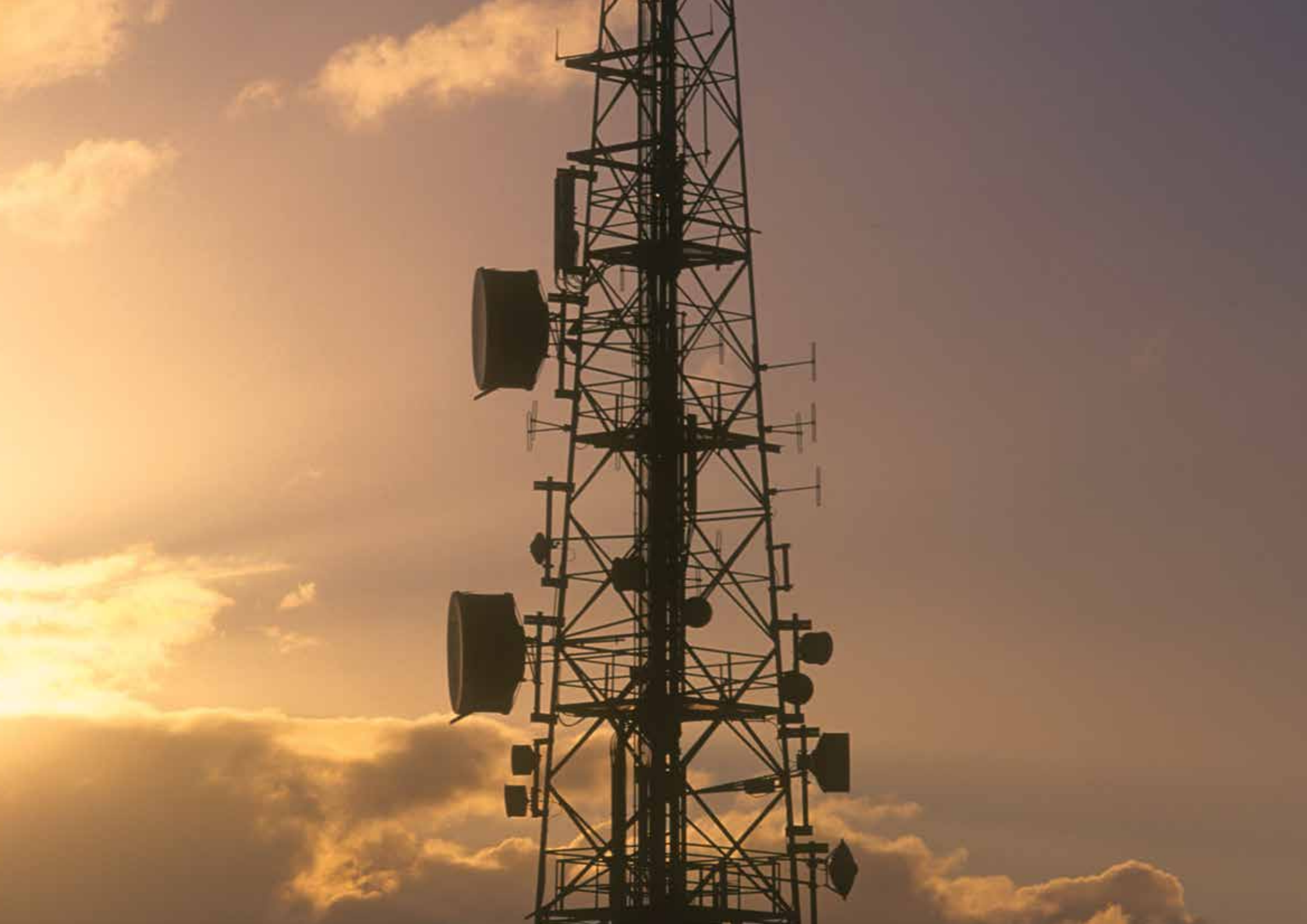


How will consumers communicate in 2020?





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The way people communicate is changing rapidly

Scenarios are stories. They are works of art, rather than scientific analyses. Perhaps the reliability of their content is less important than the types of conversations and decisions they spark.

Arie de Geus
Former Corporate Planning Director at Shell

In the past few years, a lot of game-changing developments have disrupted the telecommunications industry. These developments originate from the use of new technologies, changes in customer behavior and increasing regulatory requirements. Looking at the telecommunications industry, you will see that boundaries between content and service providers have blurred or even disappeared and competition has intensified. On the other hand, the past couple years have also shown that consumers increasingly use the internet for new ways of communication.

All these developments create uncertainty, making it hard to predict in which direction they will develop, at which speed and what the outcome will be. Therefore, it is extremely difficult to forecast when and how these developments will impact your business. Uncertainty is of all times, but recent developments in the telecommunications industry have aggravated the level of uncertainty. To be able to cope with this kind of uncertainty, respond appropriately, and maintain or strengthen your position in tomorrow's market, you must understand the root causes of different kinds of developments. Ideally, you would like to take a look into the future to see what the world will be like in 5 or 10 years and to find the answer to questions such as:



- What will our life be like in 10 years?
- What will be the role of communication in our personal lives and our work?
- In which ways will we gather and share information?

Based on these answers you could develop your own strategy and strengthen your competitive advantage. To support you in finding answers to these questions, Ernst & Young has developed a scenario study for the telecommunications industry. The focal question of this study is: "How will consumers communicate in 2020?" On our website, you will find an interactive video that allows you to travel with us to 2020. In this report, you can find the results of this study. Since there are many uncertainties, we will show you four divergent scenarios for 2020.

Scenario planning helps to get a grip on uncertainty

By using scenarios, people are forced to look beyond the "official future" and as a result develop divergent, challenging but likely portraits of the future. Ernst & Young's scenario planning methodology uses a unique eight-step approach to embed scenario planning in the day-to-day decision-making

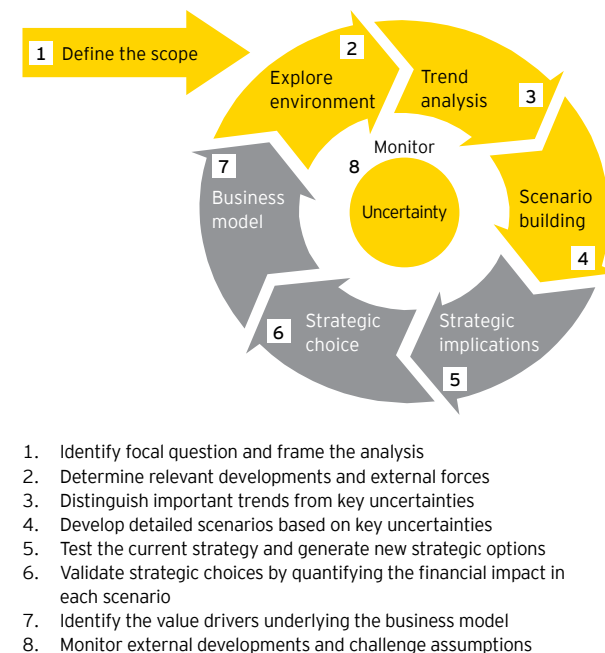
process, instead of using it as a stand-alone exercise. We carry out scenario planning projects on a regular basis, both for our own strategy and for our clients.

Scenario planning is the start of a strategic discussion. Scenario planning is not a separate activity; it feeds a strategic control cycle. Companies can use scenarios to validate new strategic decisions or challenge their current strategy. By monitoring the environment and tracking changes that will increase the likelihood of occurrence of specific scenarios, companies can adjust their strategic choices accordingly.

Different views and top expertise were involved

The most crucial part of scenario planning is the exploration of the external environment. Therefore, we have asked a wide variety of industry experts and young talents, representatives of the future generation, to join us in this journey into the future. Additionally, we consulted less directly involved specialists such as trend watchers and psychologists. Together with these visionaries, we have gone through steps 1 through 4 of the process as shown in Figure 1.

Figure 1. The eight-step process of the Ernst & Young Scenario Planning Method



Annual update

Building scenarios enables companies to operate successfully in an uncertain environment. Continual assessment of the impact of changes on the business environment and the ability to establish strategic control requires a dynamic monitoring system. Such a system provides up-to-date insight into future market developments and their consequences for your business, enabling you to anticipate these developments and make appropriate adjustments.

Ernst & Young will update this telecommunication scenario study on an annual basis. We will define and monitor so-called "Key Change Indicators" to signal changes in the external environment related to these four scenarios. If you are interested in these updates, please contact us.

How to use this report

In this report you will find the four future scenarios described in more detail. If you would like to see which one of the four scenarios best represents your view on the future, you can start a scenario journey yourself. Use the QR code on the back of this report to be directed to Ernst & Young's telecommunications 2020 website, where you can take the journey to 2020 yourself using our interactive video.

Visit our website

You can find all information and contact details on our website: <http://www.ey.com/NL/nl/Industries/Telecommunications/telecoms2020>. Or you can use the QR code on the back of this report to be directed to Ernst & Young's telecommunications 2020 website.

The result: four challenging scenarios

Together with a wide range of industry experts, we explored the external environment. This resulted in a long list of trends and developments in various areas, including economic, technical, political, environmental and social arenas. In the next step, we assessed these trends to identify important trends from key uncertainties. Key uncertainties are trends with a very high impact on the focal question that are very hard to predict. We held multiple working session with our steering committee where we plotted trends and developments according to their level of uncertainty, impact and interrelatedness with one another. trends that scored highly with these three aspects were determined as key uncertainties, and further erduced to two uncertainties:

1. The first one is the degree of integration of the internet in our lives. Integration will continue, but at which speed and to which extent? We defined two extremes: on one hand a full and seamless integration, which means that the virtual world is fully integrated in our daily lives and is an unperceived part of everything we do in the physical world. We have all kinds of smart devices and applications in and around our house that work seamlessly together without us even knowing. On the other hand, we defined the extreme of a stand-alone and fragmented virtual world. In this world, we do have smart devices in and around our house, but they still work rather independently, and human intervention is still needed to combine the intelligence of different devices. For example, you may have a remote control to preheat your oven, but it does not turn on automatically at the moment you start driving home at the end of a working day.
2. The second key uncertainty is security and privacy. The big uncertainty is whether security and privacy issues will be managed and in control in 2020 or whether the number of issues will have grown exponentially? We defined two extremes: a controlled and safe internet on one hand and totally uncontrolled chaos with numerous serious privacy and security incidents on the other.

Putting these two key uncertainties on the axes of our scenario framework results in four divergent scenarios, which will be described in detail on the next pages.

Figure 2. Scenario framework



Full speed ahead

“The virtual and physical worlds are seamlessly integrated in combination with successful self-regulation of the privacy and security aspects of the industry.”



- Privacy and security are in control.
- The virtual and physical worlds are fully integrated.

Scandals and serious internet, IoT in all uses incidents have made customers more aware of the risks and impact of cyber crimes. These incidents have resulted in irritation, for instance when all bridges in the Netherlands opened during rush hour due to hacking of the security system, but they have also resulted in serious concerns and fear when the sites of all banks were down for one week as a result of a serious cyber attack.

The frustration of poorly functioning and complex products has made consumers more critical. Consumers have joined forces against malpractices and demanded openness and transparency. Social media and review sites gave these consumers the opportunity to be more assertive and rebellious. Consumers showed their dissatisfaction and joined digital protest groups demanding more transparency in the way personal data is used, about product quality, about pricing and with respect to company policies. As a result of a combination of high consumer pressure and the threat of government intervention, various companies realized that they needed to make changes in their policies and ways of communicating.

Scenario 1

It took two years to establish cooperation and agreements between companies about the way they will serve and protect customers on the internet and to also reach agreement on the principles surrounding integrity, openness and transparency of market players.

The United Nations has set up a global think tank consisting of global experts from the industry and several leading universities. This think tank has designed a global regulatory framework. The industry itself has filled in all the details. In the area of privacy, they agreed, for instance, that personal data cannot be used without the consumer's explicit permission. The default setting is that personal data cannot be used for commercial goals or customer analytics.

In the field of security, all experts recognized that it is impossible to "clean up" the current internet to make it a safe environment. The only way to solve the security issues is to build a second internet with separate servers and routers. The traditional internet will be used for low-risk services such as reading news, looking for a holiday destination or listening to music. The secure premium internet will be used for services involving personal (e.g., health-related data) or financial data. The consequence is that every device will have two IP addresses. On the secure premium internet, strict rules apply, and it is quite

safe – not 100% safe, but similar to driving on the road, there are strict rules, and although not everybody follows these rules, in general security is under control.

All of these changes have also resulted in a new way in which companies and customers communicate. Customers are involved in the change process. Companies listen very carefully to what customers want, need and like. Customers are willing to share their ideas because this is important to them and they perceive that their input is taken seriously.

This makes consumers feel in control and empowered. After years of losing power and faith, the consumer occupies an important position in the new world. The combination of growing importance and being in control gives a boost to consumer confidence. They are curious about new and innovative products. At the same time, they are demanding. There is no room for poor quality products. However, there is room for pilot products, which need improvement and adjustments to make them premium, tailor-made products.

As customers become more knowledgeable and their needs more complex, they will require a more tailored service, a truly differentiated experience. Consumers provide input for the development of new products. They will be even more willing to contribute if they feel loyalty toward the company concerned.

By forming "crowds" that include other companies and customers, they will collaboratively deliver true end-to-end customer service. This enables customers and companies to deliver integrated solutions that will go beyond boundaries between companies, industries and products. This way of working will give customers even more influence over companies and brands.

Consumers are in control when it comes to providing companies and brands with personal information. Only companies and brands they like have access to them and can give them information such as new products and services and loyalty discounts. It is crucial for companies to avoid bothering their loyal customers with excessive "pushy" advertising or products they don't like. A company can easily lose vital customer relationships due to improper behavior, and it is a major challenge to restore customer loyalty. At the same time, customers want to be informed about new brands; they want to be inspired and surprised. That is why they follow trendsetters with a focus on fashion, gadgets, books, or lifestyle and travel products.

Augmented reality, even with fragrance and flavor applications, has reached maturity. Online shopping offers the option of picking up a three-dimensional virtual tomato and smell or even taste it. If customers want to buy a new product, they will first get in touch with their personal group or find out from trendsetters what is “hot.” Then will gather information related to quality (from reviews), ecological footprint (from trusted experts) and prices. Based on this information, they are able to make a well-informed choice.

The interface between human and machine is gesture- and voice-based. These gestures do not involve touching a screen. Instead, the input is based on two-handed and multi-fingered gestures in the air. Voice- and gesture-based commands will make interaction with machines more natural, and people will find themselves forming emotional bonds with their devices.

Internet connections are everywhere in every home. Home appliances such as refrigerators, electric blinds, sprinkler systems or microwave ovens are all connected to the internet to make people's lives easier. These appliances are able to “understand” the data they collect and to function both independently and in conjunction with one another without people even knowing. Technology seems to touch every aspect of our lives. Even when people are not at home, they will be able to control a wide variety of home systems. Homes will become healthier and cleaner, for instance through the use of bacteria-resistant countertops to keep the kitchen sanitized and free of germs.

In 2020, the home will have sophisticated monitors and controls for energy, water, sewer, trash, security and entertainment. These monitors can be controlled by the intelligence in the cloud, which combines real-time data with historic data and personal preferences, or by the residents themselves. For example, the plants in the living room are normally watered

automatically twice a week. When the outside temperature falls, the room will be heated instantly to achieve the preferred temperature, and the air will become drier. Then the watering system will start watering the plants every day. This all happens without human intervention. Consumers are relieved of many household chores, as they are now managed automatically. Housekeeping becomes more and more efficient, and people have more time to do things that they like to do and to engage in sports and entertainment activities, for instance.

Robot pets for special target groups enjoy increasing popularity. They can be used for monitoring and providing companionship to the elderly, or they can serve as a substitute for families who would like to have a pet but don't have time to care for a living pet. As new technologies become more integrated into people's daily lives and activities, they become more dependent on the new capabilities they provide, often to the point where they will find it hard to imagine how things were done in the past without these technologies.

In this hyper-connected world, people will have different roles in the same physical location. They will have multiple virtual face-to-face meetings at home with different persons. For example, they can talk face-to-face with family, friends, colleagues, a doctor or a teacher at home. This extreme connectivity invades their personal life and might go against their need to be a different person in different settings.

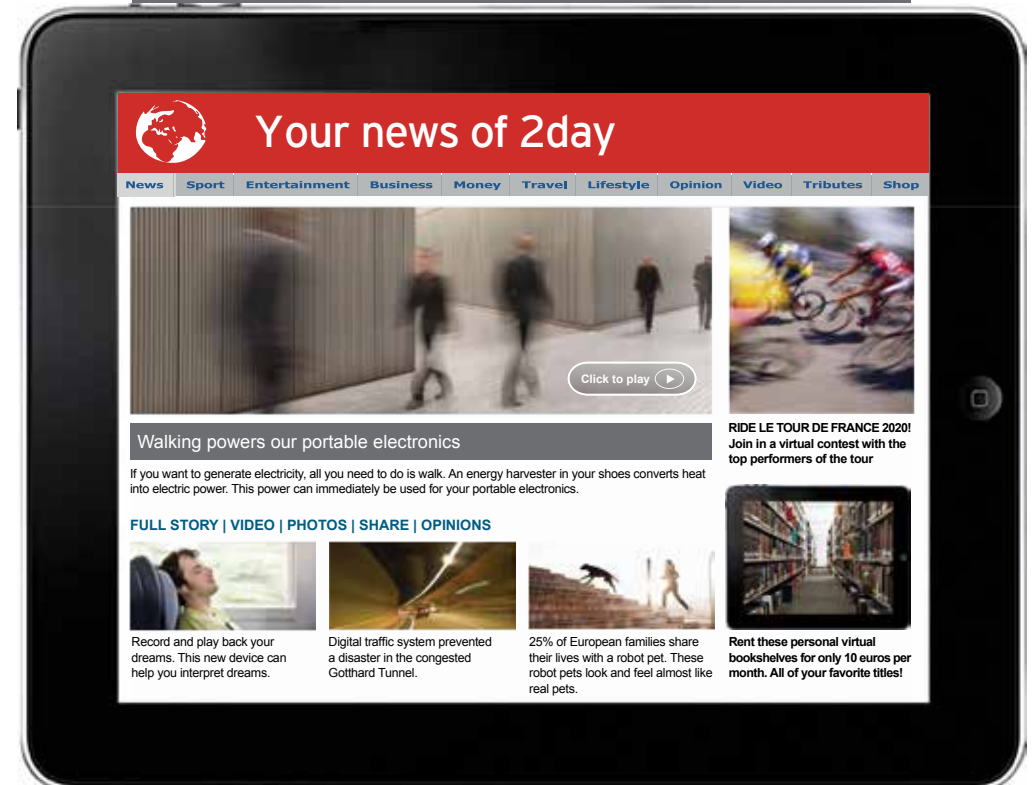
Characteristics of this scenario

- ▶ Privacy and security issues are solved by means of self-regulation. A global high-level regulatory framework has been designed by the government, and the concrete details are developed by the industry.
- ▶ To guarantee security on the internet, two internets are needed: the traditional and a premium secure internet.
- ▶ Innovation is boosting by leaps and bounds, and customers are willing to adopt new services and applications because they will make lives easier and add convenience. New technologies and standardization make a seamless virtual world possible.
- ▶ The industry is fully aware that it is essential to listen to customers' needs and to involve them in the product development process.
- ▶ Customers are demanding. There is no room for poor quality products.
- ▶ The customer is in control and decides who can and cannot be part of his or her life: only companies and brands preferred by the customer are allowed to approach this customer.
- ▶ Valuable and reliable product information is available from different sources and from different perspectives (e.g., health, price, quality and footprint).
- ▶ Companies will not use consumer profiles or data unless they have explicit permission from the customer.

Challenges and opportunities in this scenario

- ▶ Customers are very demanding and do not accept poor quality products and services. At the same time, the time to market is crucial to keep up with the competition. The key challenge is to find the right balance between a short time to market and a high-quality, thoroughly tested product.
- ▶ Brands face loss of control over the customer relationship, losing their information monopoly and a shifting toward two-way communication and conversation. It is vital that brands embrace the shift in consumer power and find ways to make it work to mutual advantage. As customers gain more power to choose where and how they interact, they will begin to choose a smaller number of organizations with which they want to maintain primary relationships.
- ▶ Integration of multiple communication channels is possible because of the development of certain standards. For providers of services, it is important to embrace these standards for successful adoption of the (new) services by consumers. These standards can be found in service interfaces, technology development and in more business process – related aspects of security and privacy.
- ▶ Different types of services will make their way into the daily lives of consumers, and their security and privacy need to be guaranteed. Therefore, a smooth and efficient switching process between these types of services will become extremely important. Different types of services will require different quality levels for the Internet connection and network. For example, banking and health care services will require a “premium,” 100% secure internet, while for news services a “standard,” less secure Internet will be sufficient.
- ▶ This scenario is characterized by strategies of “unrelated diversification.” Organizations are expanding their horizon to include telecommunications markets and industries that may not be related to their core business but do offer important opportunities to connect with their customers. As a result, competition will increase, and there will be many new entrants competing fiercely to gain market share.
- ▶ Significant investments in infrastructure are needed in this scenario because of the ever-increasing data consumption by consumers and the explosion of the number of devices with an internet connection in and around homes. The big challenge is to include the extra revenue streams in the business case for the infrastructure provider, because a lot of the benefits of these investments will go to other companies, such as power suppliers, retailers and insurance companies.
- ▶ In this scenario, customers are in the driver’s seat. They decide which brands they like and which are allow to contact them. The opportunity is to be on their “like” list, and the challenge is to make an emotional connection to please them without annoying them. Co-creation is an opportunity to build strong relationships with customers. Companies have to find new and original ways to involve customers in the product development process. Reward them creatively for the co-creation of new products.

Figure 3. Your news of today



Roller coaster

“The integration of the virtual and physical worlds is gaining ground, but it is not perfect yet. Some brands are compatible; others are not. Due to lack of cooperation within the industry and absence of adequate privacy regulation, it is a chaotic and uncontrollable world.”



- Privacy and security are not in control.
- The virtual and physical worlds are converging, but not always seamlessly because some brands are not compatible.

Information overload is growing rapidly. This information is a mixture of videos portraying happy Italian families enjoying a meal at long tables under olive trees and horrifying images of war victims and environmental tragedies. The mixture of information and the frequency of exposure lead to indifference. People prefer to concentrate on their own busy and complex lives, and their focus is quite limited. They like to concentrate on positive achievement and turn a deaf ear to bad news and criticism.

In the area of cyber crime, disturbing incidents happen on a regular basis. Cyber crime is big business. This industry spends huge amounts of money on research and innovation to stay ahead of corporate and government security initiatives. At the same time, governments and companies have more and more access to real-time and stored data reflecting the interests and activities of groups of people and individuals. Companies use this personal data without restriction or remorse for all kinds of commercial benefits. This data is captured, analyzed, sold and used for commercial purposes without the knowledge or permission of the customer.

Scenario 2

People have no idea who is observing them, when and where information is captured, or for what purpose – and frankly, people don't care.

The speed of innovation is very high. New technologies tumble over each other, resulting in creative and surprising new products, but not all products or brands work seamlessly together. A short time to market is crucial. Competition is increasingly based on rapid innovation, often at the expense of product quality. Being the first to launch is more important than extensive product testing. In this very competitive market, there is no time to align standards. Some companies from different industries, work together and use the same technological standards. The products produced by such a "consortium" integrate quite well, but products from different consortia are often incompatible and unable to work together. If someone chooses one brand for a smart refrigerator, he or she may well find out that there is a limited choice of smart waste bins that are able to cooperate seamlessly with the refrigerator to create a shopping list.

Internet connections are everywhere in every home. Appliances such as refrigerators, electric blinds, sprinkler systems and microwave ovens are all connected to the

internet to make customers' lives easier. These appliances are able to "understand" the data they collect and to function independently and in conjunction with one another. Housekeeping becomes easier and more efficient because devices take over a lot of the work. This applies not only to physical work, but also to mental work. People no longer need to think about tedious household chores. The intelligent devices collaborate to conserve energy and to signal the need for new supplies and maintenance. When people get up in the morning, the coffee will be ready at the right time, the surround sound system will broadcast their favorite morning tunes, and the bathtub will be filled with water at the right temperature. The tunes will follow them in every room they enter. Even clothes become connected and more intelligent. People wear sportswear that warms or cools their body depending on the air and body temperature. These clothes will also send out a signal to let the owners know when they need to be washed and ready for the next scheduled gym appointment. In 2020, there will be around 100 billion devices with an internet connection. This will cause a veritable explosion in the amount of data transferred. Major congestion problems will occur in the networks, resulting in delays, errors and services that fail to respond. The lack of cooperation causes inefficiencies and suboptimal network usage. For example, the scarce frequency spectrum is not used to optimal advantage.

Data pertaining to personal activities are stored on servers that are prone to hacking. Cyber crime is a lucrative business, targeting companies and consumers. Smart meter data shows when people are out and when they are at home, burglar alarms can be switched off by a mouse click, and savings can be stolen from a bank account online, but the most common cyber crime is identity theft. Stolen identities are used to buy cars, create new bank accounts, or even to produce a false ID to the police at the point of arrest. Identity theft can have devastating consequences for the victim. It does not only have direct financial consequences, but the victim may be denied jobs, housing and boarding for flights, or even get arrested for crimes he or she didn't commit. This serious risk of the digital age is ignored or dismissed by most people. They feel that they cannot control or prevent it, and they'd rather not think about it.

The fact that people are very dependent on the new technologies is another thing they'd rather not think about. However, frequent breakdowns and malfunctioning machines are really frustrating and remind them of their heavy addiction. The benefits gained by virtualization, its convenience and efficiency, far outweigh the disadvantages. At least that is what they like to think.



Everything is speeding up, and the adoption rate is incredible thanks to people's obsession with technology and efficiency. The result is 24/7 connection, 24/7 access to services, a bombardment of information and hectic households. The consequence is stress and anxiety.

People are exposed to multiple truths (one source says orange juice is very healthy, another source says orange juice should be avoided because of the high sugar concentration), half-truths and pure lies. Overloads of information and advertisements have made us immune to the lies and half-truths of companies. Unreliable information in combination with a wide range of products to choose from makes it hard to choose. People have little time; therefore, they make their choices arbitrarily, based on advertisements or the most appealing discounts. Consumers don't know how to make a good comparison, since there is a lack of reliable and transparent information.

Users communicate naturally with their devices through a gesture and speech recognition interface. One can give voice commands like "Show the Tour de France," and a nearby screen will show it.

The nature of family life has changed as well. Where once people would send wedding pictures and videos to relatives who were unable to attend, these people now have the opportunity to attend the ceremony in virtual reality. And when lives become more hectic and people more focused on their own convenience, it is conceivable that weddings or even funerals will entirely take place in virtual reality. This means that all invited guests will attend the wedding from their own home, or any other place that suits them. The new technology creates an illusion that makes it seem as though people are actually sitting together in the church, while in fact they are sitting alone on the couch at home.

People can also attend events "uninvited." If a father lends his car to his daughter, he can track where she is going, whether she is driving safely and whether she wears a safety belt. This extreme connectivity invades people's personal life and makes their lives very complex and busy. It sometimes makes people feel unhappy because it goes against their need to spend some time on their own.

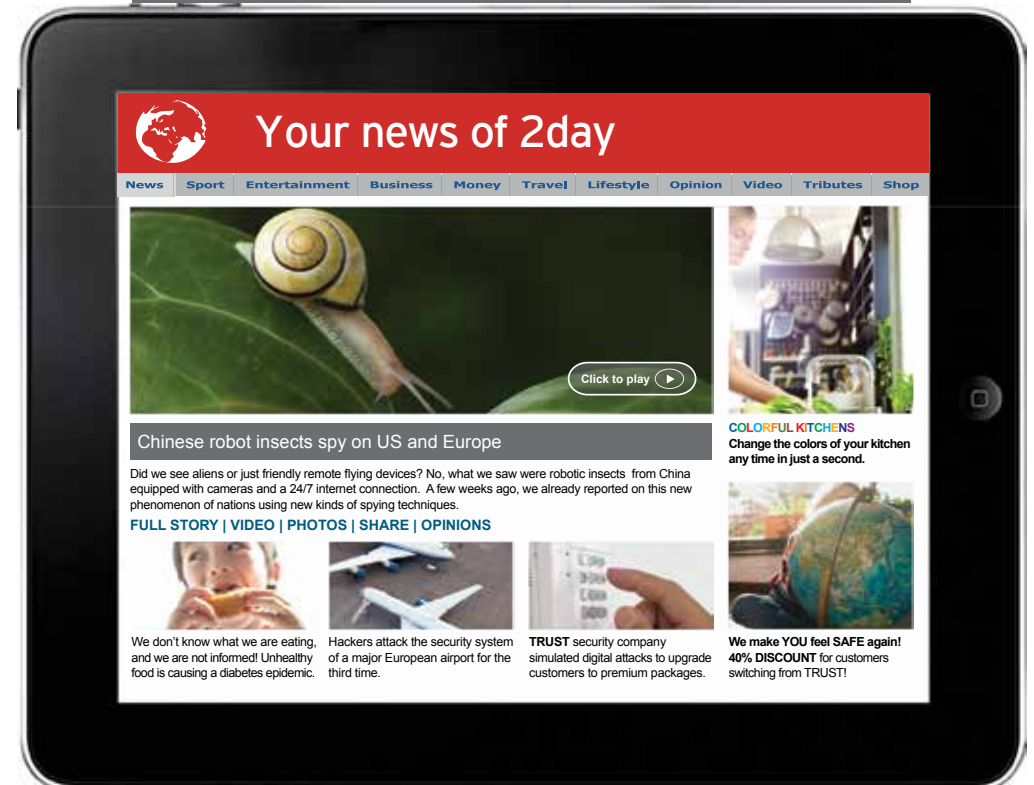
Characteristics of this scenario

- ▶ Privacy and security issues are not solved. On the contrary, internet crimes, identity theft and abuse of personal data happen on a regular basis.
- ▶ Customers are slightly worried, but ignorance and denial prevail. The new world has made their busy lives easier and more comfortable. This outweighs the lack of privacy and security.
- ▶ Customers are exploited by companies. They have become products. Without any remorse, companies store, analyze, combine, sell and distribute personal data to gain maximum insight into their customers and make maximum profits.
- ▶ Customers are overwhelmed by advertising. It makes them numb and indifferent to most advertisements.
- ▶ Product information and reviews are colored and unreliable. It is hard for people to judge or compare different products.
- ▶ Customers consume a lot. Buying things is made extremely simple. Everything they see around them (e.g., on billboards, on other people) can be bought easily.
- ▶ Seamless cooperation between devices is not always possible. Because there are different standards, not all brands work together. Customers have to choose the right combination of brands within the same consortium.
- ▶ The prices of interactive screens have dropped significantly. This in combination with new interfaces (gestures, voice recognition) and augmented reality services further blurs the distinction between "real" and "virtual."
- ▶ A short time to market is crucial. This goal is often achieved at the expense of product quality.

Challenges and opportunities in this scenario

- ▶ The products produced by a certain "consortium" of companies do not work seamlessly together with those of other consortia. It is very likely that in this scenario one will see winning and losing consortia. It is key to select the right partners and especially the right consortia. Being part of the winning consortium is crucial to achieve success.
- ▶ In this scenario, the frequency and intensity of information and advertisements being bombarded at customers has reached a dramatic level. This has made customers rather indifferent to advertisement. It is essential to be distinctive in the way you approach your customers. The opportunity in this scenario is to distinguish yourself from the crowd by offering high-quality products.
- ▶ Customers find it hard to make choices in this scenario. Everything looks the same and information is not reliable. The challenge is to become and be recognized as an honest and reliable guide for customers, a guide who serves as a portal to new services, applications and technologies and who offers the extra service of assessing the quality and security of connected service providers.
- ▶ Customers are willing to pay for Internet safety insurance policies that cover financial loss as a result of security violations or digital theft. New "internet insurance providers" will emerge and offer "internet gold cards." At the same time, these insurance providers will prescribe which sites and services their customers may use, which can be used safely and which are not covered by the insurance policy. This will have a huge effect on the behavior and security measures of companies. As they want to be included on the "allowed list of services" of the insurance provider, they will start to behave better and improve their security systems. Insurance companies, middlemen and intermediaries will become quite powerful as service and content providers are all trying to become their "preferred provider."

Figure 4. Your news of today



Speed limit control

“The government has intervened and imposed heavy regulation to get internet safety and security under control. Heavy regulation happened at the expense of service innovation. This has stopped the further integration of the virtual and physical worlds.”



- Privacy and security are in control.
- The virtual and physical worlds are separate and fragmented worlds.

With double-digit growth of cyber crime over the first 15 years of the new millennium, the world has entered a new age of crime in cyberspace where criminals can freely venture about and realize high payoffs (in terms of money and information) without a high risk of getting caught, as was the case in more traditional crimes. Billions of dollars and terabytes of data were stolen every year. Security threats were changing constantly and became more sophisticated, more targeted and more intelligent.

The government had to intervene to protect customers against these malpractices and crimes. This has resulted in severe regulation in the field of privacy and security. In the early days, regulation used to be rule-based, meaning that a set of rules had been developed to describe good entrepreneurship in the field of privacy and security. Increasingly, companies looked for the blind spots within this framework of rules to gain short-term advantages over protection of their customers. Numerous privacy and security scandals ensued. Today, the new regulatory framework is more explicit and tries to capture

Scenario 3

everything from securing information to guaranteeing privacy. This new regulation is described in every possible detail aiming to cover every conceivable misconduct. According to most companies, this new regulation is excessive, disproportionately heavy, far too detailed and inflexible. Nevertheless, customers show immense trust in these new regulations and are prepared to spend money on digital services because of this imposed regulation. Organizations are therefore forced to implement these new regulations and show compliance to gain crucial customer trust. Implementing these new regulations is a heavy burden for companies in terms of time and money.

The internet has been split up into a traditional internet for rather harmless services and a heavily protected one for more sensitive services, such as online shopping, government and health services. Customers literally pay a price for their safety online, not only in terms of money, but also in terms of user-friendliness of services. On the heavily protected internet, identification often involves a combination of iris and fingerprint scanning. Identification is required every time one accesses a new online service. As data exchange is prohibited between companies, people have to perform more operations than in the old days. For example, if they want to pay for online shopping, they have to go to a different secured

banking site and log in again and fill in the amount of money and the receiving company themselves, which makes it more complicated and a well-recognized hurdle for many online customers. Besides these hurdles, customers have to read and agree with many extensive terms and conditions for every service they want. As companies are not allowed to single-handedly change the terms and conditions of their services, frequent updates of the terms and conditions require frequent customer agreement to these changes. Some people prefer going to traditional stores because that is more efficient than online shopping. Most people use the traditional internet for reading the news, looking for specific information and performing other tasks that do not involve any exchange of personal information.

Global cyber security systems (GCSSs) are introduced to scan, monitor, intervene and sanction violations of the rules. Penalties for violation are heavy. These GCSSs are fully automated systems that work proactively to prevent cyber crimes and cyber attacks. They are intelligent and able to make decisions independently. Customers feel safe on the internet again because they see that the new severe regulation decreases the number of incidents.

The necessity to comply with new regulations has taken a lot of time and effort from all companies in the industry. Given the loss of consumer confidence in the way companies take care of security and privacy, companies aim to restore trust by investing in a new, secured premium internet. As a result, consumer confidence has indeed gone up, but at the same time, the speed of service innovation has slowed down. This slowdown has in turn decelerated the further integration of the physical and virtual worlds. The upside of this speed reduction is that people have time to breathe again. Life has become calmer and less stressful. People feel safer and more in control.

Transparency is very well covered in the new legislation. This results in clear and fact-based product information in commercial communication and on product packages. Product information includes lists of all ingredients, sources of all ingredients, information about the production process and the environmental footprint. The government has introduced new standards and quality marks for these aspects. Government intervention extends beyond the needs of privacy and security. There will be many products that are allowed to be offered but not advertised because of their negative impact on health care costs or on the environment.



Homes have become more modern and more efficient. People have smart trash bins and smart refrigerators, but they don't work well together. Because storing, reusing or analyzing personal data is not allowed, devices can only work independently. This means that people have to combine information themselves. For example, when they want to create a shopping list, they will have to collect information from the display on the refrigerator and on the display on the trash bin. Both sources give them separate input for the shopping list. When a washing machine breaks down, a signal on the display shows what is wrong and which element needs to be replaced, but the owner still needs to check his or her schedule and make an appointment with the technician. Human involvement and intelligence are still needed for simple chores such as making a shopping list and scheduling maintenance.

After years of increasing use of fast and pre-prepared food, this rather unhealthy habit has changed. Traditional cooking is gaining more and more popularity. People spend more time selecting fresh food and preparing food in their kitchen.

There is also a shift in how people spend their leisure time. One way people have found to maintain and even improve their relationships and connections with friends and family is to stay home. Something as simple as grocery shopping, cooking and eating together brings people closer. People tend to spend more time with family and friends in the same room than online communicating with "digital friends."

As mentioned, people are less confronted with new technological advancements and new gadgets. In fact, technology has become less helpful and less user-friendly. As a result, people manage their life using relatively fewer technological tools than a few years earlier. Relatively speaking, they have become less dependent on technology, and one might say they have started to think for themselves again.

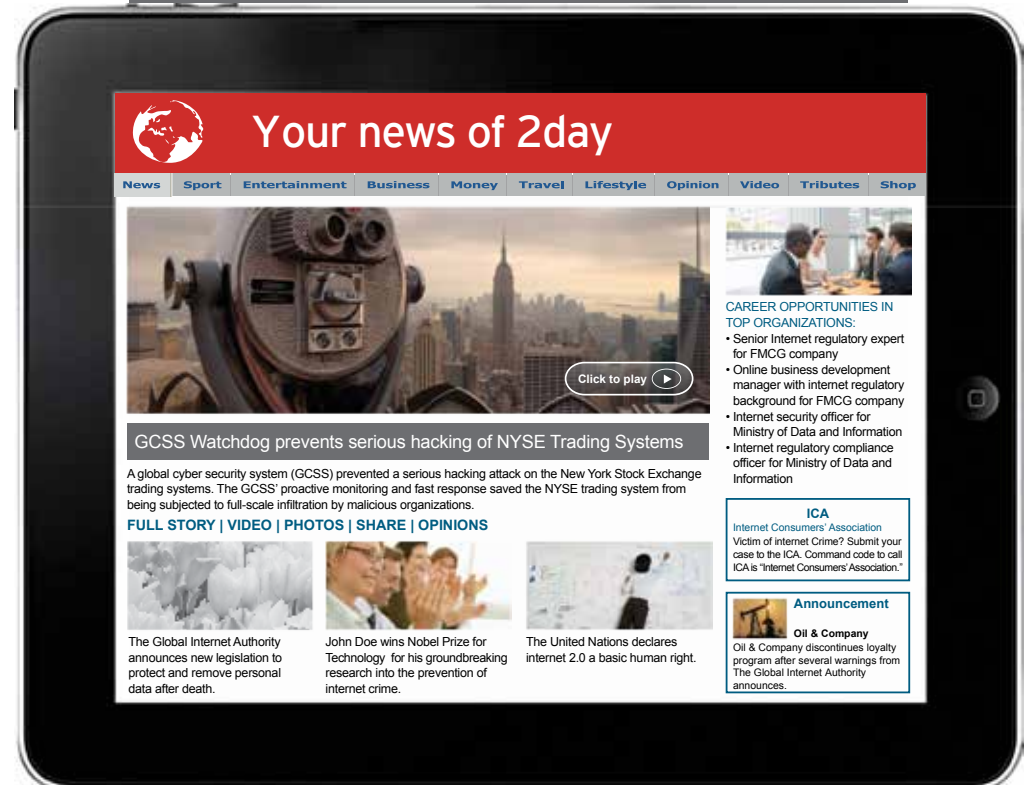
Characteristics of this scenario

- ▶ The internet has been split up into the traditional internet for rather harmless services and a second, heavily protected internet for more sensitive services.
- ▶ After years of severe cyber crime attacks, the number and magnitude of cyber crimes has significantly been reduced.
- ▶ There is a feeling among customers that security and privacy is safeguarded. This feeling of safety among customers and a significant reduction in cyber crimes can be attributed to government intervention. This has resulted in strict regulation in the field of privacy and security.
- ▶ In the opinion of most companies, this new regulation is excessive and inflexible. At the same time, they have to implement these new rules to avoid losing their license to operate. Implementation places a heavy burden on companies in terms of time and money; this comes at the expense of service innovation.
- ▶ GCSs are introduced to scan, monitor, intervene and sanction violations of the rules. Penalties for violation are heavy.
- ▶ The disadvantage of the regulation is the fact that online services have become less user-friendly and more expensive.
- ▶ There are some technological advancements, but these innovations are quite isolated and are not in harmony with other innovations. The impact on people's way of living is therefore limited, and this does not result in any further integration of the virtual and physical worlds.

Challenges and opportunities in this scenario

- ▶ The main disadvantage of the strict privacy and security regulation is the fact that online services have become less user-friendly. The big challenge in this scenario is to develop products and services as easy to use and convenient as possible within the regulatory restrictions.
- ▶ This is a scenario in which customers have to read and agree with complex legal terms and conditions for every digital service they use. A challenge in this scenario is to be clear about these legal policies by explaining, in simple language and with clear images and examples, the function and the reason behind the policies and procedures. This will increase transparency of business processes, strengthen the client relationship, and develop a common understanding among customers of the need for heavy regulation and compliance.
- ▶ In this scenario, people tend to choose in favor of companies that have a positive and proven track record related to security and privacy issues. They prefer brands with a reliable reputation and a solid history over new unknown entrants. This gives an opportunity to the settled brands to distinguish themselves from the new entrants.
- ▶ A Global Internet Authority will hand out to selected and qualified companies the exclusive rights (licenses) to maintain the data servers of the new premium internet. To obtain these rights, companies have to apply and compete for the licenses. The requirements are very high. In some countries, the data servers are owned and managed by national regulatory institutions.
- ▶ Another challenge is efficient and effective implementation of the new regulation in business processes and policies. (National) governments will become more important and will take a more dominant position in the (tele)communications industry.

Figure 5. Your news of today



Gear down

“Neither the government nor the industry has been able to provide a real solution to the growing abuse of consumer information. As a result, customers have turned en masse against innovation and virtualization. New services have not been adopted by consumers. This has stopped the further integration of the virtual and physical worlds.”



- Privacy and security are not in control.
- The virtual and physical worlds are separate and fragmented worlds.

The entire world is held hostage by a thunderstorm of cyber attacks, harming complete nations, companies and individuals. With double-digit growth of cyber crime every year for the first 15 years of the new millennium, there was total chaos around 2015. For years, cyber criminals could relatively easily conduct their malpractices and earn millions of dollars. Billions of terabytes of data are being stolen every year. Security threats are constantly changing and becoming more sophisticated, more targeted and more intelligent. Cyber criminals have always been one step ahead of prevention institutions, and the tradeoff between risk and payoff is very positive.

Companies tried to develop some kind of code of conduct for the industry describing the rules for handling the security and privacy of consumers. At first, it looked like this was working, but soon a few companies misbehaved. These companies could not be sanctioned because there was no worldwide industry authority with the power and responsibility to enforce regulation, monitor compliance and sanction offenders in the

Scenario 4

industry. A few European countries responded by joining forces to develop a general regulatory framework for dealing with security and privacy. Although a few countries agreed to the initial rules and obligations, major countries such as China and the United States did not. To avoid the heavy burden of local regulatory compliance, companies set out to effect a strategic reorganization of their businesses. In the end, regulation of privacy and security failed.

Given the numerous scandals, incidents, threats and the lack of a sound solution for securing consumer privacy, consumers lost confidence completely. People didn't trust institutions such as the government, and they didn't trust the information they got from companies. This made them feel insecure and even frightened.

The sector is characterized by numerous companies making unauthorized use of personal data, making lots of money at the expense of consumers. Cyber crime is really flourishing. A comparison between today's hackers and cyber criminals and the bankers and hedge fund managers of the 2007-09 financial crisis is frequently made. A social movement that accuses companies of malpractices and criticizes privacy violations is becoming more popular (again, a comparison

can be made with the protest groups of the financial crisis in 2007-09, when the occupy movement was calling for drastic restructuring of the financial system). It started as a small group of people demanding a reform of the regulatory framework regarding security and privacy, but quite rapidly more and more people joined the protest group. Solidarity grows, but this solidarity is fed by a common feeling of dissatisfaction with the current situation. A representative of this protest group is now involved in talks with industry representatives and important national politicians to discuss possible solutions.

The lack of trust in new technologies combined with an unhappy feeling that new products will give them even less power makes the adoption speed of new products extremely low. There is a growing need to slow things down. As a result, innovation within the industry is scattered, and revenue streams are unclear. Consumers generally assume that to an increasing extent, companies are making huge profits abusing personal customer data. Using new technological products or services is really seen as playing Russian roulette because up front it is impossible for customers to see what is actually happening to their personal information and their well-being is in the hands of the unreliable service provider.

In their homes, consumers are increasingly disconnecting all kinds of communication channels through which service providers promised efficiency and effectiveness of energy and water supply and the convenience of other kinds of home-related services (e.g., media, entertainment, groceries). Consumers want to be more in control regarding these services and want to decide on a case-by-case basis what, when and how they get these services.

All this is fuelling an interest in nostalgia, but also an interest in patriotism and local community life. People long for the "good old days" when they could easily use the internet and other communication solutions for their convenience and when a simple security package would adequately protect them. Since people realize that this scenario is unlikely to unfold in the near future, they become more and more interested in spending time with family and friends again. Another trend is that people like to dig into old archives to discover family ties and stories.

People have an increasing trust in products and services that are tangible and close at hand. Therefore, they tend to buy predominantly local and national products, rather than international products. As a result, local shops offering all kinds of local products and services really flourish in contrast to online



shops. Greengrocers, butchers and bakeries are back in the street next to stores of former online merchants. Consumers strongly believe that local products are more reliable, healthier and safer than products from far away.

Consumers trust recommendations from people they know personally more than they trust company information. This can be seen in the increasing popularity of all kinds of discussion groups. Consumers are increasingly actively involved in products, services, political and economic discussion groups where they physically come together to discuss opinions about a specific topic. These discussion groups are an important source of reliable information, and many buying decisions are based on this information, instead of product, company or independent consumer interest group information. Consumers are just too suspicious about these sources and in general regard companies and institutions as insincere or unauthentic. Besides knowing what other consumers think about a product, consumers want to know where products are made, how they are made and what they are made of.

Materialism is still in full swing, but for many people it is starting to lose its appeal. It is becoming clearer that money cannot buy happiness. People are starting to realize that their identity is not shaped by what they own and consume but by who they are and how they live their life. Many people will get back to family values and the good old community spirit.

Characteristics of this scenario

- ▶ Privacy and security issues are not solved. On the contrary, internet crimes, identity theft and abuse of personal data happen on a regular basis. There is an explosion of the number of incidents. This makes people afraid of using digital services.
- ▶ People turn against the internet. They only use it for harmless purposes, but not for more personal and confidential things.
- ▶ Social media and online shopping have lost popularity. People prefer to go to physical stores and to pay in cash.
- ▶ The adoption rate for new innovative products is very low. People don't trust these new products.
- ▶ The society of mass consumption made people unhappy and dissatisfied. People long for authenticity. They want the real thing: experiences that enhance their lives and tell a story about their past. This is a scenario with nostalgia and a longing for the good old days.
- ▶ Recalls of products and food scandals have made people suspicious and afraid. They want to know where products are made, how they are made and whether they can trust them. They trust local products more than products from far away. Therefore, local products are in strong demand.

Challenges and opportunities in this scenario

- ▶ In this scenario, most customers have lost their faith in the internet and digital services completely. The main challenge is to regain the trust of the customer. Most people have lost their naivety. It is essential to improve the company's reputation as a reliable organization that can be trusted as a close friend.
- ▶ People appreciate their contacts with close friends and family. They are reluctant to have private conversations on the internet. This resistance can be reduced by introducing closed and secured communication networks for specific communities. This is a closed network in which participants know each other and trust the way information is shared.
- ▶ Data usage will increase because consumers are still using one-way data consumption such as video calls and video-on-demand services. Payment for these services will be settled using prepaid methods. People are reluctant to make online payments and prefer to pay in cash. It is key to make their preferred payment methods convenient for them.
- ▶ People have an increasing trust in authentic products and services that are made in their own region or country. The challenge for companies is to present themselves as local rather than global. They should use local distinctiveness when approaching customers. At the same time, they must focus on fair and authentic products and services and be transparent about the origin, ingredients, production and source of each product.
- ▶ Customers are sensitive to social responsibility in this scenario. This makes it important for companies to show their customers what they contribute to society. They can, for examples, show the benefits of their services and efforts in the field of improving the quality and effectiveness of education, healthcare and elderly care.
- ▶ There is a shift in morale among hackers. Since the payoff for hackers on the internet has decreased (fewer people make financial transactions or share personal information on the internet), more and more hackers are willing to offer their knowledge and expertise for the good cause: a secure internet where privacy is guaranteed. This gives companies the opportunity to hire these people. Nevertheless, this will not immediately lead to a global solution for a secure and safe internet.

Figure 6. Your news of today



A background image showing a collection of shopping bags and boxes in various colors (pink, teal, green, blue, and brown) and patterns (solid and striped). The items are stacked and slightly out of focus, creating a sense of a shopping haul.

Example: shopping in 2020

How will people shop for
groceries in 2020?



Scenario 1: full speed ahead



My virtual assistant, Moby, asks me what I would like to eat for the next few days and whether I have any special requirements. I answer that I would like Italian risotto and stew, but not with too much fat because I have promised myself to lose 4 kilos. Moby's response is quick and clever as always: "If you want to lose weight, you'd better eat salads and vegetables instead of risotto and stew." I know he is right, and with a bit of resistance, I give in and ask him to shop for Italian salads and vegetables that I like. My smart refrigerator, smart trash bin and organizer combine and analyze all sorts of data. Based on this analysis, Moby shows me a number of suggestions ranging from Italian salads with tomatoes and basil to grilled plates with eggplant and pumpkin. For each suggestion I can see facts such as the nutritional value and the number of calories, vitamins and fats. I can even smell the fresh basil. I choose what I like most, and Moby checks where he can buy these products at the best price. Moby only shops at stores I have marked as preferred stores. He arranges for the groceries to be delivered to my home on Tuesday afternoon at 3:15 p.m., when I will be working from home all afternoon. If anything changes in my schedule for that afternoon, Moby will change the delivery time immediately.

My virtual assistant, Moby, asks me what I would like to eat for the next few days and whether I have any special requirements. I answer that I would like Italian risotto and stew, but not with too much fat because I have promised myself to lose 4 kilos. This information is directly available to companies follow me. I immediately receive offers for light stews and light risottos, one even healthier and better for my weight than the other, but I have no idea what to believe. In addition, I get four tempting offers from gyms and six special offers from dieticians who want to help me to lose weight. Rather annoyed, I sweep away all these messages and let Moby choose. My smart refrigerator, smart trash bin and organizer combine and analyze all sorts of data. Moby selects an affiliate wholesaler and orders products directly in an online store, without the participation of a retailer. All these products will be delivered to my home on Tuesday afternoon, when I will be working from home. If anything changes in my schedule for that afternoon, Moby will change the delivery time immediately.

Scenario 2: roller coaster



I realize that I urgently need to shop for groceries. I check my calendar to see how many evenings I will eat at home during the coming week. Then I walk to my smart trash bin and smart refrigerator to look at the displays to check which packages have disappeared in the trash bin and what is left in the refrigerator. I combine all this information and think about what I would like to eat. Then I go to the website of my favorite retailer. When I log in, I have to say my name and make an iris scan to identify myself. This gives me a secure feeling. I mention all the products I want to order. I have to be very specific. Instead of just saying "pasta," I have to say "pasta fusilli, brand Barilla." I buy this type of pasta almost every week, but the retailer is not allowed to store and reuse this information. After almost 15 minutes, I am done placing my order. I choose the products to be delivered on Tuesday afternoon. I will pay for them when they are delivered.

Scenario 3: speed limit control



Scenario 4: gear down



I realize that I urgently need to shop for groceries. I check my calendar to see how many evenings I will eat at home during the coming week. On the refrigerator I keep a handwritten list of things I need to buy. I combine this list with the things I would like to eat. Then I make a shopping list on my device. I immediately get all kinds of offers related to the products on my shopping list. Some of them are directly related, for example special discounts for the products on my list. Other advertisements are indirectly related to my shopping list, for example there is no candy on my shopping list this time because I try to eat less candy. This is immediately noticed, and I receive advertisements for healthy, low-sugar candy. All these advertisements are very tempting, but I try to ignore them. Then I drive to the store that I trust the most for my standard products such as pasta, rice and soft drinks. Once I walk into the store, I am recognized by my mobile device. Based on my profile I immediately receive personalized offers from the store, but also from other stores. Annoyed, I turn off my mobile device and promise myself to print my list the next time I go shopping. I do my shopping in the store, and I pay cash. Then I drive to my preferred greengrocery I always buy fruit and vegetables at this local greengrocery, because the products are delivered by regional vegetable growers. I would never buy fresh products at a big retail store because you never know where their products come from and you hear terrible stories these days about harmful substances, diseases and genetically modified food ingredients.

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