in 2025, which translated to data can amount to 163 sextillion bytes produced annually<sup>2</sup>. Therefore, companies race to reach the 5G technology, i.e. the Internet whose speed is between 10 Gb/s and 100 Gb/s. This July, a US telecommunications company AT&T announced the launch of 5G transmitters for their customers in 15 American cities. Nokia, a telecommunication company from Finland, made an agreement with the European Investment Bank for 500 million euro. The money are to be allotted for the development of 5G technology. And in China, the year 2018 is when it is introduced for commercial use in selected cities. In Poland in recent years, UPC introduced a service with fibreoptic Internet access of a ground breaking 1 Gb/s speed in Warsaw. Orange Polska plans to introduce 5G Internet in 2019, and according to the Polish Ministry of Digital Affairs, Łódź will become a pilot city in which the infrastructure will allow residents to use mobile 5G networks. Gigabit Internet access affected also

## GigaApps

Application from the Augmented Discovery group enable interactions with the world through mixed reality and thus enable using solutions from the area of entertainment e.g. displaying holograms of sporting events. Virtual Telepresence enables exceeding physical or geographical limits, contacting someone online or shopping for clothes without visiting a fitting room. Meanwhile, Automated Living provides an opportunity to commission the technology tasks normally performed by humans, e.g. monitoring the patient status thanks to special sensors connected with the application.

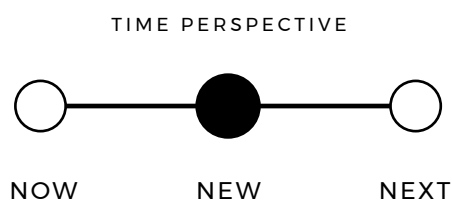
the development of three groups of applications that the report "Unlocking GigaWorld Innovation"<sup>3</sup> calls "GigaApps". These are: Augmented Discovery, Virtual Telepresence and Automated Living.

1. „Polska jest MOBI”, Kantar TNS, 2018.

2. Raport Strategiczny Internet 2017/2018, ICAN Institute, 2018.

3. Raport „Unlocking GigaWorld Innovation. GigaApps in a GigaWorld”, Arthur D. Little and Liberty Global, 2017.

# Mobile edge computing

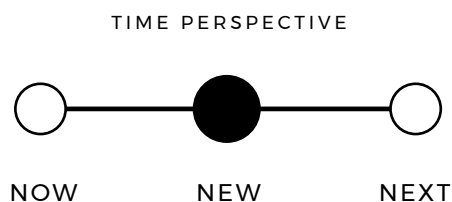


Mobile edge computing is a technology that will revolutionize the data transfer process. Mobile edge computing architecture enables data to be processed almost in real time, directly in its place of origin, relieving heavily exploited data centres and Internet connections. This technology will surely influence the development of the entire area connected to immersive viewing, from literal entertainment (games, watching series, listening to music, etc.) to shopping, to learning, to work optimization. Mobile edge computing (together with superfast gigabit Internet) will make immersive VR experiences cheaper to produce, easier to implement and more interactive. Mobile edge computing is one of the factors that will enable sending not only visual and sound effects via the Internet in real time. Thanks to wearable technologies (clothing and accessories involving advanced electronics) we will be then able to receive online content not only through the sense of sight, but also touch and taste. It is estimated that the Mobile Edge Computing market will increase from USD 148.2 million in 2016 to USD 838.6 million until 2022.<sup>1</sup>

1. <https://www.marketsandmarkets.com/Market-Reports/mobile-edge-computing-market-10135317.html>



## VR and AR development



VR is Virtual Reality in which the world is generated entirely digitally. In Augmented Reality (AR), elements of the virtual world become superimposed on the real world. Currently these technologies become increasingly omnipresent and indicators of the frequency of their application are on the rise, both among consumers and industries. Various and increasingly cheap (which is an important factor for consumers) devices and equipment that enable transporting users to virtual reality appear on the market constantly. It is not surprising, therefore, that almost twofold increase<sup>1</sup> in the number of users worldwide is estimated: from 57 million in 2017 to 114 million in 2018. It is confirmed by the results of the research we conducted for the purpose of this report which state that in 2017, among people who declared having encountered the notion of VR, 38% had the opportunity to test it. In 2018 the number of these declarations rose to 52%. As we can see, access to this technology is becoming increasingly widespread. Meanwhile, respondents see the application of VR today mainly in games (52%), tourism (36%), culture (33%), education (31%), sport (22%), sex (21%) and in areas connected to wellbeing (17%). Respondents have a greater awareness of the notion of Augmented Reality. In 2017, 19% of them declared they had encountered the term, and in 2018 this number increased to 22%.

1. "Number of Active Virtual Reality Users Worldwide from 2014 to 2018 (in Millions)", Statista, [online] <https://www.statista.com/statistics/426469/active-virtual-reality-users-worldwide/> [access: 17.09.2018].



Source: Unsplash.com / JESHOOOTS.COM

The number of respondents who had the opportunity to test AR grows. In 2017, only 19% indicated they had encountered AR-based solutions, and in 2018 it was already 61% (an increase by 42 percentage points). It is, therefore, clear that the popularity of augmented reality which can be encountered more often on social media platforms, including Snapchat and Instagram, rises.

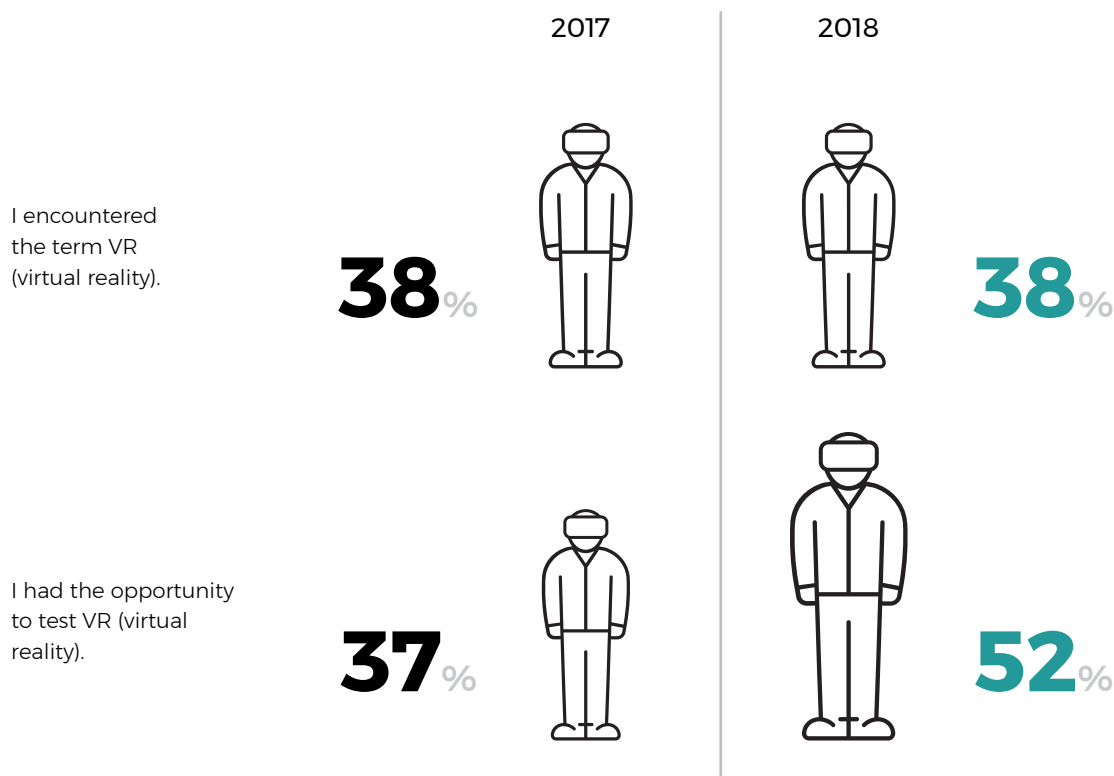
Almost half (43%) of respondents (that had encountered AR or VR solutions) believed they would soon become popular and common in our everyday lives. For 34% of them it is a matter of 5 years, for 6% – closer to 10 years in the future. 16% claim that these areas will remain a novelty, a toy and will not enter our daily existence.

The increasing popularity of these technologies is evidenced also by the fact that it draws the interest of major market players: Samsung, HTC, Google, Sony, LG and Microsoft. In August of this year Sony announced that it sold 3 million VR goggles for PlayStation VR that premiered in 2016. While Xiaomi VR goggles (equivalent to Oculus Go) were sold out in three minutes on the brand official website on the day of the premiere. In August 2017 in Warsaw, the first VR cinema in Poland was opened. Using virtual reality techniques is visible also in training applications.

PKN Orlen plans to buy VR solutions to support training employees of refinery and petrochemical production. The growing popularity of this technology is also connected to the accessibility of smartphones that can be used as input devices for controlling VR environment, especially for games. It is estimated that before 2025 the VR/AR software market will be driven in 60% by consumers (for their personal use).<sup>2</sup>

2. "Virtual and Augmented Reality. Understanding the Race for the Next Computing Platform", Goldman Sachs Global Investment Research, 2016.

Chart 8. VR (virtual reality) awareness and testing in 2017 and 2018

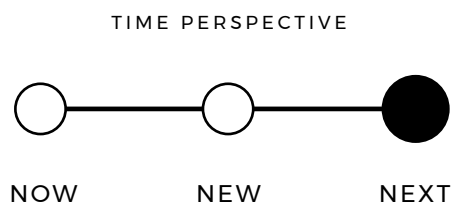


Source: Internet survey (CAWI) conducted on a representative sample of Internet users, n = 1144, Mobile Institute, commissioned by the infuture hatalska foresight institute, September 2018.

Internet survey (CAWI) conducted on a representative sample of Internet users, n = 1112, Mobile Institute, commissioned by the infuture hatalska foresight institute, March 2017; only the respondents who declared having encountered the term VR were asked the question about VR testing.



# AI development



AI (*Artificial Intelligence*) is a technology aiming at the development of computer systems capable of performing tasks that require human intelligence, visual perception or decision-making skills. AI will help to customize entertainment supplied to customers online, and thanks to recommendation systems, it will become even better matched to their needs and expectations.

An increasing number of countries is interested in a strategic implementation of artificial intelligence. France has included working on an AI in a development strategy, allotting EUR 1.5 billion to this purpose.<sup>1</sup>

Meanwhile in China, a 10 million dollar National Centre of Information Technology and Quantum Computers was built, as well as a 2.1 billion dollar Industrial Park in Beijing, whose activities are to be focused precisely on AI. The Polish government works on a national strategy on artificial intelligence which, according to announcements, is expected in 2018. Digital Poland Foundation is currently working on an AI map for Poland whose objective is substantive support for the implementation of this technology in Poland. The map of Polish AI will feature companies, start-ups and businesses involved in artificial intelligence. The AI development in Poland is already visible, and its impact can be observed both in its social aspect and in work automation. Samurai Labs, the first Artificial Intelligence Laboratory in Poland was created where machine learning technology allowed for the development of an effective, scientifically proven method of detecting and combatting cyberviolence against children. The recruitment process of the BZ WBK Bank is facilitated by an AI-driven bot. The preliminary interview for job candidates is conducted via the Messenger app: candidates talk to an artificial intelligence-based bot.

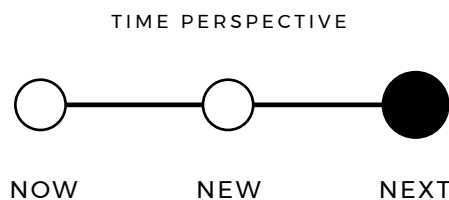


1. Przegląd Strategii Rozwoju Sztucznej Inteligencji na Świecie, Digital Poland, 2018.



Source: flickr.com / Strelka Institute photo

## Haptic technologies



Haptic technologies are called touch technologies, but they aim at communicating with users through all their senses. Thus virtual objects seem to be more real and tangible. Here, touch is to play the role of information medium between the real and virtual world. According to the report prepared by IDTechEx this March, before 2028 the haptic industry will be worth over 3 billion dollars<sup>1</sup>. Stimuli transmitted via haptic devices include shape, form, texture and even temperature. Haptic technologies are currently widely used in all devices (touch, wearable, exoskeletons)

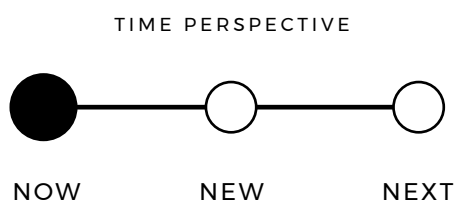
although the technology is still in infancy compared to VR or AR. The number of applications and fields in which haptic technologies can develop is practically unlimited: from medicine to education, to entertainment. In the context of the future of entertainment, haptic technologies can take gamers' experiences to a new level. Even today they are able to feel the surface of virtual objects, and in future, thanks to special game controllers, it will be possible to e.g. feel pain.

1. Haptics 2018-2028: Technologies, Markets and Players, IDTechEx Research, 2018.



# Social factors

## Nanosecond culture



We are living in the nanosecond culture, or the age of the so-called eternal present. We are constantly in motion, we act quickly and in multiple areas, we are always short on time. In Poland, children start to systematically use the Internet at the age of 9. In the most recent study conducted by Google, 75% of respondents declare that a smartphone helps their productivity. Furthermore, 54% claim that phones diminish their level of stress or anxiety<sup>1</sup>. The market is full of solutions that serve to help people in their time management and broadly understood optimization. Dedicated apps remind us to go to sleep, keep our appointment calendar and remind about deadlines. We are increasingly less connected to places and more to objects. Today, we can easily prepare a work presentation on a smartphone and meet our friends online, e.g. playing the same game from different places. The nanosecond culture generates in us the need for immediate action and consumption of knowledge. We learn about the new album of our favourite artist on Spotify which sends us the information based on the previously conducted analysis of our musical choic-

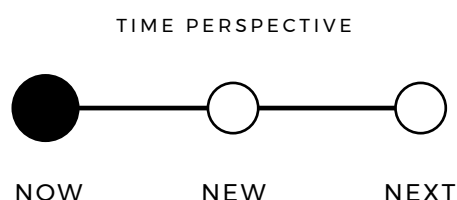


es. Netflix sends notifications to smartphones when users finish watching a season of a series and immediately suggests new titles that match their taste. Life in such a world forces us to communicate briefly and act swiftly, but with increasing frequency we look for role models that would serve us as sources of knowledge and trust.

1. "Getting Things Done on Mobile", Google/Heart+Mind Strategies, 2017.



## Fear Of Missing Out (FOMO)



FOMO is the fear of missing out on something. And although this fear has always been present, the explosion of social media caused young people to experience the FOMO phenomenon. In the world of digitalization and social media we cannot keep up with the information and consequently, we cannot participate in everything. The spread of the FOMO was undoubtedly influenced by the increasing addiction to the Internet. Over 83% teenagers spend online more time than they planned, and over 64% percent of them feel anxiety or irritation when their access to the Internet is hindered. Almost one third of young people give up their school work only to go online<sup>1</sup>.

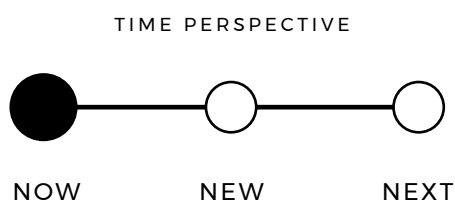
According to the report “Addictions and their consequences,” 52% of Poles cannot imagine their life without browsing the Internet<sup>2</sup>. As many as 73% of young people aged 15–24 browse the Internet and 45% talks via the social media before they go to sleep. In 2018, scientists from two Canadian universities conducted a study on a group of students to check their level of anxiety in the context of the FOMO. Students filled in an especially prepared survey five times a day for a semester. The results revealed that the FOMO was at its highest at the end of the day and at the end of the week. Furthermore, students who worked and performed more chores daily, had a stronger sense of the FOMO, which resulted in exhaustion, stress and trouble sleeping.

1. Report from the research “Nastolatki 3.0”, Pracownia Edukacyjnych Zastosowań Technologii Informacyjno-Komunikacyjnych NASK 2017.

2. Raport „Uzależnienia i ich konsekwencje”, ARC Rynek i BIG InfoMonitor 2017.

# Economic factors

## Subscription economy



Less than a half of Polish consumers (48%) buying online use subscription services. 25% of Poles use 5–6 subscription simultaneously. We use the subscription model most often to pay our insurance premiums (44%), bills (43%), VOD services (39%), we pay for fitness activities (30%) as well as means of transport and software (both 25%). Among people spending more than PLN 600 monthly for subscription payments, the largest share goes to VOD enthusiasts (81%)<sup>1</sup>. Ac-



cording to the survey conducted by McKinsey & Company, 15% of Americans who shop online subscribed to an e-commerce service within the last year and 46% subscribed to streaming services, including Netflix. 55% of all subscriptions is based on the so-called content curation, i.e. finding out information relevant for a particular subject or for a particular group of people<sup>2</sup>. It points to the fact that customized services are incredibly important for consumers.

Nowadays, we pay for subscriptions, we buy access to desired content, unlimited access to music, films or TV shows. Not to miss out on anything, to know more, to be up to date, to have constant access to news. Subscription allows us not only to be here and now, but it also gives the consumer the possibility of fulfilling their needs in any place at any time. The statement “I have access” is more important than “I own”. 60 million people pay for Spotify monthly and the number of Netflix subscribers exceeded 117.5 million. The Subscription Economy Index grows nine times faster than the stock market S&P index and Gartner expects that before 2020, 80% of software providers will sell their services as subscriptions.

The television industry as well reaches for financing from subscriptions with increasing frequency (especially that a part of advertisers move their marketing budgets online). PwC forecasts that investments of traditional television networks will also focus on the subscription model (with a 10% CAGR increase before 2020) and VOD (8% CAGR increase before 2020).

1. Raport „Subskrypcje PL. Polski rynek a ekonomia subskrypcji”, Straal 2017.

2. Thinking Inside The Subscription Box: New Research On E-Commerce Consumers, McKinsey & Company, 2018.



Źródło: Unsplash.com / obayda PH



# areas of change

Areas of change described in this part are an attempt to summarize the impact of technological, social and economic factors on the future of entertainment in selected areas: *immersive world* (engaging experiences), *human inter(net)action* (interpersonal relations), *digital wellbeing* (health), *unlimited knowledge* (education), *digital journey* (tourism) and *connected culture*.





# Internet users' readiness to use new technologies in selected areas

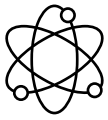
In the report, there are six areas related to entertainment that are visibly affected by the development of gigabit Internet (*giga connectivity*): *immersive world*, *human inter(net)action*, *digital wellbeing*, *unlimited knowledge*, *digital journey* and *connected culture*.

Within the online study conducted by the Infuture hatalska foresight institute, we also asked our respondents about their readiness to adopt new technologies in the distinguished and described areas that are connected to or use the benefits of entertainment:





## AREAS OF CHANGE



using technological advancements in education (*unlimited knowledge*), e.g. learning anatomy through virtual visualization of organs



using new technologies in culture (*connected culture*), e.g. watching concerts in 360°



using new technologies in tourism (*digital journey*), e.g. admiring Paris from the top of the Eiffel tower at home through VR



using new technologies in interpersonal relations (*human inter(net)action*), e.g. remote meetings or online kissing



using new technologies in the area of health (*digital wellbeing*), e.g. relaxing meditation sessions before going to sleep

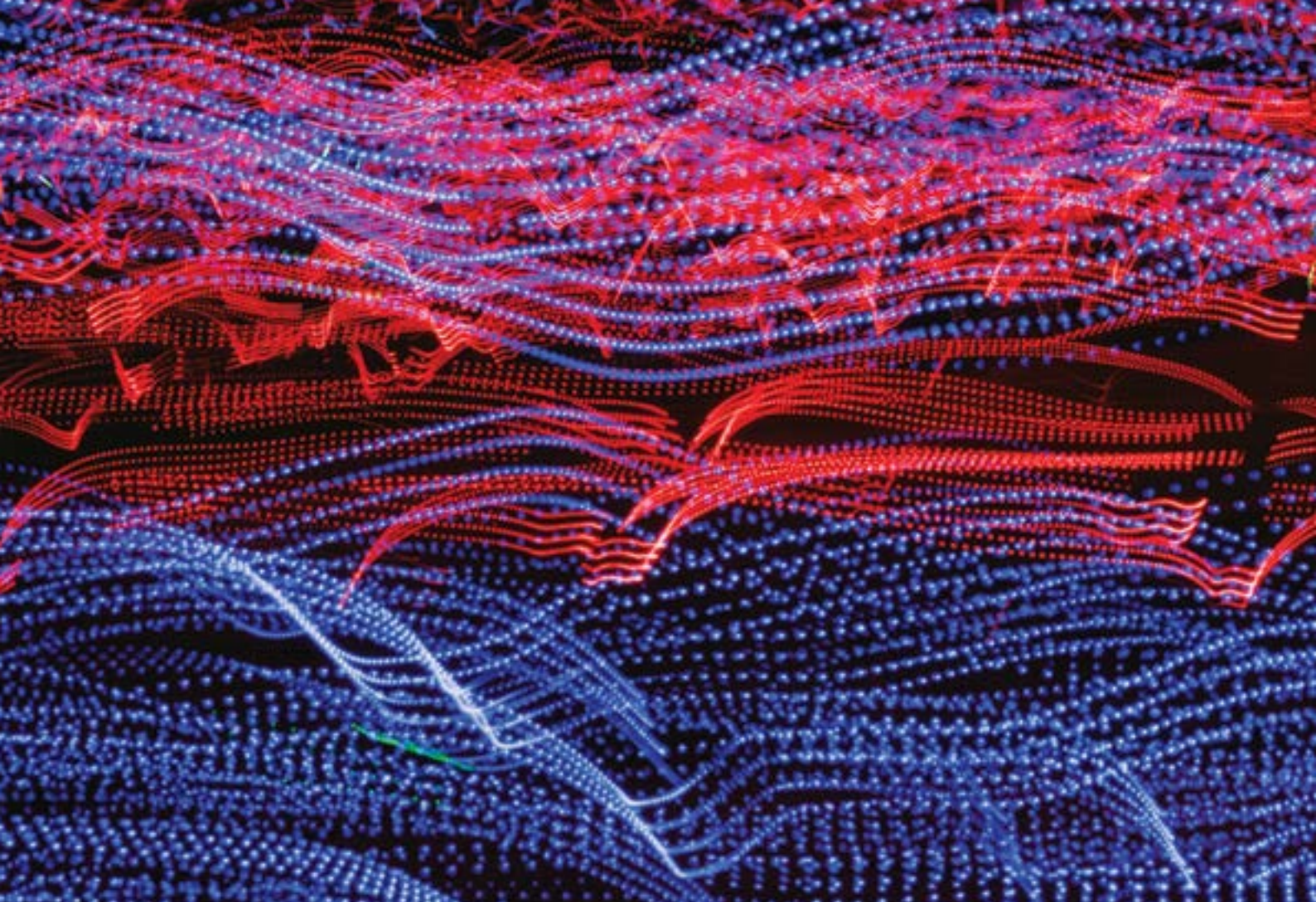


using technological changes in entertainment (*immersive world*), e.g. playing and being transported to a very realistic online world, e-sports tournaments or VR television

Source: flickr.com / TORLEY





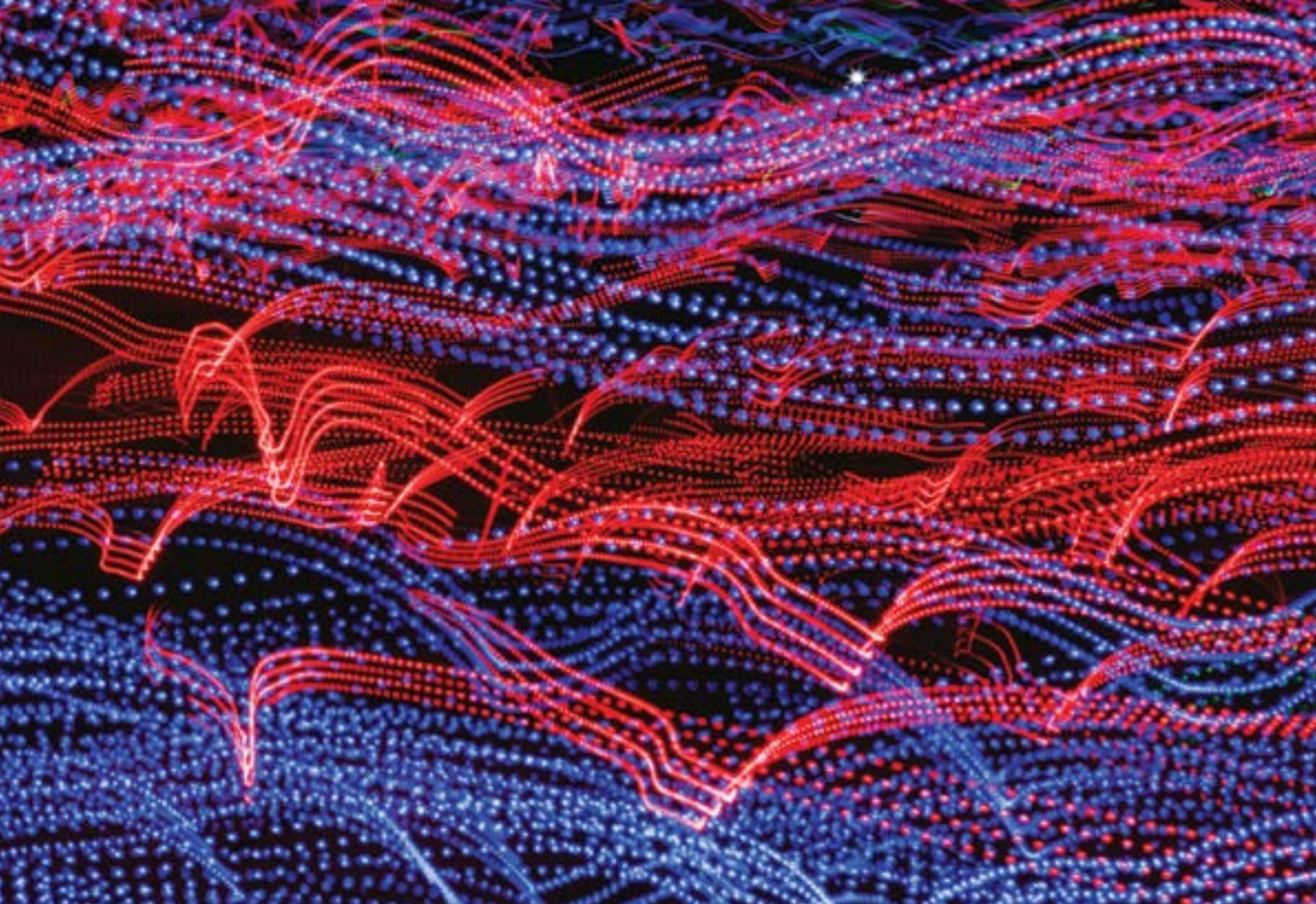


The results obtained may constitute one of the pieces of data used for estimating the market potential for indicated solutions and areas and a hint regarding the extent to which knowledge – or already the use – of a given solution becomes common among their recipients. Due to the applied research method and the declarative nature of the survey, they rather indicate tendencies and directions than provide precise data on respondents' behaviours. We analysed results divided into two groups. "Non-tech savvy" is a classification used for people who have no or little interest in new technologies. "Tech savvy" was used for people who indicated strong or very strong interest

**For  
"tech savvy"  
the least familiar  
area new technologies-  
wise are interpersonal  
relationships. One in four  
did not encounter the  
possibility of online  
kissing.**

in new technologies. The first group comprised 583 respondents (which constitutes 51% of the surveyed Internet users), the second one – 333 (29% of respondents), while both groups were very similar with regard to social and demographic features such as gender, age or place of residence. In both the proportions are almost identical when it comes to the percentage of women and men, the size of age groups and the number of people from large cities. The only distinguishing features is the attitude to new technologies. We used a five point scale of interest, from not knowing a given solution to being its user.



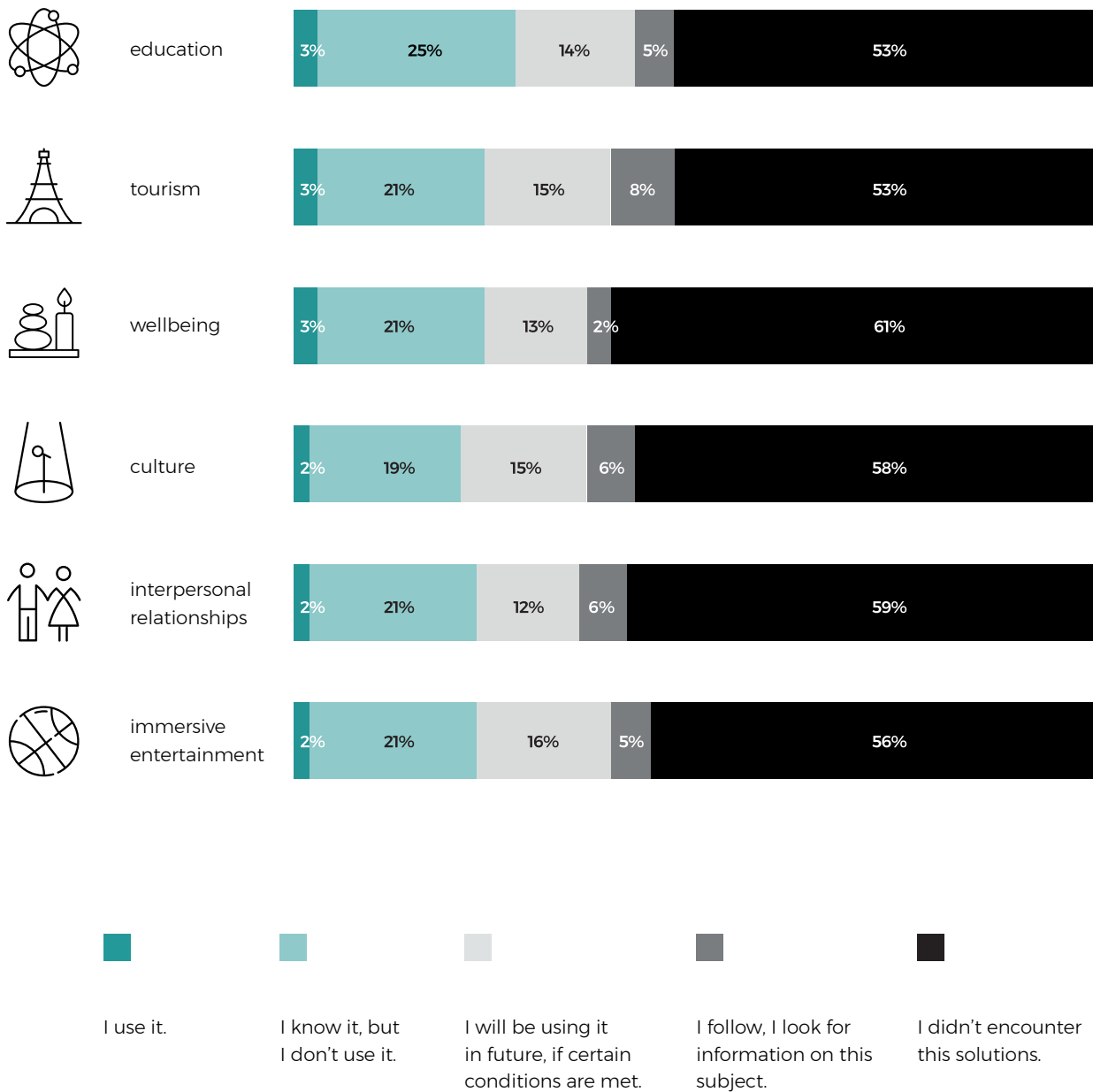


### Key conclusions resulting from the analysis

- There is a huge disproportion in the awareness of what new technologies can offer in terms of entertainment between “tech savvy” and “non-tech savvy” respondents. In extreme cases (which is the area of wellbeing), the difference reaches 48 percentage points. For instance: 61% of non-tech savvy respondents had not heard about such solutions as relaxing meditation session before going to sleep. Among people interested in new technologies, the percentage amounted to only 13%.
- At this stage of the popularization of novelty solutions in entertainment, it can be concluded that the non-tech savvy people do not use them.
- The relatively largest percentage of tech-savvy respondents use innovative solutions in education to gain knowledge through play and entertainment (21%) and have access to immersive entertainment (19%), e.g. playing and being transported to a very realistic online world (e-sports tournaments or VR television).
- For tech savvy respondents, relatively the least explored area when it comes to new technologies are interpersonal relationships. One in four did not encounter the possibility of online kissing.
- In the case of new technologies in tourism (e.g. admiring Paris from the top of the Eiffel tower from your home in VR ), 13% among tech savvy and 15% of non-tech savvy is willing to use them in near future if certain conditions are met.

## AREAS OF CHANGE

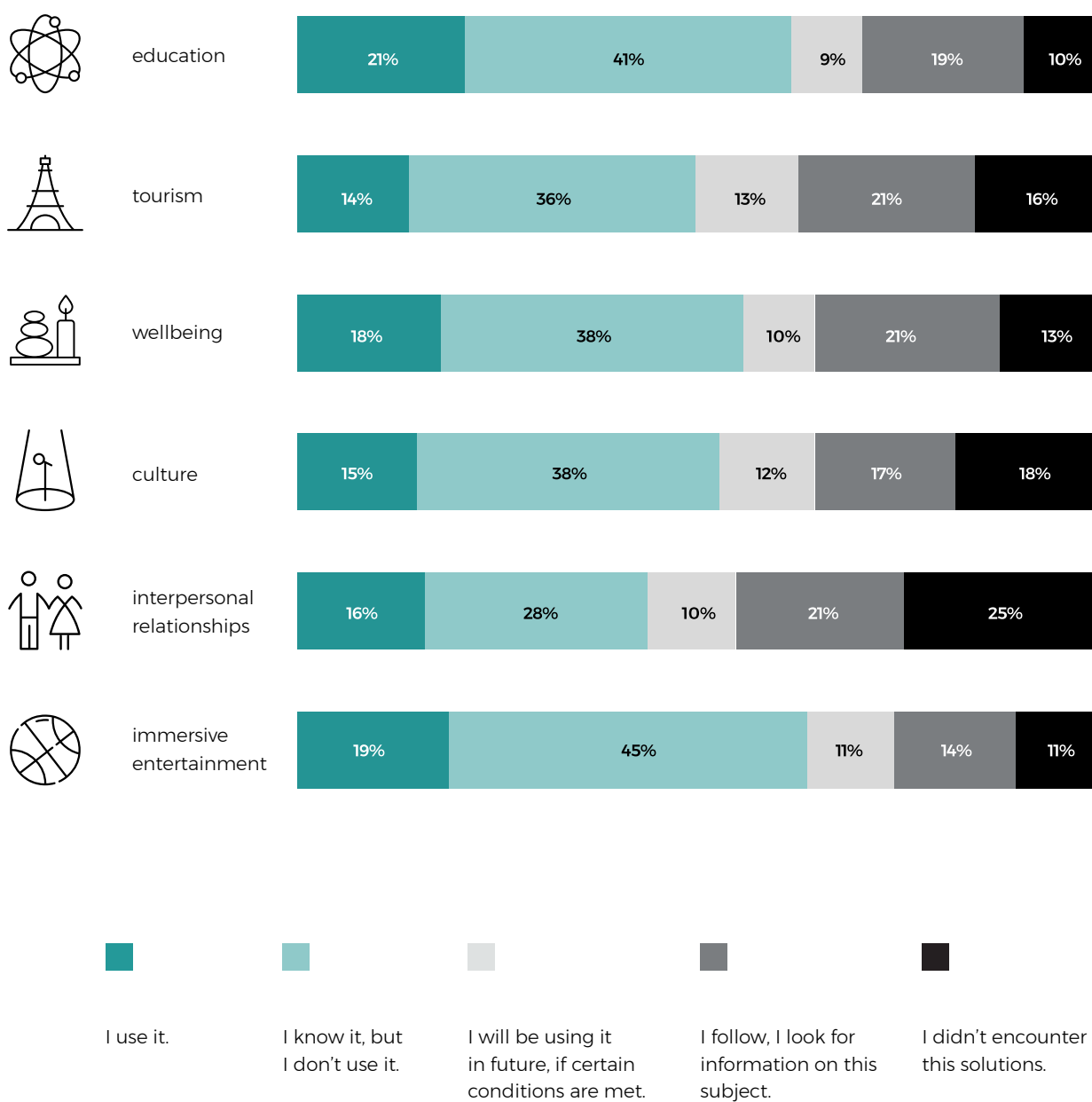
Chart 9. Readiness to use new technologies in selected areas by “non-tech savvy” respondents



Source: Internet survey (CAWI) conducted on a representative sample of Internet users, n = 1144, Mobile Institute, commissioned by the infuture hatałska foresight institute, September 2018.



Chart 10. Readiness to use new technologies in selected areas by “tech savvy” respondents



Source: Internet survey (CAWI) conducted on a representative sample of Internet users, n = 1144, Mobile Institute, commissioned by the infuture hatajska foresight institute, September 2018.

AREA OF CHANGE

# immersive world



Source: Unsplash.com / Martin Sanchez

The area called in this report *immersive world* is based on technologies and solutions that even today facilitate the viewer's immersion in the world of video content: *immersive viewing*. These are experiences that will undoubtedly revolutionize entertainment not only at our homes. It is the screens that surround us, high quality content and the accessibility of the equipment (e.g. cheaper VR headsets) that will enable living our lives in two worlds (real and virtual). Also the status of constantly evolving gaming will affect areas connected to the new quality of television entertainment and sports. Participants of contemporary games can already often have the impression that they become a part of the world with which they can fully identify. It carries with it also the will to invest in your virtual life. This year, the player of a popular game "Counter Strike" paid over USD 61,000 (over PLN 204,000) for a unique skin that enables changing the appearance of items in the game. *Digital storytelling* became a commonly used tool for creating immersive entertainment. It is visible in game scripts that apart from the graphics are based on multiple narratives and well-developed characters. Watching that kind of interactions with the virtual world became attractive for users. We can observe immersive viewing also in e-sports tournaments; participating players can be watched by thousands of people and the entire tournament becomes a huge sporting event. Thus, e-sport starts to compete with traditional sport. The organizing committee of the 2024 Olympic Games in Paris notes the increasing popularity of e-sports and assures taking into consideration featuring this discipline in the summer games. Whereas in April, the Olympic Council of Asia announced that e-sport will be a competitive discipline in Asian games (the most important sporting event in Asia after the Olympics) in China in 2022.

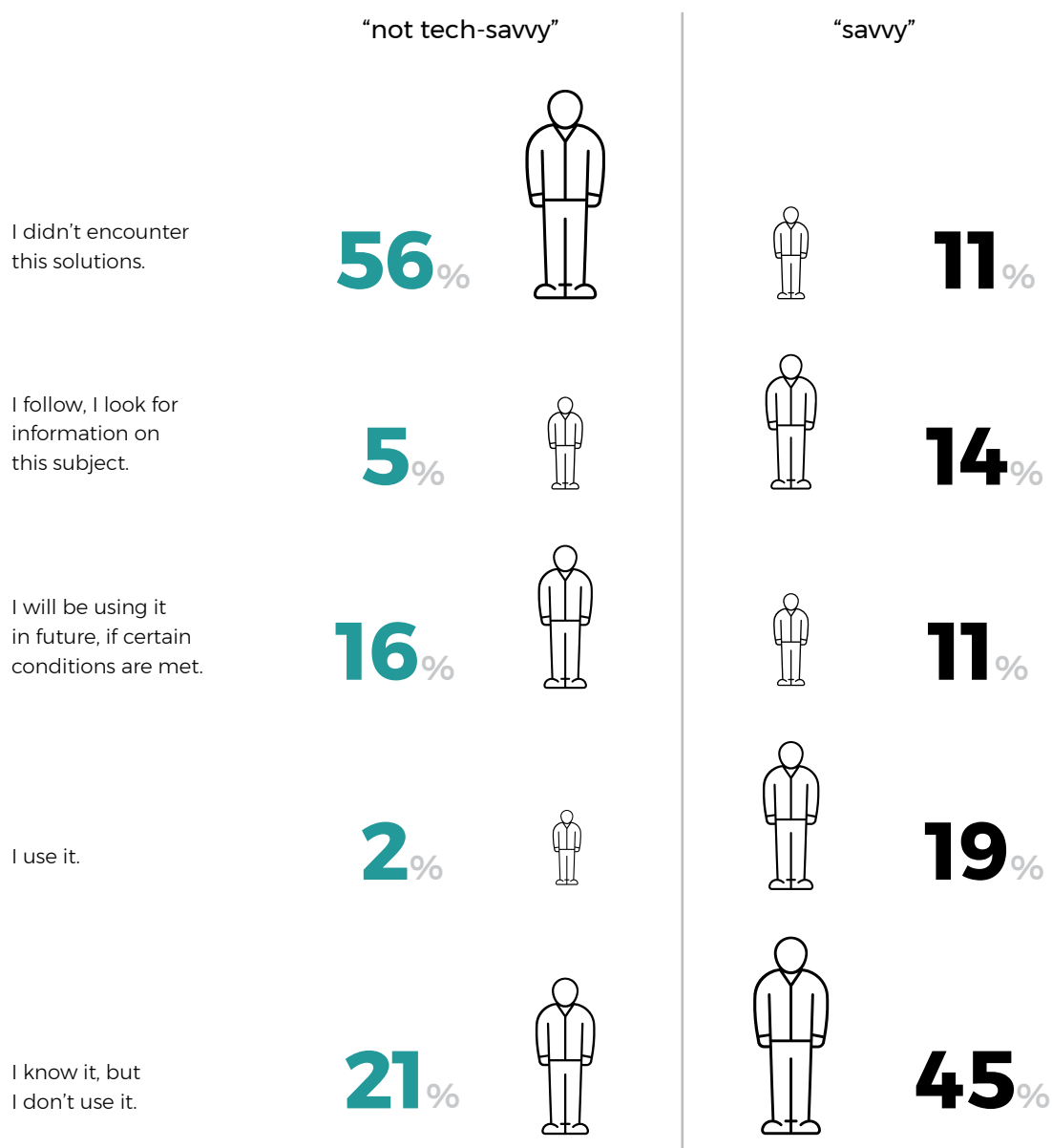
**Increasingly  
large screens, high  
quality content and  
accessibility of equipment  
will make living a life in  
two worlds (the real and  
the virtual one) will  
be possible.**

It does not change the fact that new technologies have an enormous impact on how the traditional form of sports develops. Already solutions appear that transport athletes to a virtual world in order to enhance the sporting experience (see below: case study of running a VR marathon). AR, in turn, works for the analysis of athletes' results in real time. The digital transformation affects also television, which means that it must provide its viewer with the same or larger and more immersive dose of entertainment. Paid online rental services offer to their subscribers apps that enable them streaming straight to VR. Producers of VR equipment, such as Oculus Venues and Oculus TV, aspire to become a hub for apps that offer video content for VR. It could mean that in future, thanks to a VR headset, while sitting in a comfortable chair, we can be transported to e.g. a sports pitch.



Source: [www.oculus.com](http://www.oculus.com)

Chart 11. Readiness to use new technologies in immersive entertainment (e.g. playing and being transported to a very realistic online world, e-sports tournaments or VR television)



Source: The analysis based on statements of the Internet survey participants (CAWI). "Non-tech savvy" is a classification used for people who have no or little interest in new technologies. "Tech savvy" are people who indicated a strong or a very strong interest in new technologies. The first group included 583 surveyed, the second - 333.



**SOLUTIONS THAT ARE A PART OF THE AREA OF CHANGES TODAY****The Park**

In 2018, Telenet, a Belgian cable television operator created The Park – space that involves its users in immersive experiences. The project is the result of the cooperation between Telnet and 9,5 Magnitude Ventures (a venture capital fund specialising in creating new, tailor made start-ups). The entire space of The Park is divided into three rooms: Free Roam VR (200 m<sup>2</sup>) where users can spend an hour in the virtual world, park Lounge where you can watch what Free Roam VR users are doing and VR Demo Area where the guests have 30 minutes to become familiar with the technology, painting in 3D or practicing archery in virtual reality. In Free Roam VR, 30 cameras detect every move of users equipped with VR goggles and backpacks with sensors. According to The park official website, it is currently possible to visit already five worlds and there can be five players (participants).



Source: [theparkplayground.com](http://theparkplayground.com)

**Jogging in VR**

AchieVRfit is a VR app that can be found in the Experiences section of the Oculus Store. Using VR goggles, the user runs on a virtual path while jogging in the real world. It is possible to select the duration of the training, the kind of music and collecting items in the game. The pace of jogging changes depending on whether the user picks up the pace or slows down in the real world. AchieVRfit is the perfect choice for users who get bored on a treadmill or using a stationary bicycle.



Source: [youtube.com / The VR Shop](https://www.youtube.com/watch?v=TheVRShop) –  
AchieVRfit – Gear VR Gameplay

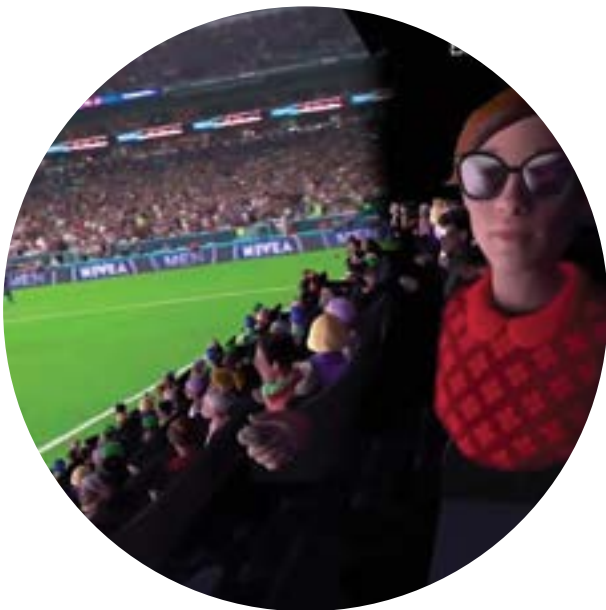
## SOLUTIONS THAT ARE A PART OF THE AREA OF CHANGES TODAY



Source: youtube.com / Mark Zuckerberg – VR  
Safari In Puerto Rico

### Facebook Spaces

Facebook Spaces is an app that aims at encouraging its users to explore and discover new technologies, in this case – virtual reality. The cartoonish look of avatars in the app is a deliberate choice on the part of the Facebook team. Research says that robots that resemble humans too much (in appearance and behaviour) evoke greater fear. Avatars in Spaces are colourful and friendly looking. After opening the app, the user joins a space that they can manage, e.g. invite their friends, take a picture together, talk or change their appearance.



Source: youtube.com / Oculus Venues – El  
Clasico Soccer Preview

### Oculus TV and Oculus Venues

Recently Oculus Go and Samsung Gear VR introduced the Oculus Venues app which uses the Internet to enable approaching the most interesting events broadcast on TV thanks to VR technology. It is possible to watch direct transmissions of concerts or sporting events from the comfort of your sofa, all live and in real time. The second of the introduced features is the Oculus TV, virtual reality (fitted with an enormous screen) for watching programs (from platforms such as Hulu or Showtime), sports events and e-sport.

**SOLUTIONS THAT ARE A PART OF THE AREA OF CHANGES TODAY****Bring to Light**

Bring to Light is the first game in a horror style that apart from the VR technology uses also a biometric sensor. The player moves around a terrifying abandoned subway tunnel as the only person who survived a tragic accident. Besides VR goggles they can use a heart rate monitor (that they must purchase themselves) that transfers data to AI, and it matches the game to the player's pulse. So the player's health condition determines how the game plays out, how often scary events would occur. „Bring to Light” is available for Oculus Rift, HTC Vive or PC (without a VR headset).



Source: [youtube.com / "Bring to Light" Trailer](https://www.youtube.com/watch?v=...)

# An account from the future

We created a fictional account that will enable us to see how the development of superfast Internet and new technologies impacts entertainment. These accounts were commented for us by people involved in these areas in their daily lives: Joanna, an active football and volleyball player and Adam, academic researcher.



**tomasz\_kuziołek** • [Follow](#)

**tomasz\_kuziołek** Today we played virtual basketball again! Final score 25:34. I was playing in a hall in Poland, my American friends at their place, but thanks to [#AR](#) goggles and the app we were all in a single court and played the same basketball game. Technology really has no bounds. See for yourselves!

[#VirtualBasketball](#) [#AugmentedReality](#) [#SoMuchFun](#) [#GigaConnectivity](#)

Source: Visualhunt.com / Mr ATM





# Today's comments

”

**Adam, academic researcher**

*A PE teacher, looking at all these virtual teaching aids with unreserved disgust, could realize that a goal scored thanks to the information measured in real time about the force and the angle of the thrown ball can help the players to be more effective.*



”

**Asia, sportswoman**

*Sport really often consists of sweat, blood and tears, but also joy, satisfaction, learning competition, responsibility and overcoming your own limitations. I doubt any technology can replace such emotions and give the opportunity for personal development and forming interpersonal relations. The advantage I see in these solutions include working with people with disabilities or athletes after severe injuries, to help them gradually get back to the game. It would only be a phase, because of course nothing can replace the first match played after recovering from an injury.*

Source: Unsplash.com / tommy bebo

AREA OF CHANGE

# human inter(net)action





It would be difficult to imagine the development of new technologies without its influence on interpersonal relations. And although the digitization in this area is still a cause for a lot of anxiety, it is the fact that such solutions already exist and are used all over the world.

Haptic (touch) technologies will revolutionize the sphere of human intimacy.

In today's world it is natural to speak remotely and look at one another through smartphone screens. We build long distance relationships more often, since we can connect with people from another country or continent. We spend more and more time in the virtual world, and it is there that we network and meet new people. Unfortunately, the research shows that as a result young people are less likely to form deep relationships with others in the offline world. Virtual and online contacts seem safer to them. But people need experiences that engage more senses. In response to these needs, new solutions appear on the market that enable feeling another person's touch despite the lack of direct physical contact (such as the Kissenger app for virtual kisses based on vibrations sent in real time). By analysing development directions and advancing digitization, it is also safe to assume that sex as well will move to the virtual world, providing users with the same experiences as in the real world, thanks to e.g. haptic technologies or VR. According to estimations prepared by the Piper Jaffray investment company, until 2025 pornography will be the third largest VR sector right after video games and National Football League content. Another kind of solutions in this area include empathic technologies (often AI-based),

oriented on identifying needs and immediately providing solutions. Today, they are intended mainly for the elderly and those living alone; they can improve their quality of life and daily functioning. The

number of elderly people living alone has already reached 50% of people over 80<sup>1</sup>. Robots equipped with AI (such as e.g. ElliQ or KOMP) enable the elderly to contact their relatives, but being with them every day, they also remind about taking medications, going for a walk, or encourage to meet up with friends.

**Sex  
will be moving  
to an increasing extent  
to the realm of the  
virtual, providing their  
users with the same experiences  
as in the real world,  
thanks to e.g. haptic  
technologies  
or VR.**

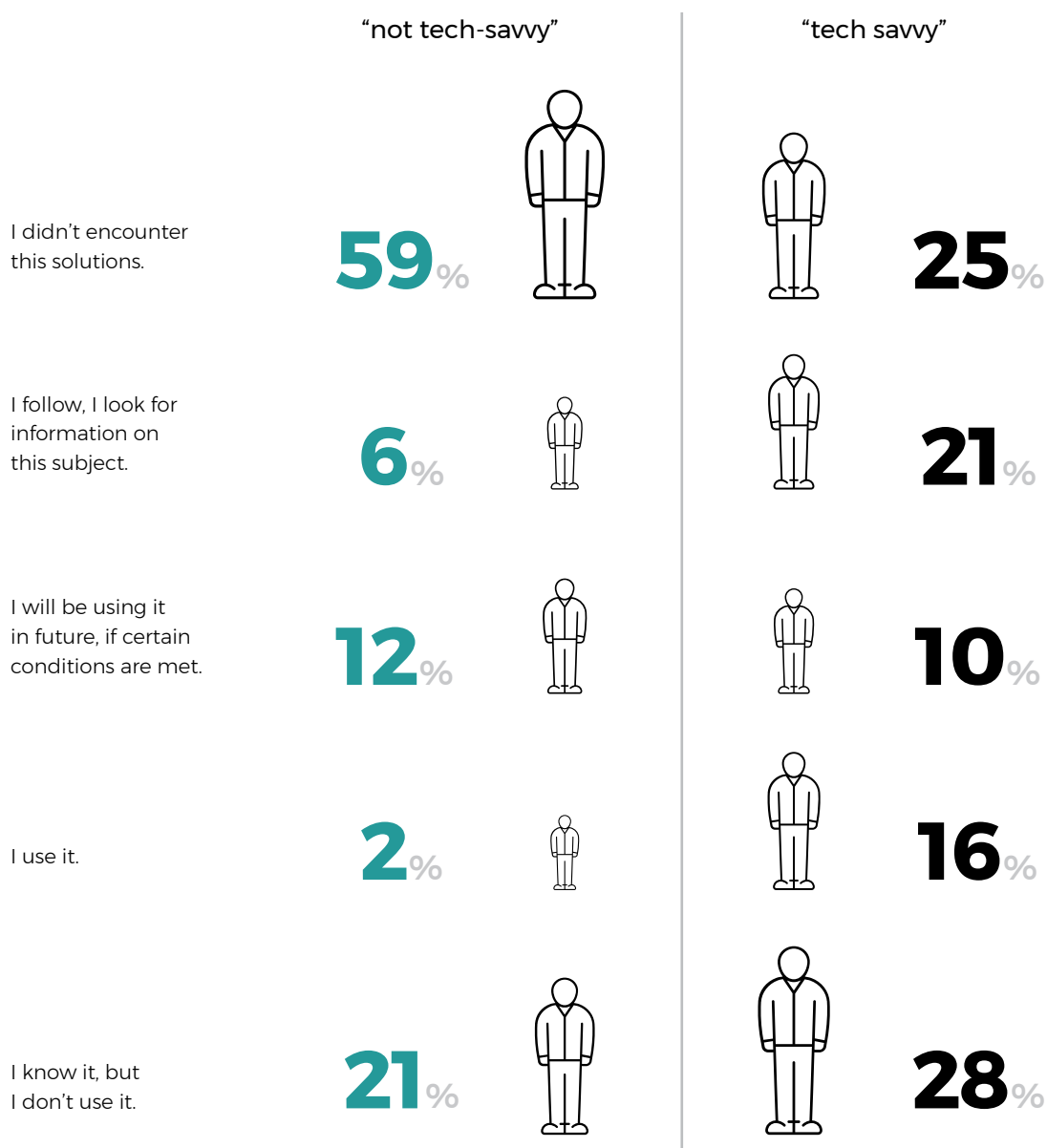
1. Study "Sytuacja społeczna osób w wieku 65+" carried out in 2018 for Stowarzyszenie mali bracia Ubogich by ARC Rynek i opinia: [https:// arc.com.pl/samotnosc\\_polskiego\\_seniora-40999667-pl.html](https://arc.com.pl/samotnosc_polskiego_seniora-40999667-pl.html) [access: 20.09.2018].

Kissenger



Źródło: [kissenger.mixedrealitylab.org](https://kissenger.mixedrealitylab.org)

Chart 12. Readiness to use new technologies in interpersonal relations (e.g. remote meetings or online kissing)



Source: The analysis based on statements of the Internet survey participants (CAWI). "Non-tech savvy" is a classification used for people who have no or little interest in new technologies. "Tech savvy" are people who indicated a strong or a very strong interest in new technologies. The first group included 583 surveyed, the second - 333.



**SOLUTIONS THAT ARE A PART OF THE AREA OF CHANGES TODAY****No Isolation**

No Isolation is a Norwegian start-up that wants to prevent loneliness and social isolation through technology. So far, it offers two products: KOMP and AVI. KOMP is a device for senior citizens who want to communicate without feeling intimidated by new and unfamiliar technology. AVI is a solution addressed to children who cannot go to school due to a prolonged illness. When a student cannot attend classes, AVI will take its place.



Source: [www.noisolation.com](http://www.noisolation.com)

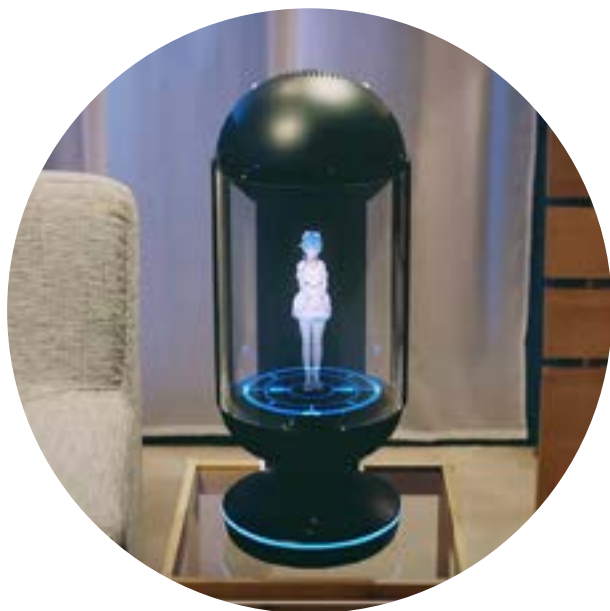
**CamasutraVR**

Camasutra VR is a platform enabling online sex. Thanks to digital avatars of adult film stars and the applied VR technology, encounters with these avatars become increasingly realistic. With the use of hand trackers users can physically touch the actor's avatar and generate interactions. Users can observe them, touch them and even simulate having sex with them.



Source: [camasutravr.com](http://camasutravr.com)

## SOLUTIONS THAT ARE A PART OF THE AREA OF CHANGES TODAY



Source: [gatebox.ai](http://gatebox.ai)

### **Azuma Hikari**

Azuma Hikari is a hologram created by a Japanese company Gatebox. A 5-centimeter device contains a hologram of a 20-year-old girl who accompanies the user in everyday life to remind about important activities, or greeting after coming home from work. She is therefore responsible for fulfilling the need for a conversation in the age of a digitized world.



Source: [www.snapchat.com](http://www.snapchat.com)

### **Snapchats make fantasies come true**

Universally known Snapchat filters can allow for fulfilling sexual fantasies. Augmented reality (AR) uses a technological interface to superimpose computer generated images over real vision, combining the virtual and the real world. When people use that technology in their most intimate moments it can enable fulfilling the strangest fantasies. So thanks to a Snapchat filter the partner can become, for instance, become a character from a favourite movie.



# An account from the future

We created a fictional account that will allow us to see how the development of superfast Internet and new technologies impacts communication between people in the future. These accounts were commented for us by people involved in selected areas in their daily lives. Małgorzata who works as a sex therapist and Bartosz, academic researcher.



**martulek** • [Follow](#)

**martulek** I was moved like whoa! Today is my graduation. Of course, the whole family is here. Even grandma made an appearance, and as she is in hospital, she connected with us through a robot that hugged me when I got my diploma. Then we went for a delicious dinner. Grandma was with us all the time.

[#AI](#) [#HelpfulRobot](#) [#EndOfSchoolYear](#)

Source: Unsplash.com / Dani Vivanco





# Today's comments

”

**Bartosz, academic researcher**

*An advantage resulting from using new technologies is supporting relationships with people in our everyday lives. Connecting with people on the other side of the world, a video call or fast sharing of information influence maintaining close ties with family and friends in a positive way. The value lies in maintaining, not in building.*

”

**Małgorzata, sex therapist**

*If the only chance of talking to my grand- or great-granddaughter would be an online call or video chat, I would choose this option, because I simply want to keep in touch. Back when we didn't have a phone and I couldn't talk to my husband, I dreamt about such a solution.*

Source: Unsplash.com / Holger Link

AREA OF CHANGE

# digital wellbeing



Source: Unsplash.com / Simon Rae



The Internet is an integral part of our world and the development of new technologies supports the emergence of solutions that enable the improvement of mental and physical wellbeing. So, the future and the connection of entertainment with wellbeing develops in several areas. Thanks to the use of Augmented Reality (AR) we can build positive habits (e.g. developing a proper teeth brushing habit in children), VR used in applications enable for example meditating in a virtual zen garden, or combatting fears and phobias.

All of it enables to hope that in future, haptic technologies (that use the sense of touch to communicate with users) enable us living according to the idea of wellbeing of the soul and the body. It will be possible to separate ourselves from the problems of the real world and the technology will make it able for us to go for a walk in the woods and feel the moss underneath our feet and relish the smell of resin, without leaving home or work.

Also distraction provided by the mixed reality in the context of wellbeing gains an entire new meaning: it changes the status quo of entertainment and turns it into the integral part of treatment, prevention and recovery. Using technology in therapy is currently an increasingly common occurrence. Possibilities that VR gives (transporting the user to virtual reality) are used with increasing frequency when drawing blood, performing painful tests or in treating patients with PTSD. Solutions offered by telemedicine were tested. In several parts of Sweden, digital doctor's appointments were tested, which enabled patients to consult with their physicians. You only needed a tablet and a smartphone with an app installed. The results of research conducted by the researches of Louisiana State University enable to suspect that fundamental functions of entertainment that we know today will evolve. Thus in future entertainment will realisti-

**The  
technology will  
enable us, without le-  
aving home or work, to  
go for a walk in the wo-  
ods and feel the moss  
underneath our  
feet.**

cally impact the development of solutions that will humanize pain and diseases. Studies conducted of July 2018 by the researchers from the Louisiana State University indicated that playing video games based on exercise and storytelling as well as the use of new technologies can have a positive influence on the increase in physical activity.

The research project lasted 6 months and included 46 families, each had an overweight or obese child aged 10 to 12. Half of families was randomly allocated to the group of players while the remaining 23 families were the control group. Families from the first group were encouraged to participate in a 60-minutes long activity physical activity every day. They got an Xbox, a device detecting movement and four games, the so-called *exer games*.

They were also equipped with Fitbit devices to count their steps. At the end of the study the BMI of children from the first group decreased by ca. 3% and their cholesterol level decreased as well, while the BMI of children from the control group went up by 1%, as did their cholesterol.

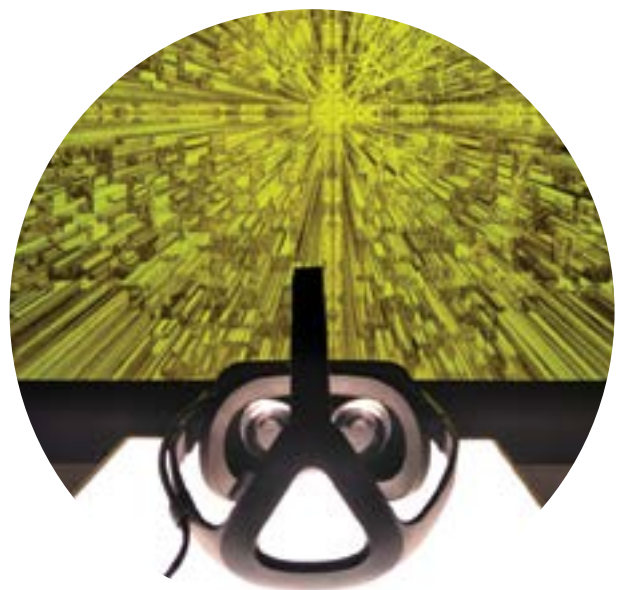
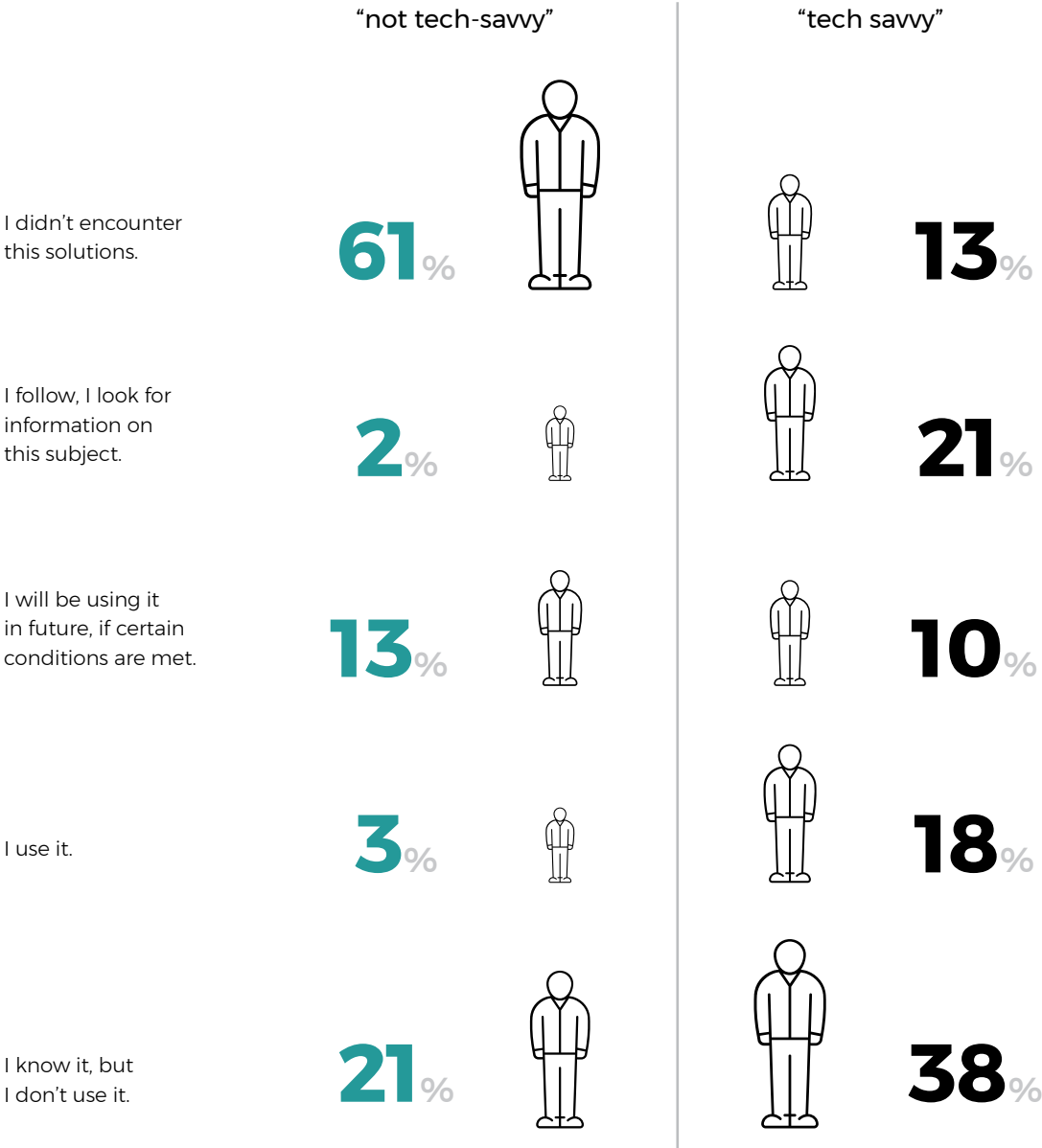


Chart 13. Readiness to use new technologies in the area of wellbeing (e.g. relaxing meditation sessions before going to sleep)



Source: The analysis based on statements of the Internet survey participants (CAWI). "Non-tech savvy" is a classification used for people who have no or little interest in new technologies. "Tech savvy" are people who indicated a strong or a very strong interest in new technologies. The first group included 583 surveyed, the second - 333.



**SOLUTIONS THAT ARE A PART OF THE AREA OF CHANGES TODAY****New Dixie**

New Dixie is an app that uses two minute long interactive games to help children learn how to brush their teeth properly. Thanks to AR, enhancing the real world with virtual elements, images on toothbrush cups come to life and make this monotonous activity more fun. You only need to download one app and scan the code from the cup.



Source: [www.dixie.com](http://www.dixie.com)

**WiseMind**

WiseMind is a VR-based application which means the reality is entirely computer-generated, and enables meditating or doing relaxation exercises using virtual reality. As a result, it directly translates to caring for your internal balance and thus also for wellbeing. With WiseMind, VR goggles enable meditating in any place in the world, e.g. on a mountaintop or by a crystal clear lake.



Source: [www.realiteer.com](http://www.realiteer.com)

## SOLUTIONS THAT ARE A PART OF THE AREA OF CHANGES TODAY



Source: toast.gg

### **Richie's Plank Experience**

A VR app called Richie's Plank Experience enables getting used to heights. In virtual reality the user is placed on the roof of an 80-storey building and stands on a plank protruding from its side. The job is to walk and reach the end of the plank, thus combatting one's fear of heights. To truly increase the immersion in the experience, there is a possibility of placing a real wooden plank on the floor which can be measured using motion controllers that adjust the dimensions of the virtual plank in the app to the real one. BeFearless, an app developed by Samsung, has a similar use.



### **Herz Kinder Circus VR App**

Herz Kinder Circus VR App created in Austria by IQ mobile project included developing an application that uses VR goggles to enable children with heart conditions (after surgical procedures) to experience a circus performance without leaving their hospital beds. This type of immersive experiences engage young patients, create positive experiences, thus accelerating their recovery.





# An account from the future

We created a fictional account that will enable us to see how the development of superfast Internet and new technologies impacts broadly understood wellbeing. We asked Kasia, a yoga teacher, to comment.



patrycja95 • [Follow](#)

**patrycja95** My first meditation on the top of Mount Kilimanjaro. Wow! I'm sitting at home on a sensory mat, wearing a suit with haptic sensors and VR goggles. And I'm almost 6,000 meters above the sea level! With a lot of clouds above my head! And I can feel the wind on my face!

[#Experience](#) [#HapticTechnology](#) [#Fun](#) [#Mindfulness](#) [#WellBeing](#) [#VR](#) [#Senses](#) [#Meditation](#)

Source: Unsplash.com / Milan Popovic





# Today's comments

”

**Kasia, yoga teacher**

*Considering the number and popularity of meditation apps (which I've used myself), many will be willing to experience a virtual meditation on the top of Mount Kilimanjaro.*

AREA OF CHANGE

# unlimited knowledge

Source: Unsplash.com / Billetto Editorial

People learn best through experience. The development of new technologies and fast Internet enable learning at any moment, moving the skill to memorize and observe to an entirely new dimension. In the context of entertainment they enable immersive experiences, solutions that engage the user.

Thanks to the Internet access to knowledge is unlimited. When we are online, we are not hindered by the lack of access to books (in their traditional form) or other resources.

Moreover, Internet users interact with education material literally. Even today, solutions based on augmented and virtual reality enable touching chemical elements, perform tests by medical students or walk around a city 400 years ago. It lets us hope that solutions based on new technologies that immerse the user in the experience will become an integral part of the learning process. Educational apps and platforms for learn-

ing by playing become the symbol of the current educational revolution. The app developed by Alive Studios enable children to touch letters, sounds or numbers through augmented reality. Such an experience of the concept supports further acquisition and sharing of knowledge.

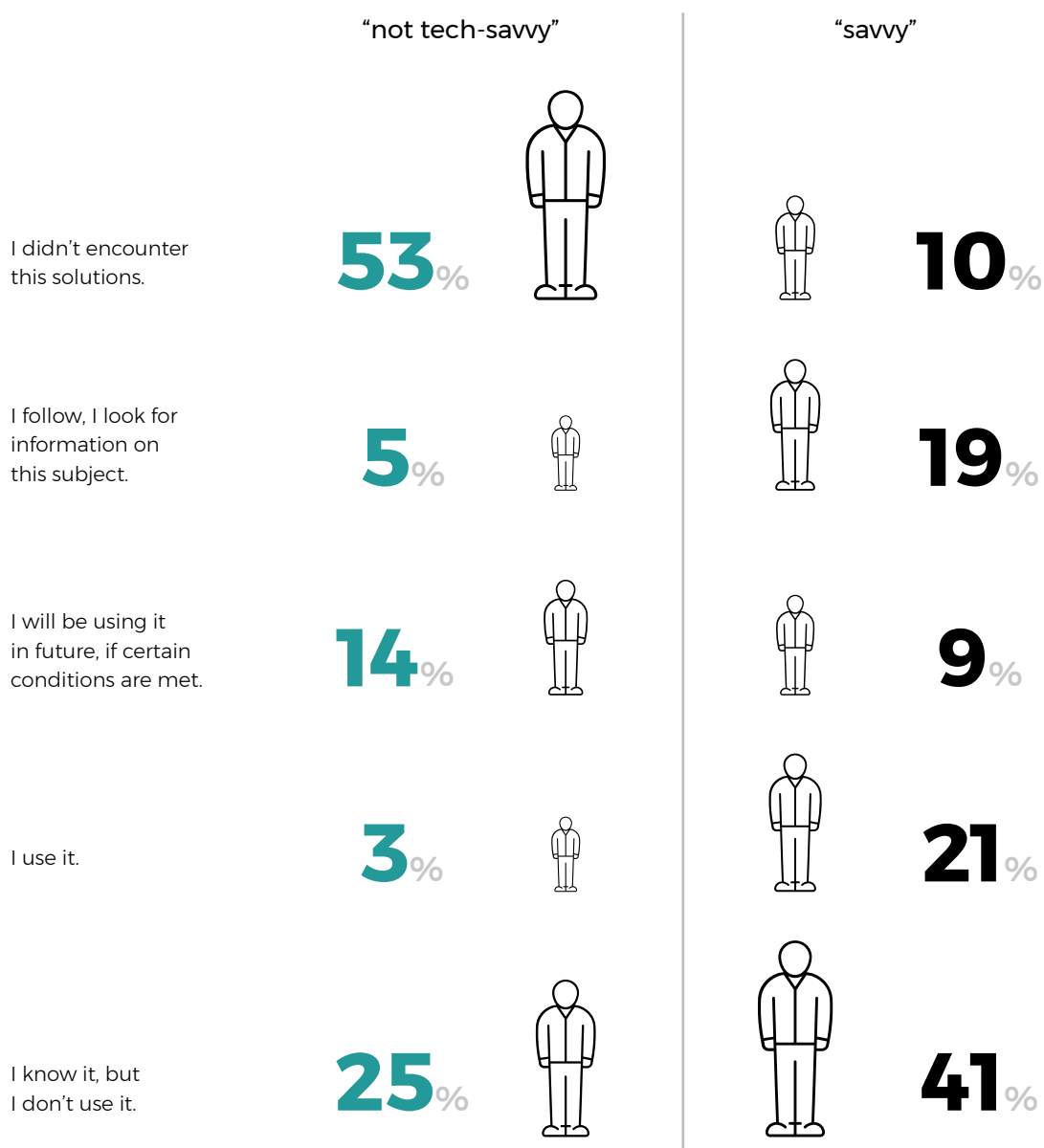
A three month study conducted on a group of children below the age of 5 with the use of Alive Studios solutions showed that using augmented reality in daily learning of reading and counting had a positive influence on how children acquired important information. And so, there was an increase in their knowledge of letter naming (by 48%) and the fluency of their speech (112%). Learning in this way is simply more interesting, and makes us want to do it not only in school, but also in our spare time: at home, when commuting, or on holidays.

**Solutions based on new technologies that immerse the user in the experience will become an inseparable part of learning.**



Source: [alivestudiosco.com](http://alivestudiosco.com)

Chart 14. Readiness to use technological advancements in education (e.g. learning anatomy through virtual visualization of organs)



Source: The analysis based on statements of the Internet survey participants (CAWI). "Non-tech savvy" is a classification used for people who have no or little interest in new technologies. "Tech savvy" are people who indicated a strong or a very strong interest in new technologies. The first group included 583 surveyed, the second - 333.



**SOLUTIONS THAT ARE A PART OF THE AREA OF CHANGES TODAY****Spherical Projection Theatre**

In South Korea, next to the Lucerium National Science Museum in Gwangju, the first spherical projection theatre in the world was built. It is considered to be the true VR theatre of the future. When the audience enters, they find themselves in a transparent glass observation bridge that cuts across the inside of the sphere. The audience is immersed in the virtual world without the need to use VR headsets. A 360° movie in very high resolution makes the experience extremely immersive. It can transport the audience to any place in the world. The first screening that was organised in 2018 and it tells the history of the world from the Big Bang until the dawn of the human civilization.



Source: [frontpictures.com](https://frontpictures.com)

**Orion's Nebula**

NASA created an incredible video that enables observing one of the most beautiful views in the galaxy – the Orion's Nebula which can be admired in 360° in two types of imaging: daylight and infrared. The space journey is accompanied by the sound of Dvořák's Serenade for Strings in E Major Op. 22. Using the computer mouse, users can move across the galaxy and to immerse themselves in the experience fully, they only need to put on their VR headset.



Source: [youtube.com / NASA Video](https://youtube.com/NASAVideo)

## SOLUTIONS THAT ARE A PART OF THE AREA OF CHANGES TODAY



Source: [www.elizamcnitt.com](http://www.elizamcnitt.com)

### **Spheres – sounds of the universe**

“Spheres” directed by Eliza McNitt is the first series produced in virtual reality that will become available in the autumn in every VR Oculus set. It was premiered at film festivals all over the world. “Spheres” prove that thanks to the possibilities of VR technology science can be closer to people. The series consists of three 13-minute-long episodes that tell the story of the sounds of the universe (recently confirmed by the discovery of gravitation waves). Thanks to platforms such as the Oculus Rift, sounds interact with the audience. At a certain point they are even encouraged to sing along, so that their voice can enrich the sound of the universe.



# An account from the future

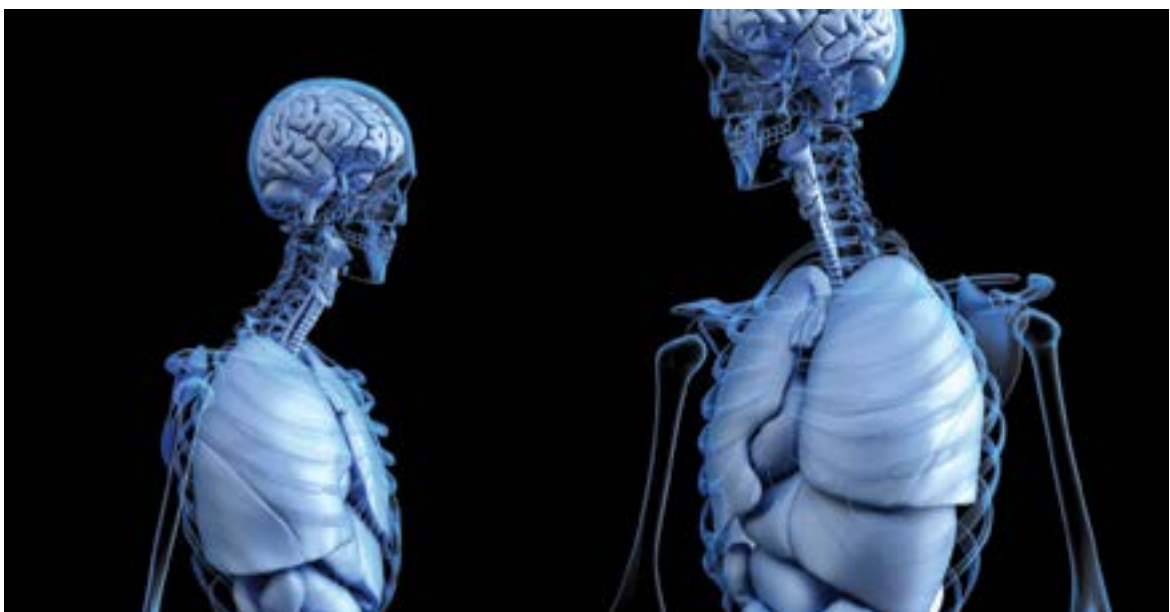
The fictional account that we created shows the possible future of science and the impact of new technologies and superfast Internet on that area. The account was commented by Weronika who works as a teacher and Adam, a university employee.



**doctorX** • [Follow](#)

**doctorX** Exams [#day2](#). Anatomy still to go. [#FYI](#) watching and naming tissue structures and systems in close up in an [#AR](#) app is unreal, but the professor is really strict, doesn't allow for any mistakes. To be continued tomorrow.

[#FutureMedStudent](#) [#HelpfulTechnology](#) [#KeepUpTheGoodWork](#) [#AR](#)





# Today's comments

”

**Weronika, teacher**

*Using only a text or an image will not give us as much as the personal encounter with e.g. tissues. We can view a given thing from all sides or zoom in, which will undoubtedly help us to remember important information. This form of learning through experiencing and exploring is much more interesting and effective. It doesn't mean, though, that the computer will learn for us. It can help us, but we play the main part here.*

”

**Adam, university employee**

*I think we all remember those classes when from a safe distance we observed experiments performed by a chemistry or physics teacher. What many of us felt in that moment? That the coolest thing would be to discover ourselves the explosive nature of hydrogen or the action of voltmeter in a series and parallel electrical circuit. The current level of information technologies and their omnipresence give or will give in near future the opportunity in the VR or AR for each student to experience phenomena or experiments which until recently have been reserved exclusively for the teacher or entirely impossible, e.g. changing the order of planets in the Solar System to verify whether or not they would fly away.*



AREA OF CHANGE

# digital journey



The development of superfast Internet and new technologies makes our physical limitations no longer an obstacle in exploring the world. Thanks to the VR technology, tourist agencies are able to show the customer the real place they wish to go. However, such a use of new technologies in the tourist industry can become the beginning of a fundamental change of the shape of travel in the future. Maybe one day tourist agencies will offer virtual trips to any place in the world, providing an inclusive experience regardless of the age, health and origin.

Even today customers can visit the jungle or the Grand Canyon (The Grand Canyon VR Experience) in virtual reality. For some people it is the solution that does not generate such costs as the real trip and it saves time. It also answers to the current need of immersive, condensed entertainment.

**Maybe one  
day tourist agencies  
will offer virtual trips to  
any place in the world, pro-  
viding an inclusive experien-  
ce regardless of the age,  
health condition and  
origin.**

Studies of the Polish Main Statistical Office indicate that nowadays Poles most often choose short trips (2–4 days) and the main reason for not participating in trips remain: financial reasons, health-related problems, lack of free time or motivation for travelling<sup>1</sup>. Virtual trips which enable us

deep experiences, may prove to be the remedy to the lack of time or funds, or boredom which plague us today. New technologies and the Internet will make this journey possible in just a couple of hours. Furthermore, currently developed solutions using haptic technologies can engage all senses.

Thanks to VR shoes we can feel sand underneath our feet and haptic gloves enable touching virtual raindrops. Thus new technologies, especially augmented reality (AR), enhance travels we make in the real world. Today already a smartphone or a tablet with a suitable AR filter can become our virtual guide in places we visit. Visit Wales, an online tourist portal, gave 290,000 pounds for six VR projects aiming at the promotion of the region through new technologies<sup>2</sup>.

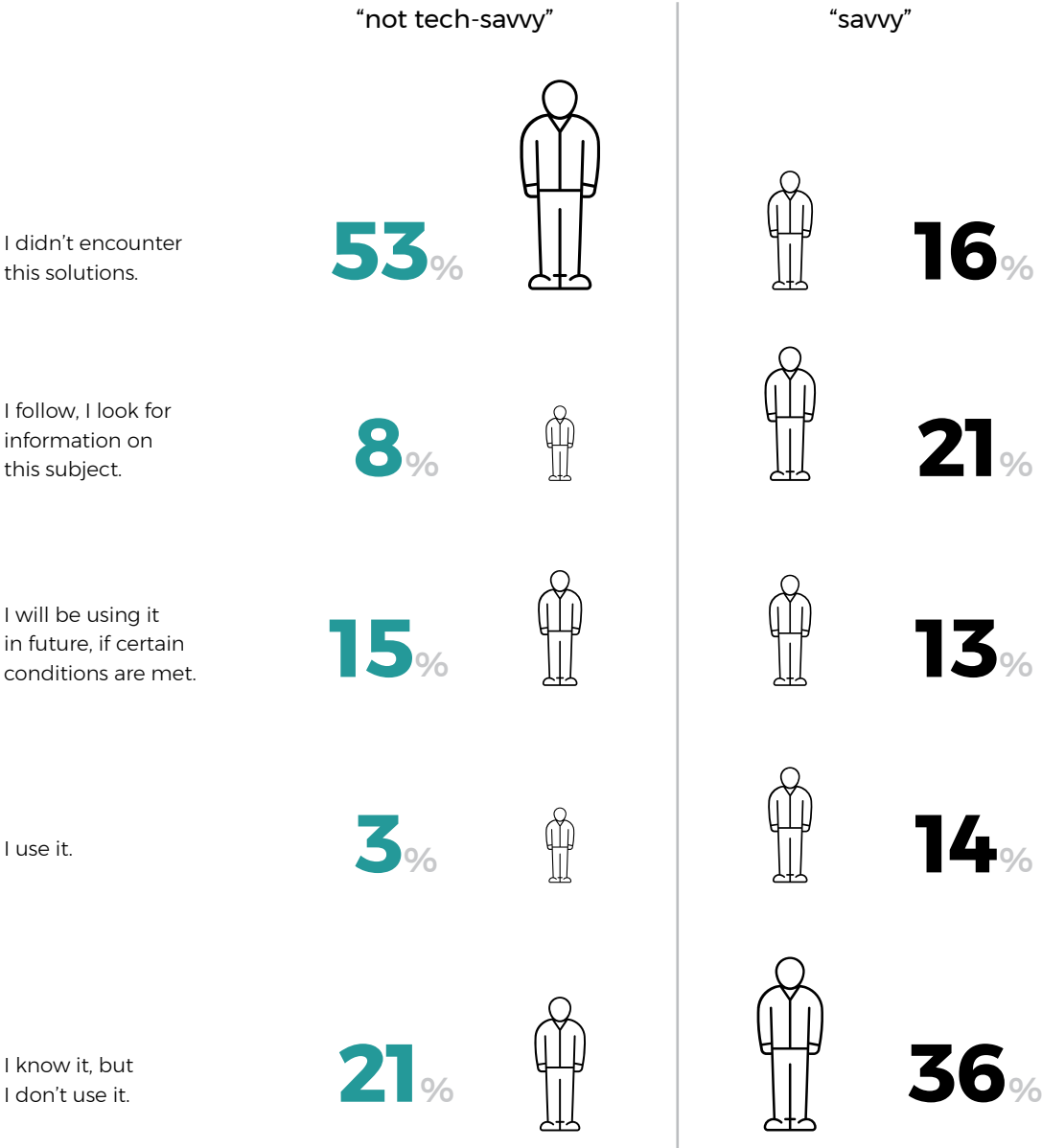


Source: [www.oculus.com](http://www.oculus.com)

1. Raport Ministerstwa Turystyki i Sportu „Charakterystyka podróży mieszkańców Polski w 2016 r.”, [online] <https://www.msit.gov.pl/pl/turystyka/aktualnosci/7403,Charakterystyka-podrozy-mieszkanow-Polski-w-2016-r.html> [access: 20.09.2018].

2. Sophie Gidley „Virtual Reality: Tourism Firms Use VR to Attract Visitors”, BBC News, [online] <https://www.bbc.com/news/uk-wales-41635746> [access: 20.09.2018].

Chart 15. Readiness to use new technologies in tourism (e.g. admiring Paris from the top of the Eiffel tower at home through VR)



Source: The analysis based on statements of the Internet survey participants (CAWI). "Non-tech savvy" is a classification used for people who have no or little interest in new technologies. "Tech savvy" are people who indicated a strong or a very strong interest in new technologies. The first group included 583 surveyed, the second – 333.



**SOLUTIONS THAT ARE A PART OF THE AREA OF CHANGES TODAY****VR Shoes**

Cerevo created special shoes that thanks to the haptic technology enable users to experience not only through the sense of sight, but also touch. In VR shoes, users can sense features characteristic for a given environment, e.g. when walking on desert sands in VR goggles and boots, they can feel hot sand underneath their feet.



Source: [taclim.cerevo.com](http://taclim.cerevo.com)

**A virtual climb on Mt. Everest**

The Everest experience available on Oculus, based on the 360° technology and virtual reality, enables to go in person to almost 9,000 meters above sea level, thanks to the VR headset. The experience is based on five scenes. They include preparations for the journey in the base camp, crossing the Khumbu Glacier, climbing Lhotse and the Hillary Step, and reaching the top of Mount Everest.



Source: [www.oculus.com](http://www.oculus.com)

## SOLUTIONS THAT ARE A PART OF THE AREA OF CHANGES TODAY



Source: [www.inventing.nyc](http://www.inventing.nyc)

### **Inventing America**

Inventing America is a new AR experience that was mapped on a real Governors Island, east of the Statue of Liberty. The user is transported to the 17th century and Inventing America is really a game in AR. There are many virtual characters to choose from. The app has a multithread story whose elements can be either explored or ignored. The app is based on augmented reality, so it the only way to discover the virtual island and its history is walking around it in the real world.



Source: [tx-inc.com](http://tx-inc.com)

### **Visit with avatar eyes**

Telexistence Inc., a start-up working on solutions in robotics, is developing MODEL H, an avatar to function in real time. Using VR goggles and special gloves, the user would be able to see exactly what the robot sees and receive haptic feedback, feeling exactly what the avatar feels. The robot on wheels can move around and be somewhere else that the user. In the promotional clip, the avatar visits the Cherry Blossom Garden in Kyoto while the user sits in their living room. Such solutions would enable visiting far off places through the eyes of the avatar.

alibi ERS-1000, a dog designed by Sony Corporation

Source: infuture hatajska foresight institute own materials



# An account from the future

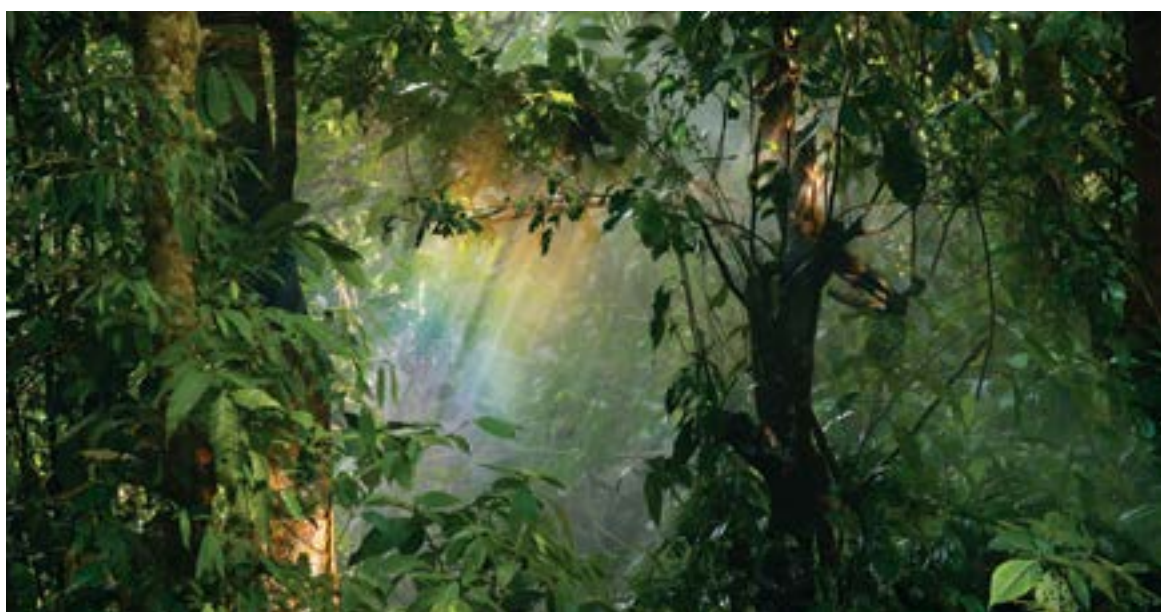
The fictional account that we created shows how the future of travel and tourism can look like thanks to the development of the gigabit Internet and new technologies. We asked Sonia, a traveller, to comment.



**girlinjourney** • [Follow](#)

**girlinjourney** I finally saw the Amazonian rainforest. @MamaiTata, thank you for the gift. I entered the special capsule from which I observed the jungle in real time. Thanks to sensors on the suit and those installed in the capsule, I could observe comings and goings of animals. I could smell all the smells and the hot, humid air. What an experience!

[#VirtualGlobetrotter](#) [#VirtualTravel](#) [#Fun](#) [#Experience](#)





# Today's comments

”

**Sonia, traveller**

*More than in tourist attractions, I'm interested in people, talking to occasional acquaintances or making friendships during longer stays, exploring cultures, eating local fruit. Even the journey to my destination is equally important. Travelling in the virtual world is surely a wonderful opportunity for people who can't really go travelling due to their health and other limitations.*

AREA OF CHANGE

# connected culture



Source: Usplash.com / Parker Whitson

Digitization changes our participation in culture to a significant extent. We are no longer only passive observers, but we become instead a part of the experience. Solutions that appear even today (such as the Tónandi app, based on the synesthetic reception of reality), allow us to suspect that in future, the experience of culture it will engage all senses. According to the latest report from the Polish Main Statistical Office (a study entitled "Culture in 2016") in that year, Polish households spent on average PLN 31.92 per person (sic!) on tickets to theatres, musical venues and cinema. Research authors indicate distinct differences between results from cities and rural areas, due to the limited access of countryside residents to cultural institutions<sup>1</sup>. The Internet has thus become the symbol of cultural transformation, enabling access to culture practically from any place in the world.

Today theatre, concerts or opera move from the real to the virtual world. An excellent example of this type of cooperation is the project of the Welsh National Opera and REWIND VR (a technological company). It aims at presenting "Madame Butterfly" and "The magic Flute" in a way that would enable interaction and audience's interaction with musical pieces. Thanks to VR and motion capture technology, opera worlds were moved to the virtual space. With VR goggles, the audience could interact with animals (like

Tamino from "The Magic Flute") or enjoy the performance of the "One Fine Day" aria ("Madame Butterfly"). Meanwhile, Oculus Immersive Theatre is a real world theatre with real audience encouraged by actors to change the direction of the story. It inspired creators of the Oculus to combine theatre with virtual reality. It is going to involve introducing professional actors' performances to VR headsets.

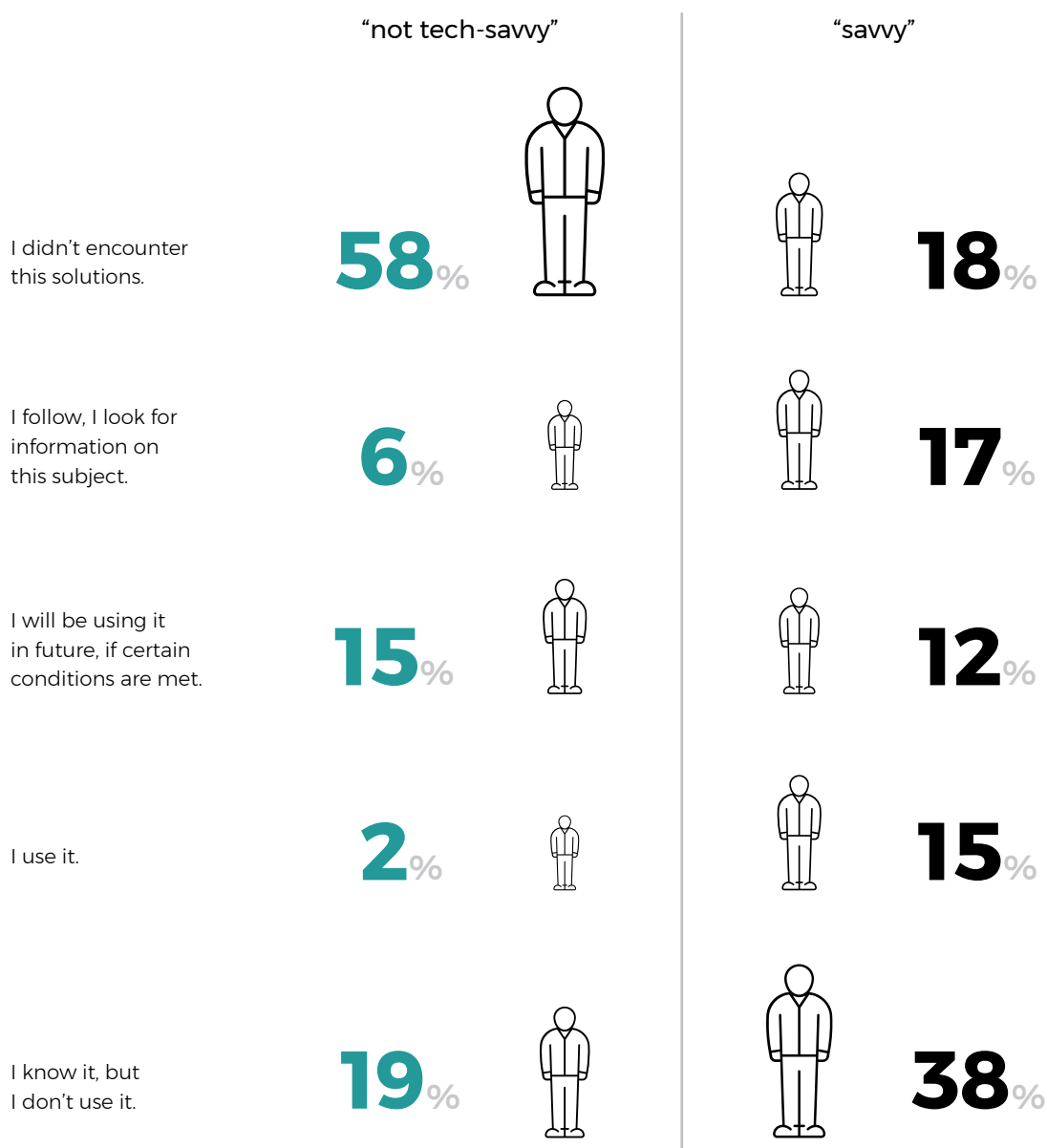
And even though the characters that the user would see in the virtual environment would be computer-generated, they would become the result of the work done by actors in *motion capture* suits. The user, sitting at home, in their own chair, will be able to interact with virtual actors and change the course of history happening in front of their eyes. There are ongoing preliminary works on the concept Oculus plans to introduce the service in 2019.

**The user,  
sitting at home,  
in their own chair, will  
be able to interact with  
virtual actors and change  
the course of history  
happening in front  
of their eyes.**

1. 1. Raport GUS „Kultura w 2016 roku”, [online] <http://stat.gov.pl/obszary-tem-atyczne/kultura-turystyka-sport/kultura/kultura-w-2016-roku,2,14.html> [access: 19.09.2018].



Chart 16. Readiness to use new technologies in culture (e.g. watching concerts in 360° perspective)

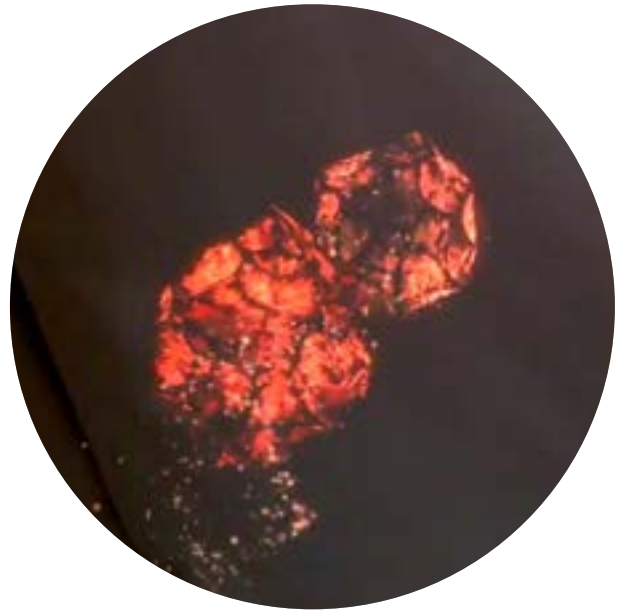


Source: The analysis based on statements of the Internet survey participants (CAWI). "Non-tech savvy" is a classification used for people who have no or little interest in new technologies. "Tech savvy" are people who indicated a strong or a very strong interest in new technologies. The first group included 583 surveyed, the second - 333.



**SOLUTIONS THAT ARE A PART OF THE AREA OF CHANGES TODAY****Tónandi**

An American start-up Magic Leap invited the band Sigur Rós to co-create a new audio-visual experience in augmented reality, called Tónandi. Thanks to Magic Leap One glasses and the app containing music recorded by the band, the user can manipulate reality, by interacting with visual effects around sounds.



Source: [www.magicleap.com/experiences/tonandi](http://www.magicleap.com/experiences/tonandi)

**ARShow**

ARShow is a tool whose purpose is revolutionizing theatre, stage performances and the experience of these art forms by the audience. By combining AR technology with actors' performances in the real world, ARShow enables fully use the potential of mixed reality (MR). ARShow company enables creating a virtual set, transforming art into an AR animation live and add music to it. During the performance, the content can be played by any number of devices. Using AR goggles, the theatre audience can interact with real actors on stage and at the same time experience incredible experiences provided by the AR setting.



Source: [vimeo.com / arshow](https://vimeo.com/arshow) preview

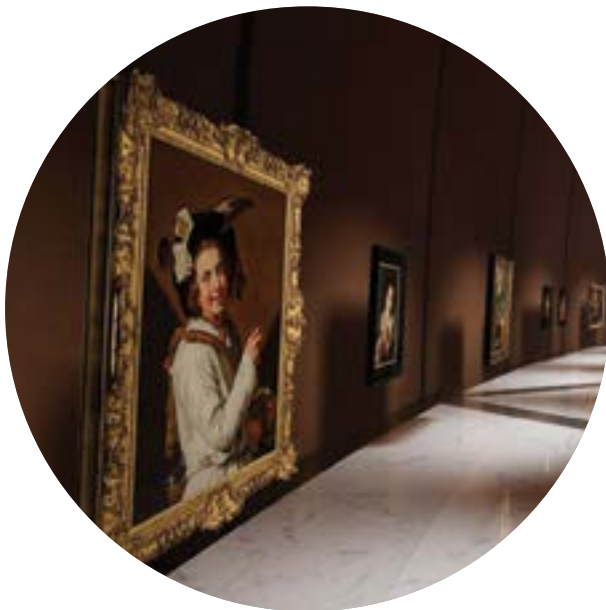
## SOLUTIONS THAT ARE A PART OF THE AREA OF CHANGES TODAY



Source: [www.themuba.com](http://www.themuba.com)

### Theatre online

TheMuBa is a multimedia platform for live broadcasts of theatre performances, concerts and ballet. The project is supported by Borys Szyc, Jarosław Kuźniar and Marek Maslanka. TheMuBa wants on the one hand meet the needs of connoisseurs and on the other hand, build accessibility for people with limitations (e.g. disabilities). First transmissions will be available to Polish users in October.



Source: [www.thekremercollection.com](http://www.thekremercollection.com)

### Virtual Kremmer Museum

To create a futuristic digital museum, collectors George and Ilone Kremer who gathered almost 75 art pieces (including Rembrandt or Pieter de Hooch) during almost 25 years created a virtual museum which requires only a VR headset to visit. Images can be admired within a spherical structure which seems to float in space. Thanks to the high resolution, the experience is incredibly realistic. Visitors have the impression that they can touch images whose surface seem to be tangibly similar to the real thing (it was possible to achieve this effect by taking between 2.5 and 3.5 thousand pictures of each art piece). Even the frames are impressively three-dimensional. There is also an app which enables every user with a smartphone equipped with Google Daydream and a VR mask to explore this unique collection.

**SOLUTIONS THAT ARE A PART OF THE AREA OF CHANGES TODAY****A Snapchat exhibition**

Intel, sponsor of the exhibition “No Spectators: The Art of the Burning Man” released technology which enables Snapchat users to present three exhibition sculptures from any place in the world in augmented reality. Scanning the snapcode unblocks a lens that enables the user to visit one of these exhibition halls containing three sculptures. It is possible to watch them up close and read the information about them.



Source: [youtube.com / The Art of Access | Intel](https://www.youtube.com/watch?v=TheArtofAccess)

**Jupiter's Hall w VR**

CROC experts from the Virtual Reality Center developed a digital copy of one of the rooms (Jupiter's Hall) from the State Hermitage Museum in St. Petersburg, Russia, to demonstrate it in virtual reality. This unparalleled project aims at promoting the national cultural heritage. Using the photogrammetry technology, the project team reconstructed sculptures, decorations and interiors of the room, 46 pieces altogether, including world-famous masterpieces. To visit museum, you only need to put on VR goggles and see the photo-realistic image of the room. The joystick enables approaching each piece and listen to the information about the history of its creation, its creator and its style. The project makes the collection of the State Hermitage Museum available to many, including people with disabilities.



Source: [youtube.com / Crocincor](https://www.youtube.com/watch?v=Crocincor)

# An account from the future

We created a fictional account that will enable us to see how giga-entertainment will impact culture in the future. This account was commented by Kasia, an even producer and Diana, the festival curator.



**artfan** • [Follow](#)

**artfan** I've been always fascinated by antique cultures. Today I made one of my dreams come true. I talked to Venus de Milo in the virtual art museum! Thanks to [#AI](#) the entire history of the sculpture was placed in a digital [#avatar](#) in the VR world that I could access via the Internet. Venus de Milo told me her story and answered a few of my questions!

[#ArtIsFun](#) [#VirtualMuseum](#) [#VRMuseum](#) [#VenuDeMilo](#) [#AI](#) [#GigaConnectivity](#)

Source: flickr.com / Bradley N. Weber





# Komentarze dziś

”

**Diana, festival curator**

*As a festival curator, I learn what are the real needs of people with disabilities when it comes to the access to culture. In the experimental phase we try to create solutions that will enable sensing works of art.*

”

**Kasia, producer**

*Personally, I treat VR seriously only in the context of art and for the use in contemporary audio-video realizations.*



# Summary

The report “The Future of Giga Entertainment” shows how superfast Internet access will impact digital entertainment in the broad sense. Thanks to the development of giga connectivity, elements of entertainment enter various spheres of our lives, including those not usually associated with it, such as wellbeing, medicine, education, tourism or culture. Consuming entertainment becomes nowadays an increasingly immersive experience. Apart from giga connectivity, it is aided by an increasing content resolution and quality, continuously larger and curved screens, always developing 360° video and the development of VR, AR and AI. All these factors enable the audience to receive a broader spectrum of experiences, emotions and, importantly, it also ensures inclusive experiences regardless of age, health condition and origin. For the purpose of the report, the Infuture hatalska foresight institute team distinguished six areas that develop the most rapidly due to giga connectivity and described them in separate chapters: *immersive world*, *human inter(net)action*, *digital wellbeing*, *unlimited knowledge*, *digital journey* and *connected culture*.

For the same reason, a CAWI study entitled “Entertainment in Poland according to Internet users” was conducted as well. It shows the present increase in the consumers’ interests and knowledge related to the use of new technologies in the area of immersive entertainment that draws the audience into the world of video content and provide them with the fullest experience available. Below you will find selected conclusions drawn from the study:

- What respondents expect now from the TV of the future is: even better quality of image and sound (33%) which provides a sense of immersive viewing.

- Answers in the joint second place: the possibility of watching television in 360° technology (18%), voice control of services and programs (18%) and the need to watch what we want, when and where we want, i.e. mobile television (18%). The possibility of watching previously broadcast programs – catch up TV ranks third, but only by 1 percentage point (17%).
- Over a half of Internet users (57%) still are not sure how the superfast (gigabit) Internet will affect their daily lives. Among the people who claim to know the advantages of this change, over a half (57%) awaits unlimited access to video formats in extremely high quality, and 52% declares their interest in the possibility of almost instant upload and download of very large amounts of data, e.g. movie files. 36% of respondents claim that such a change would be very useful in using solutions based on augmented, mixed and virtual reality: in video games and films.



Source: Unsplash.com / Parker Byrd





Source: Unsplash.com / Andre Hunter

- Almost one in five Polish Internet users (22%) believe that changes to come will be positive for television. However, one in four people (19%) declared that they believe the development of AI, AR and VR would not affect using television in any way. 16% of respondents believe that this impact may be negative, and the dynamically growing number of new solutions may replace traditional television. As many as 43% do not have an opinion about how technologies will affect using television. It may stem from the fact that the awareness of these technologies as well as knowledge about AI, VR or AR-based solutions is not huge, so the consequences of changes these technologies can cause are not very significant. It means, among other things, that we should indicate concrete examples of how these technologies impact particular categories and areas of entertainment (numerous examples provided in the report).

- Internet users most often use a TV to watch TV shows (series, films, information programs, etc.) – this amo-

unts to as many as 78% of answers. The subsequent choices are as follows: using free streaming platforms for films and series (16%), playing on a PlayStation or Xbox (16%), using paid online streaming services like Netflix, Showmax, HBO GO (15%), watching and listening to music via YouTube (14%) and using video on demand – VOD services (11%). 6% of respondents say they access social media via a TV (Facebook, Twitter, Instagram).

- Almost half (43%) of respondents (that had encountered AR or VR solutions) believe they will soon become popular and common in our everyday lives. For 34% of them it is a matter of 5 years, for 6% – closer to 10 years in the future. 16% claim that these areas will remain a novelty, a toy and will not enter our daily existence.

# About the Institute

The Infuture hatajska foresight institute is a forecasting institute focused on identifying and describing key trends and showing what implications they might have for the economy, market categories, and specific brands. The Institute was established by Natalia Hatajska, one of the most influential and acknowledged experts on trend analysis, trend forecasting, and trend research in relations between the market, brands, technologies, and consumers.

The Institute monitors and analyses all the factors, particularly technological and social ones, which might trigger fundamental changes in individual categories.

**We help you to understand tomorrow and implement innovation today.**

- workshops on trend adaptation and using trends in the company
- processes of seeking out and implementing innovations
- forecasting reports and trend analysis
- trend-hunting trips
- consultancy and strategy
- research

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