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Future of Screens
The screen is dead.
Long live the screen!

Introduction

Imagine you are on vacation in the year 2030. You are sitting in your self-driving car and enjoying your favorite TV series on the windscreen, which is voice-controlled and functions as a high-resolution movie screen. Meanwhile, your children on the seats behind you are using the side windows as touchscreens for electronic games. Or how about this: Rather than the smartphone, ultra-smart augmented reality glasses are your constant companions in everyday life. They replace dozens of other screens and can be your personal navigation system and control unit for your smart home or your car. What may seem like a far-off dream of the future is actually closer than you think.

Screens are omnipresent in today's digital world. They are essential components of smartphones, tablets, TV sets, laptops, and wearable devices. By now, the total number of screens has passed the double-digit billion mark globally. In 2020, an additional 3.2 billion flat-panel displays will be produced worldwide. Screen sizes currently range from 2 inches for smart watches to 75 inches for flat-screen TVs. Massive digital billboards for out-of-home media and advertising reach even bigger dimensions.

In this paper, we will look at the future of privately used screens. The examples above illustrate that the future of screens may look completely different from what we know today. Over the next few years, the form factor will diversify: Head-mounted displays for virtual or augmented reality, foldables, retinal projections, 3D holograms or direct projections, e.g. onto car windows, will be adopted in different environments and use cases. Screens will become essential enablers for both practical applications and entertainment. For instance, the attributes and context of innovative screens will not only change the way we watch content, but also the content itself. Storytelling, camera work, and even the length of content will adjust depending on the screen used, while in everyday life, screens can become novel user interfaces for all kinds of applications, potentially even operating an entire car via head-mounted display.

Another aspect to the future of screens is the diversity of players who will shape it: Hardware suppliers, digital platform companies (DPCs), media groups, and functionality app developers, not forgetting advertising companies and consumers, will set important impulses. These groups differ in their intentions; screens can showcase technology, display movies, substitute paper, or interface with customers/users. Taken together, very different stakeholder interests and radically new technological developments mean it is impossible to make accurate predictions. Therefore, the "Future of Screens" is another ideal playground for Deloitte's proven scenario approach.

"Future of Screens" is the fourth publication in a series of studies in which Deloitte combines its technology, media, and telecoms expertise with the unique methodology developed by the Deloitte Center for the Long View. Over the last three years, we have already taken a look at the long-term perspectives of telco business models, the TV and video landscape, and the future of advertising.

What could the future of screens look like? What new forms of screen-based applications and entertainment content could evolve? Will we primarily use media content or practical functionalities? And what are the dominant stakeholder groups? Our study provides differentiated answers in four scenarios.

So let's go to the year 2030 and see what the future of the screen looks like.
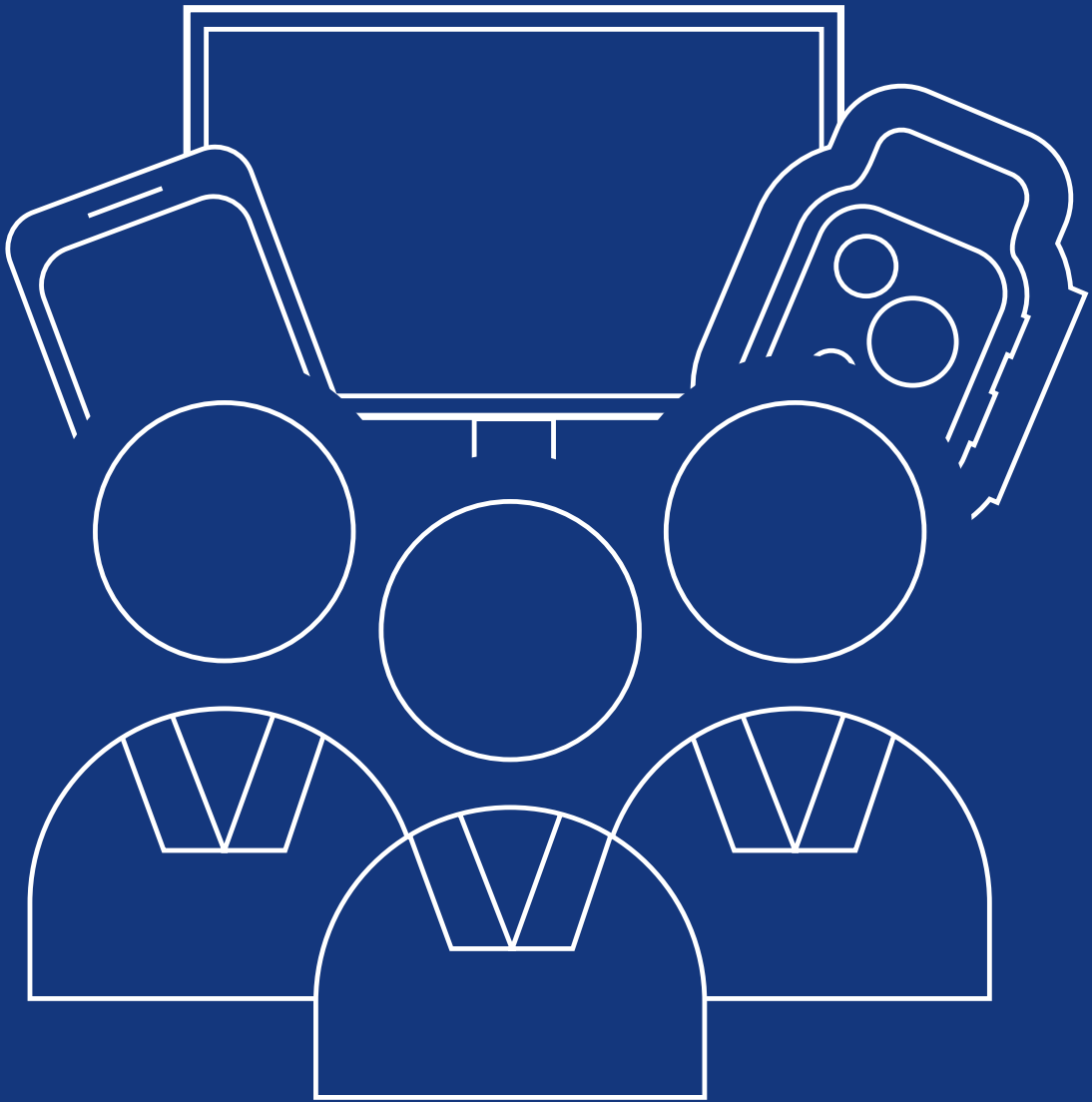
Archetypes

Six different stakeholder groups are the protagonists in this year's study, each of whom will need to be prepared to react individually to each of the future developments shown. Interestingly, stakeholders' significance varies greatly in the respective scenarios: The winners in the first one may lose importance in the next scenario. The summary table of stakeholder groups in Figure 1 also provides an overview of the market ecosystem relevant for the future of screens, and provides helpful orientation for reading our four scenarios and carrying out further analysis.

**Fig. 1 – Stakeholder archetypes**
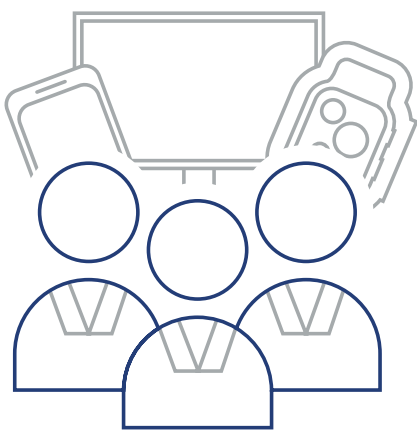
Hardware supplier

- Drive the technological development of screens (resolution, color depth).

- Want to generate revenues beyond hardware sales through additional services via TV ecosystems.

- Run he risk of becoming suppliers of dumb displays.
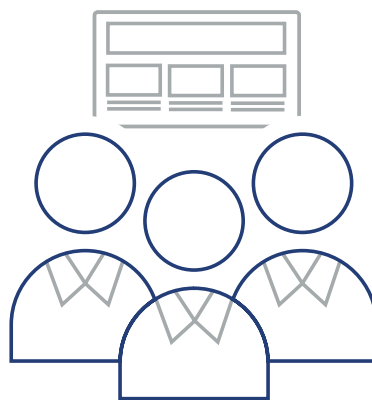
Digital platform companies

- Develop operating systems and ecosystems for different types of screens and enable seamless interoperability.

- Want to gain control over (their own and external) screen content and applications.

- Also drive the technological development of innovative forms of screens (e.g. XR).
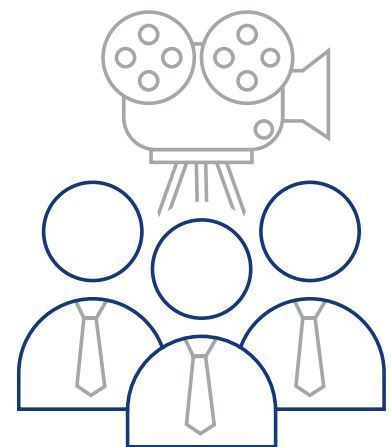
Media companies

- Need screens to play their content.

- On the other hand, their content is needed to sell screens.

- Have to implement new types of storytelling for new types of screens.

- Can use new screens to enforce paid content.

Functionality app developer

- Utilize screens to implement or improve their own services and make them individual, contextual and location-based..

- Use new screens as a new type of user interface.

- Rely on ecosystems/operating systems.
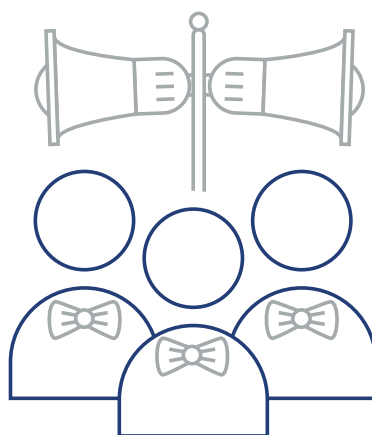
Advertising companies

- Get additional displays to play out advertising.

- Use novel screens to provide advertising at the right time and in the right place.

- Deploy AR/XR as an enabler for location and context-based advertising.
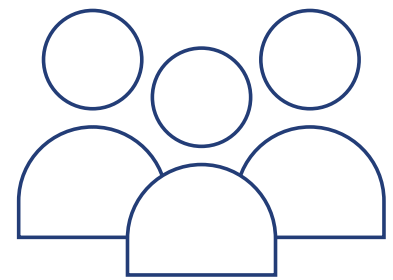
Consumers

- Use functional applications to make make their lives easier.

- Have additional opportunities to consume media content.

- Increase their overall share of screen time.

- Value seamless use of different screens.

Scenario thinking

The exact future of screens is practically impossible to predict. In addition to the usual level of uncertainty, three factors make prediction particularly difficult:

1. The multitude of technological innovations and entirely new types of use cases in the context of screens;

2. The dependence on individual, unforeseeable business decisions with long-term consequences for technology, content, use cases, and market structures;

3. The willingness of consumers to adopt new types of screens, which, like all patterns of use, is largely unpredictable.

While conventional strategic analysis does not offer much in a highly uncertain environment, approaching the landscape through the lens of scenario design gives perspectives beyond the usual three- to five-year planning horizon. Scenario design cannot predict the future per se, but it can view the risks and opportunities of specific strategic options in detail. From there, we can develop responses that are robust enough to generate good outcomes in different potential futures. As a next step, we generate a set of scenarios that describe plausible futures which differ significantly from each other and provide a sense of context and practical application. Scenarios illustrate relevant but opposing forces rather than specific events in the future. In other words, they are narratives set in alternative future environments which are impacted by today's decisions. In demonstrating the underlying drivers, scenarios help planners model their strategies and adapt them according to their potential impact.
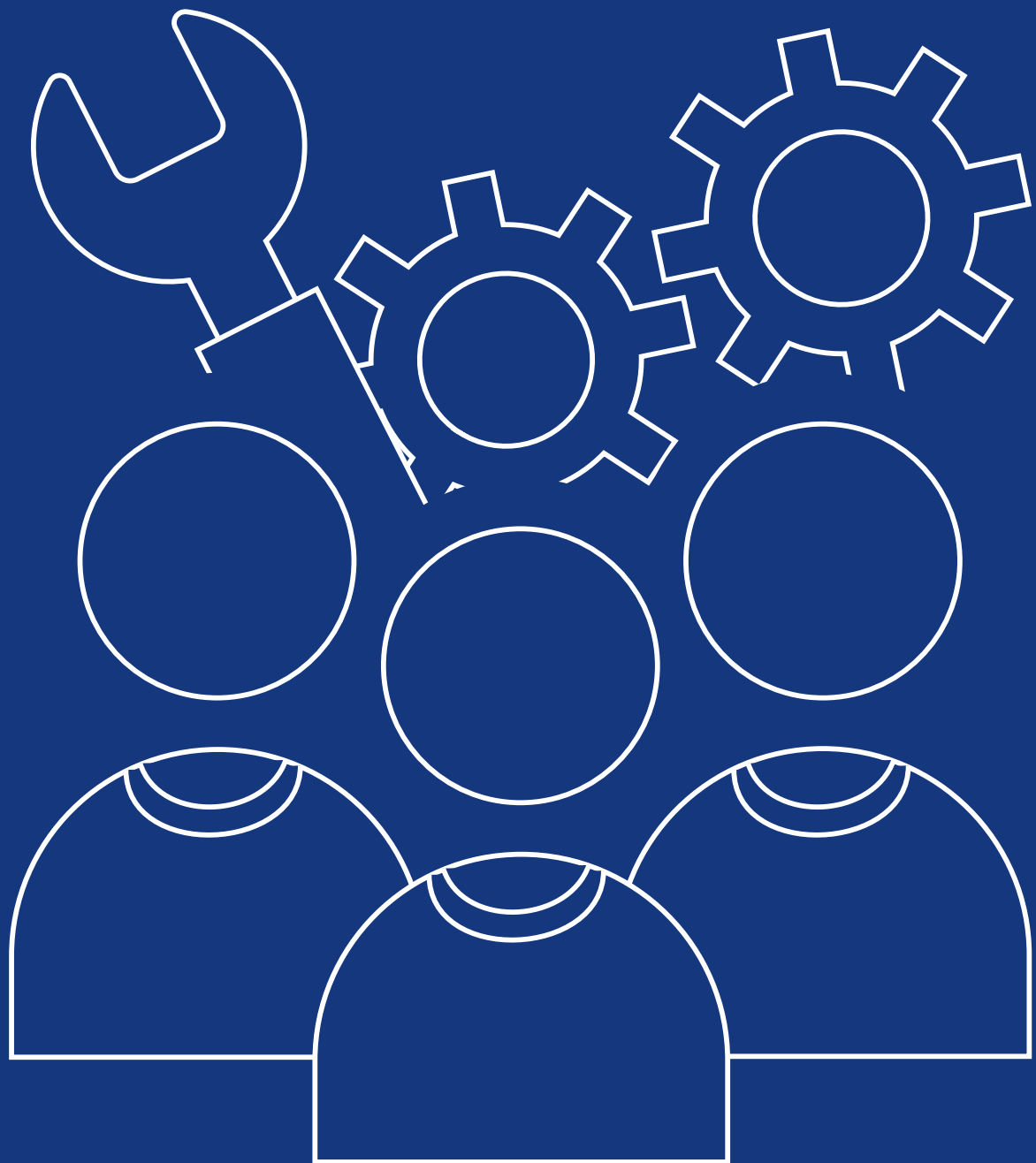
The underlying drivers and how we derive them

We develop our scenarios from a comprehensive set of underlying drivers that will plausibly shape the future of screens. These drivers come from both expert interviews and utilizing our unique external environment analysis, which is based on Natural Language Processing algorithms. Applying social, technological, economic, environmental, and political (STEEP) factors allows us to cluster our set of drivers and rate them in terms of their relative uncertainty and impact on the future of screens (see Figure 2).

The four extreme yet plausible scenarios are the result of a unique, proven Deloitte methodology.

**Fig. 2 – Driving forces: Evaluation by degree of impact and uncertainty**
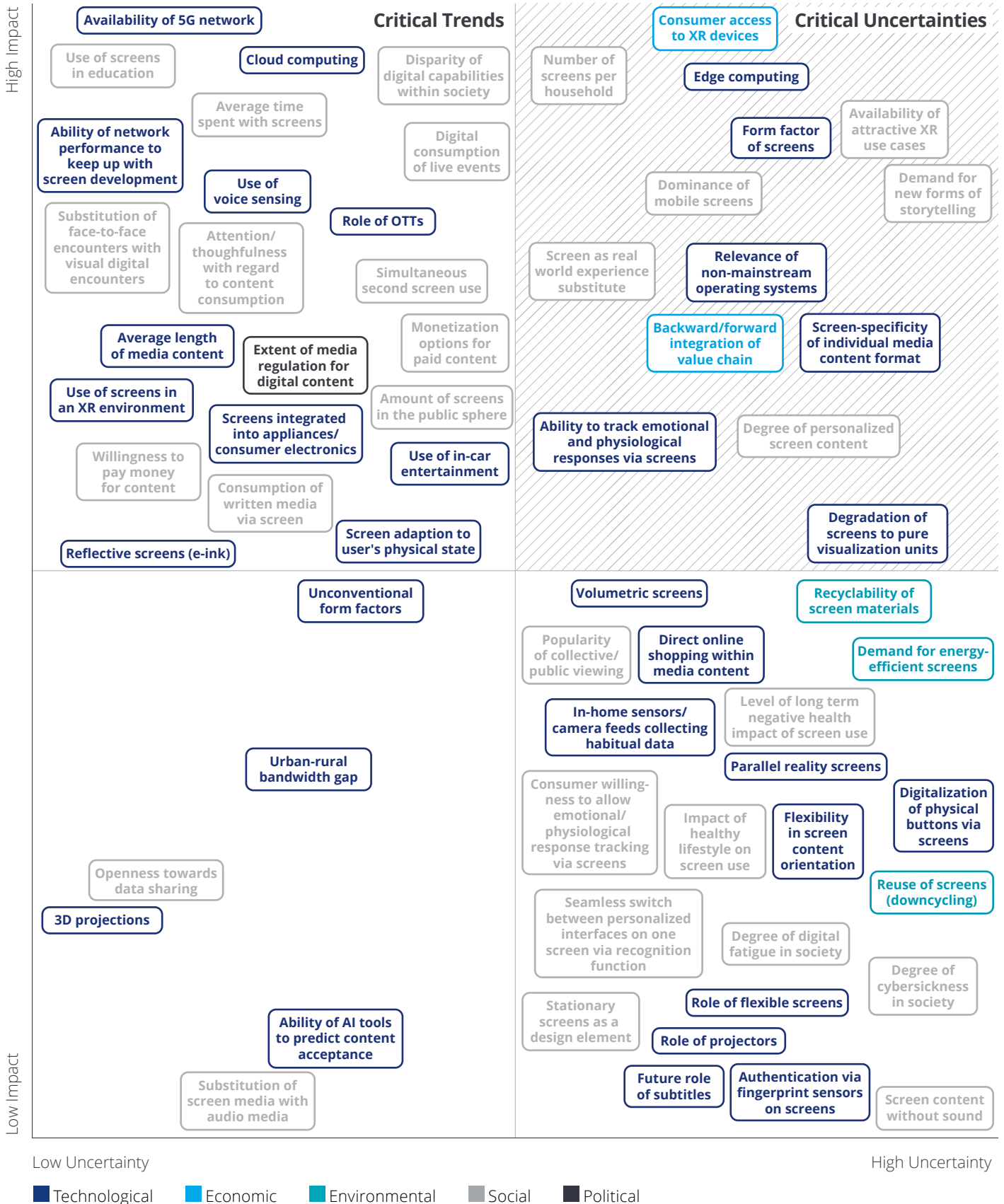
Note: Mathematically defined location of some text boxes may differ as overlapping data points have been rearranged to increase readability; survey was conducted between 12 May 2020 and 11 June 2020 with 14 participants.

We identified two types of relevant driving forces for our scenarios:

- Drivers with high impact and predictable evolution, please see the Expert Predictions section

- Drivers with high uncertainty and high impact on the future of screens

Our 'critical uncertainties' focus on drivers that are both highly uncertain and highly relevant. In this study, this area contains 14 driving forces for subsequent analysis. Next, we test the drivers by measuring their interdependence with and relevance to each other, then cluster them according to their relatedness. Finally, we create a matrix by choosing those critical uncertainties that generate the most challenging, divergent, and relevant scenarios. Two questions define the axes of the Future of Screens matrix: "How widespread are screens?" and "What drives screen usage?", as illustrated in Figure 3.

Fig. 3 – Scenario overview for the future of screens in 2030
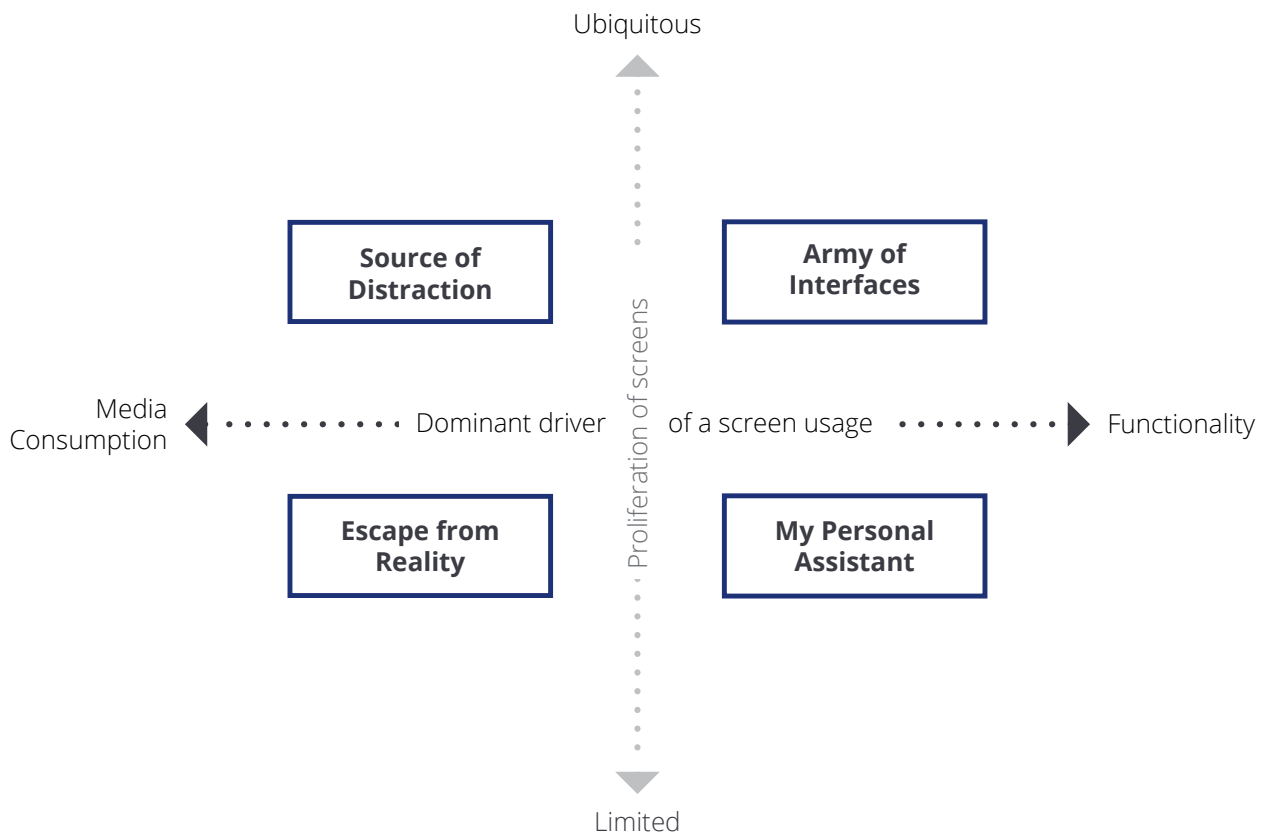
What our experts are certain about

As well as 'critical uncertainties', our driver matrix shows 'critical trends'. These are highly relevant to the future of screens, yet can be predicted by our experts. Four of these critical trends are particularly important for future developments and play a relevant role in all of the scenarios presented below.

Screen time goes up further

Screens already play an important role in our professional and private lives: Consumers currently spend hours every day in front of TV sets and computer screens. By 2030, additional screen concepts, such as XR, and more available time, e.g. while travelling in self-driving cars, will allow screen time to increase further.

Voice control is mainstream

Alongside touch, voice will become the the new standard user interface. Voice control systems enable consumers to interact with screens simply by speaking to them. In the coming years, suppliers will significantly improve such systems by means of artificial intelligence. As a result, the acceptance of voice control among consumers will increase greatly.

Powerful network infrastructure is omnipresent

Most of the things we do with screens depend critically on connectivity. The experts we interviewed tell us that high-speed data infrastructures will be widely available by 2030. Network performance will not be a bottleneck, it will keep up with the rapid development of screens. Besides fiber, ubiquitous 5G networks will form the basis for even data-intensive mobile use cases.

Consumer cloud services prevail

Cloud computing will continue to grow in significance, and this also applies to the private use of screens. Functionalities and content will be increasingly provided from the cloud and thus enable a much broader functional range of screens.
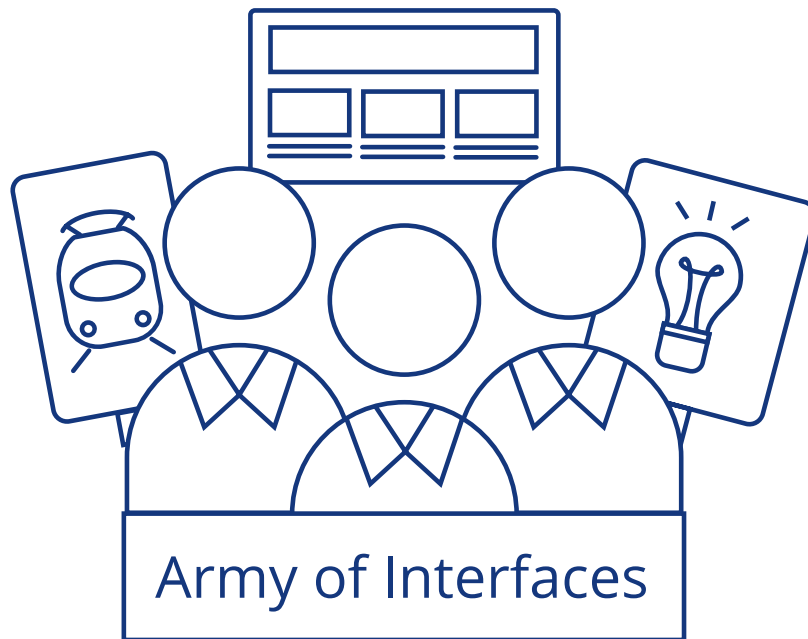
Army of Interfaces

Our four scenarios

Scenario 1: Army of Interfaces

In our first scenario, screens are omni-present and form the basis of a highly personalized IoT world. They are interfaces to a connected environment that provides functionalities in all areas of life, with media consumption only one use case among many. Since production costs for basic visualization units are low, a multitude of screens is present in all sizes, form factors, and resolutions, and with a varying number of sensors. In addition to privately owned screens, numerous smart digital displays are set up in public spaces for applications like navigation, transportation, local public services, and shopping.

Messages on screens are personalized centrally, based on the all-encompassing ecosystems and operating systems owned

by 2-3 digital platform providers (DPCs). These DPCs gather and process enormous quantities of user-specific data and offer their targeted services seamlessly across devices. They strongly benefit from the availability of powerful broadband infra-structure and the unregulated collection and processing of data.

In this world, screens have become degraded to pure visualization units with few sensors and touch functionalities. Their brainpower is centralized in the cloud and managed by DPCs. OEMs receive little benefit from the large number of screens, which are a commodity and bought solely as inexpensive hardware products, then programmed and adapted for the DPCs' purposes.

For developers of functionality apps, screens mean their services are avail-able everywhere and at all times, making them essential for IoT-based services and connected business models. Media compa-nies depend on cooperation models with DPCs to get their content distributed effi-ciently to screens. Consumers have shown a preference for using specific screens for different application scenarios. Technologies that require completely new user behaviors, such as XR, are seen as too intrusive and therefore not accepted.

Digital platform companies are the winners in this scenario. Thanks to screens, they generate, process, and monetize vast amounts of data and are enablers for an interconnected screen landscape.

Scenario 2:
My Personal Assistant

This is a world in which a single, person-alized, high-end device per user replaces nearly all screens both at home and outside, enabling a multitude of func-tionality-driven applications. Making use of new connectivity and sensor devel-opments, this personal device helps consumers at each step of their everyday lives. In their cars, on buses and trains, in shops, while exercising, at filling stations, and at work: Privately-owned smart devices help consumers navigate their days and replace all other screens they previously encountered.

The overall number of outdoor screens diminishes. Even in previously screen-filled cars, displays are now made redundant by consumers' personal devices. As function-ality use cases are placed at the forefront, media consumption may remain relevant, but has lower priority.

Since they gather all user data, hardware manufacturers can provide an ultra-personalized experience while meeting strict data regulations. Advertisers are well-advised to form collaborations with OEMs to bring personalized experiences and offerings to consumers. With an increasing need for connectivity – every-where and at high speed – it is up to telecommunication providers to ensure adequate coverage.

Hardware manufacturers with their proprietary operating systems are the key providers of go-to consumer devices and have become the keepers of consumer data and consumer contact. DPCs struggle, having failed to build an open ecosystem that is independent from consumers' key devices.

Augmented reality glasses are predestined to thrive in this world as they allow users to receive notifications or detailed infor-mation about their immediate environ-ment on the go. Other consumers heavily rely on their high-end smartphones, using them as central screen and universal remote control for IoT devices nearby.

My Personal Assistant

Escape from Reality

Scenario 3:
Escape from Reality

In this world, consumers retreat into their private spheres and seek distraction by consuming personalized premium content on very few high-end screens. Strict regulations and concerns about data management have massively shifted the use of screens towards media because functionality use cases cannot be performed efficiently. The number of screens is small in this scenario, but the hardware is of extremely high quality.

Previously, consumers had been overwhelmed with a multitude of screens, leading to their widespread rejection. Super-sophisticated personal devices have made most tablets and laptops obsolete and are also used for all social media and e-commerce needs. A new generation of virtual reality glasses is ideal for this role, but has not completely replaced mobile touch displays. Big television sets with the highest resolution and color depth complete the small range of household screens.

Hardware manufacturers are in a race for the best screen quality and resolution, pushing the technological development of displays to the limit. OEMs compete on differentiation: Users may only be willing to buy one device, but they are ready to spend a reasonable amount on it. Quality is the key to winning consumers' hearts.

As the perfect complement to their high-end hardware, consumers reach for first-class media services. They choose content consciously and let vendors provide them with personalized premium offers. Targeting is decentralized as user behavior can be tracked precisely on the few devices in use. Consequently, targeted recommendations result from cooperation between hardware manufacturers and media providers. Media companies are in a favorable position because paid content is king. On the other hand, DPCs have lost ground massively in this decentral data world, where use cases based on functionality data are no longer feasible either.

In this scenario, the highest potential is with OEMs and media companies. They both shine through differentiation and quality and succeed in monetizing the premium level of their products.

Scenario 4:
Source of Distraction

In our last scenario, screens are every-where and tend to annoy consumers because the messages displayed are not targeted and often irrelevant. Data privacy concerns have caused governments to restrict the collection and exchange of personalized data, making targeting and functionality use cases impossible. The main purpose of screens is media consumption.

Better economies of scale have signifi-cantly lowered screen prices. This is why, in addition to the many private screens, city centers are also full of displays, some of them huge: Even shop windows and entire house facades are used as screens. These display semi-targeted news articles, entertainment content, and advertising. Consumers are increasingly overwhelmed by this overdose of content in visual and acoustic form.

Due to data privacy restrictions, digital platform companies have lost much of their competitive edge. Instead of indi-vidualized, data-driven targeting, neutral messages address micro-segments based on context and location, so that at least rudimentary targeting is possible. Never-theless, media content has become an impersonal commodity that consumers are unwilling to pay for. Media companies must rely on advertising revenues.

With private and public spaces now covered in screens that show large amounts of only semi-targeted content, ad conversion rates are moderate. However, the advertising industry benefits consider-ably thanks to a great number of ads on a great number of screens. When it comes to hardware, it is quantity rather than the quality of individual high-end devices that is in demand. In this scenario, hardware manufacturers face a situation where screens are a commodity and therefore cheap. However, the high number of screens sold, plus revenues from large digital billboards, compensate for the very low prices.

This scenario is a tough environment for all stakeholder groups. It is most likely to offer the advertising industry and hard-ware manufacturers the greatest poten-tial, as both have successfully increased consumers' screen and advertising expo-sure.
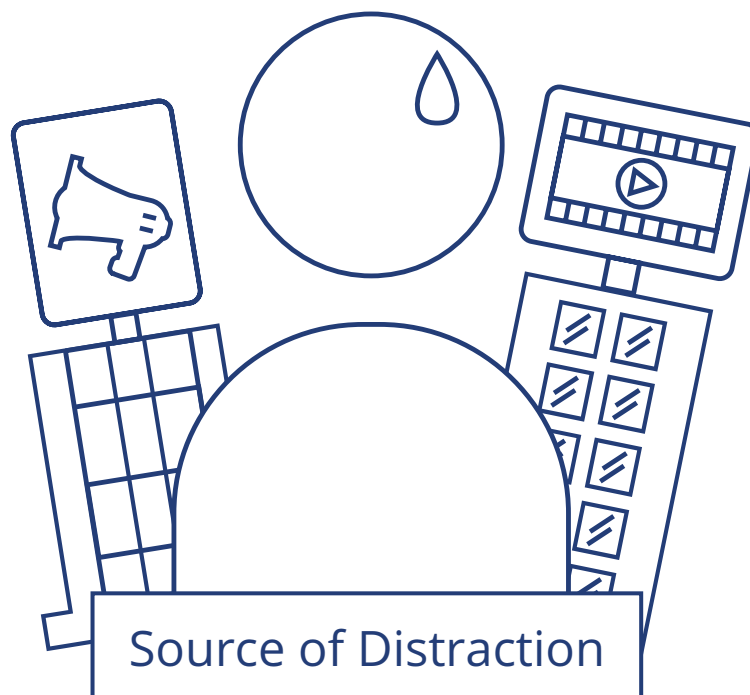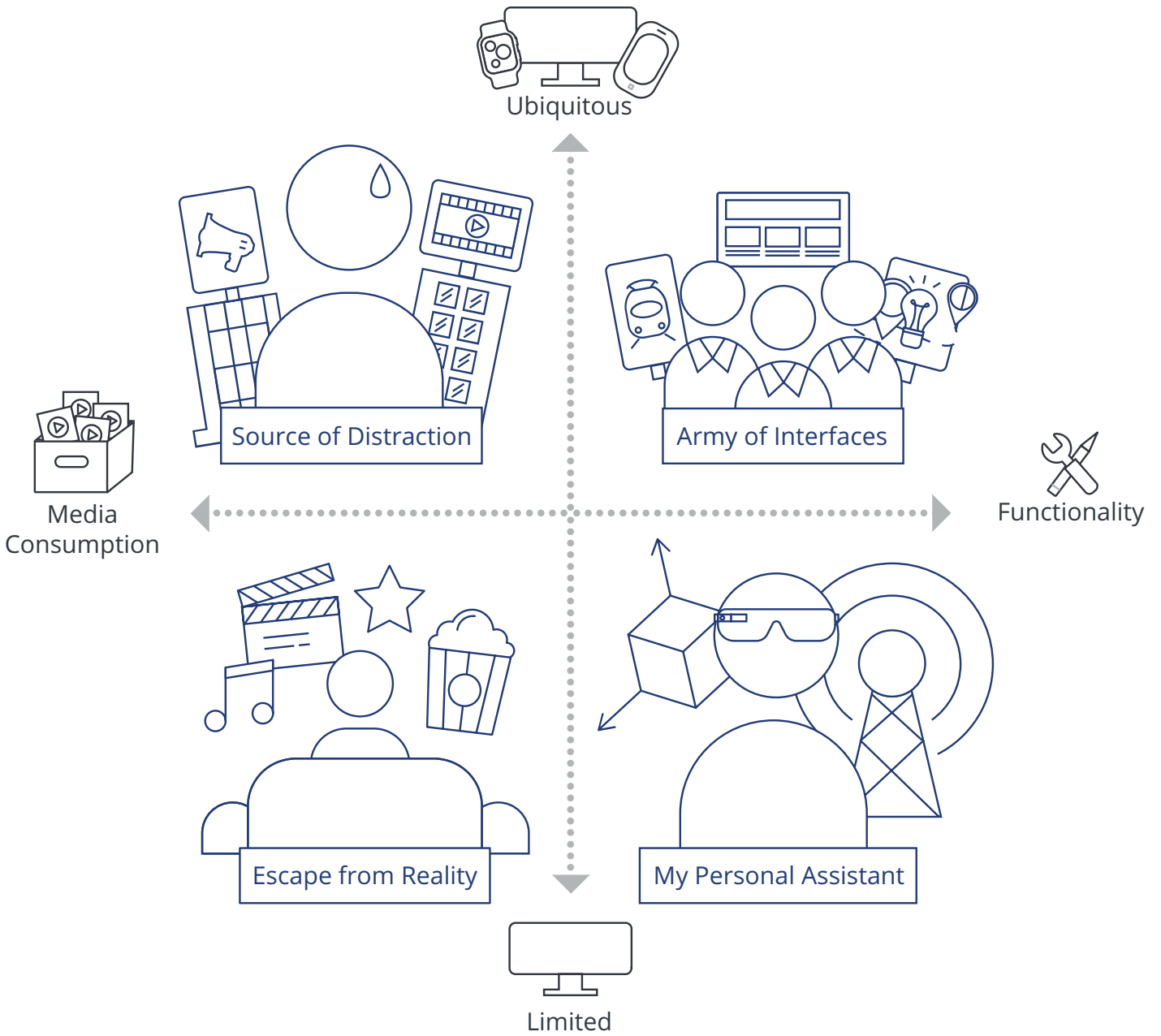

Source of Distraction

Fig. 4 – Scenario overview for the future of screens in 2030

Ubiquitous

Source of Distraction

Army of Interfaces

Media Consumption

Functionality

Escape from Reality

My Personal Assistant

Limited

Taking a closer look: Consequences and recommendations

The evolution of screens is currently in a decisive stage that will be crucial for further development. Our scenarios illustrate four extreme outcomes; however, reality could be completely different from what we imagine today. Stakeholders should therefore not be caught in old ways of thinking but broaden their horizon beyond current ecosystems. The scenarios outline greatly varying market situations and different shifts of power, but a closer look shows some overarching imperatives for the relevant stakeholder groups. These also reflect the four critical trends our experts are certain about, as outlined above. Overall, our scenario exercise reveals three strategic playing fields where developments should be observed closely in the near future: Consumer acceptance, data and regulation, and open ecosystems.

1. Consumer acceptance

Technology is not the only aspect that determines the success of innovative hardware and use cases: Consumer usage patterns matter, too. In particular, new types of XR via head-mounted displays and retinal projection require consumers to adapt. For example, augmented reality glasses were controversial in two respects: People did not want to wear AR glasses and they did not want to interact with people wearing AR glasses. VR also makes people feel isolated from their environment. Hardware suppliers must take customer requirements into account in the development process. New screen technologies must adapt to people's needs, and companies should not expect consumers to simply accept new tech for its own sake. Furthermore, technology must be a means to an end, which is either functionality or attractive new media content.

2. Data and regulation

The handling of data and attitudes towards it are probably the most relevant factors for the future of screens. Societal and public concerns must be taken seriously and answered appropriately to ensure consumer trust. For that, open and transparent communication is key. DPCs especially must accept that there are regulatory/ethical boundaries, even though they might conflict with technological applications. As a confidence-building measure, DPCs could delete user data automatically after a certain period of time, for example. The degree of personalization is determined by stakeholders' ability to make use of data-driven technology. In addition, stakeholders must follow and actively shape regulatory processes.

3. Orchestration of open ecosystems

From the consumer perspective, screens are the central user interface, potentially orchestrating both functional apps and entertainment use cases. In general, overlapping use cases offer a high value add. The range and quality of offerings is highly dependent on a variety of stakeholders using their individual competencies, e.g. media companies in the production of content, hardware suppliers for developing first-class devices. Functionality app developers benefit particularly from comprehensive interoperability, for example in the connected home. While media companies depend on a high diffusion of novel devices to make their investment in new media formats worthwhile, hardware suppliers depend on suitable content to make their devices attractive. To allow for the best possible user experience, stakeholders should work with flexible technology solutions (e.g., APIs, platform solutions) and be willing to build alliances with partners outside their current ecosystem.

Methodology

The methodology of this study is based on the proven scenario approach first employed by Shell and perfected by Monitor Deloitte. A seven-step scenario development approach applies the guiding scientific principles of objectivity, reliability, and validity. The study is the outcome of a series of interviews, questionnaires, and workshops involving TMT experts from the Deloitte Global network and industry professionals as well as experienced scenario practitioners from Deloitte's Center for the Long View (CLV).

Scenario design starts by identifying the focal question of the underlying issue. Since we could tell an infinite number of different stories about the future of screens, we first had to agree on the issue or strategic challenge we wanted to address. This enabled us to appropriately support decision-making for our clients. Scenarios are tools for shedding light on the strategic challenge, while the focal question sets the scope of the scenarios. In the present case, we focused on the question, "What will the future of screens look like in 2030?".

Scenarios are a way of understanding the dynamics that shape the future. Therefore, in a second step, we pinpointed the forces that drive the focal question. Driving forces are fundamental sources of future change. They shape the course of events and history and dramatically enhance our ability to imagine future scenarios. These drivers can be grouped into five categories known as STEEP, as they consist of Social, Technological, Economical, Environmental, and Political factors. Since most issues involve more than one of these categories, they are o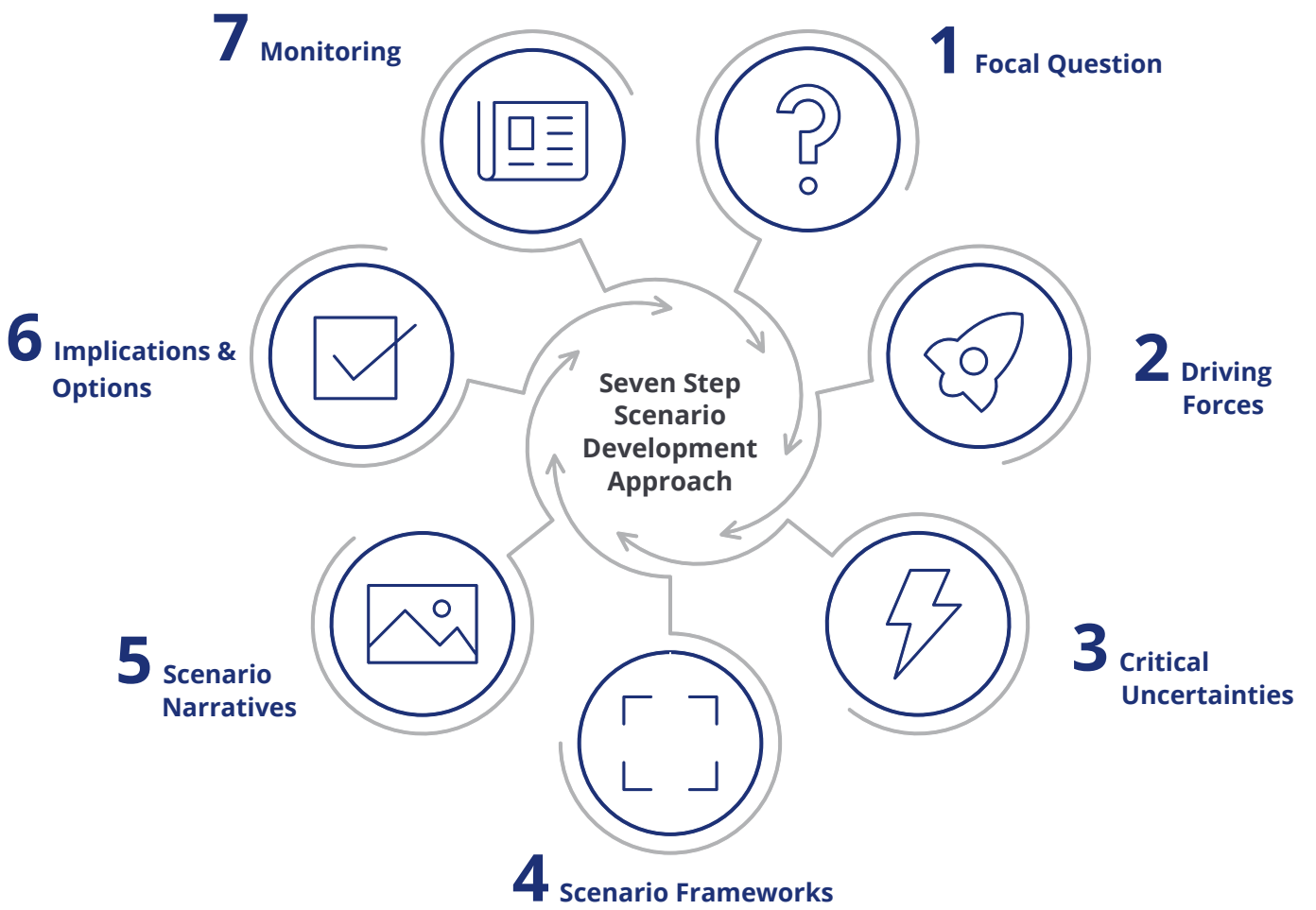nly handles. In order to derive our driver list, we also conducted expert workshops using Deep View, an Artificial Intelligence (AI)-based trend-sensing and analysis machine. Deep View helps to avoid the bias of the traditional approach, which often has a built-in tendency based on the character, mood, or preferences of the scenarists.

As a part of the workshop series, in a third step we identified the critical uncertainties for the focal question. Not all driving forces are uncertain, some may be pre-determined. These are the trends already in the pipeline, unlikely to vary significantly in any of the scenarios. Critical uncertainties are driving forces with the potential to tip the future in one direction or another. They have two fundamental characteristics: They have an unusually high impact and are uncommonly uncertain or volatile. Initially, all uncertainties appear unique, but by stepping back, we can reduce uncertainties to clusters that serve as the building blocks for creating our scenario sets.

The scenario framework was developed in the next step by focusing the entire list of related uncertainties into two orthogonal axes. We then defined a matrix consisting of crossing and independent axes that allowed us to define four very different quadrants of uncertainty. In the underlying study, we used the relevance of creativity and the relevance of mass marketing as critical uncertainties and developed four distinct, yet plausible future scenarios.

The CLV scenario approach includes two further steps that help enterprises make use of the defined scenarios: Developing strategic options and monitoring the scenarios. We use the scenarios to derive consequences for market stakeholders, in this case creative agencies and media companies, for example. Existing strategies are tested against each scenario and adjusted where necessary. Here, we apply proven Monitor Deloitte methodologies to identify, dissect, and analyze business strategies' strategies. At the same time, new strategic options are formulated that are suitable for all or for individual scenarios. As it is important to provide long-term scenario monitoring in order to ensure the validity of defined strategic options, we have developed CLV Gnosis. This is an AI-based modular tool that tracks movements toward individual scenarios in real time and indicates where the future is heading.

7 Monitoring

1 Focal Question

6 Implications & Options

Seven Step
Scenario
Development
Approach

2 Driving Forces

5 Scenario Narratives

3 Critical Uncertainties

4 Scenario Frameworks

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In cooperation with Center for the Long View.
More info and video:
www.deloitte.com/de/future-of-screens

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