

The Outernet. Say Hello to the Wild World Web!

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Under the name 'Outernet' a technological development is approaching that will profoundly change our relationships with each other and with the objects around us in the world. The internet is leaving the previously detached realm of cyberspace and placing itself over our environment like a second skin.

The possibilities we are familiar with from the internet – links, search function, personalization and interaction – are being transferred to physical objects. The connections between people and things are thus becoming denser, more specific and taking on a local component: depending on our interests and needs, different information becomes visible in the environment. A new dimension of perception is created in which virtuality and reality

are merged. HSDPA, WiBro and WiMAX are systematically erasing the dividing line between offline and online. So in the future we are always on and always connected!

Driving force 1: Localisation

Localisation is an essential element of the Outernet as it establishes the vital link between the digital data infrastructure and the real world. The ability to determine where and at what distance we are located in relation to one another is a prerequisite for many Outernet applications.

Localising by GPS

The Global Positioning System (GPS) makes it possible to localise people and objects geographically. Digital cameras and camera phones are increasingly equipped with GPS, automatically adding the relevant geo-coordinates to photos and videos.

Triangulation as an alternative to GPS

Besides GPS, triangulation of GSM towers or wireless LAN hotspots can also be used to localise mobile devices. Compared to GSM, localisation by wireless LAN allows far more accurate positioning in urban areas and particularly in closed buildings. Wireless LAN hotspots therefore play an important role in the spreading of the Outernet.

Highly accurate localization with Galileo

When the EU launches the Galileo satellite navigation system in 2010 there will be a significant improvement in localisation accuracy: in the freely available service people and objects can then be localised to an accuracy of about four metres, and for fee-paying customers to less than one metre. Galileo will therefore be a key driver for the Outernet.

CASE: The social travel guide for mobile phones

The fully customisable social travel guide “tripwolf” is available as an iPhone application that can also be used in offline mode. During installation a selection of city guides is stored directly on to the iPhone, and these can be synchronised at any time. In addition, the application displays suggestions in the surroundings once the mobile phone has been localised. “tripwolf” sources the content from its own online community and the travel literature published by MairDumont.

Driving force 2: Web of Things

The Web of things networks physical objects and turns them into information carriers. In this way, everyday objects work like a website: they are linked to the information resources of the internet and can be clicked on like hyperlinks via mobile phone.

Object hyperlinking by barcode and image recognition

Visual codes such as the QR Code, Semacode or Aztec Code serve as a method of linking objects to the Web. A further development of this technology is the recognition of objects by their shape: objects are photographed using a camera phone and matched with an image database, upon which a corresponding link is opened (e.g. kooaba.com).

However, it is above all RFID technology, NFC and sensor technology that will give the Web of Things a huge push.

RFID on the advance

RFID tags are tiny radio modules which permit the automatic remote identification of objects. They are already quite common in ski passes and electronic labels. RFID tags can also be used to link objects to information. It is conceivable, for example, that every physical object will have a website which can be called up directly via RFID-capable mobile phones.

Mobile payment via NFC

Near Field Communication (NFC) works in a similar way to RFID technology, with the difference that the exchange of data takes place over a distance of just a few centimetres. As this short distance is tantamount to physical contact, NFC is tipped to become the key technology in the field of mobile payment.

Sensors “feel” the physical world

To some extent, sensors act as the sense organs of objects. Brightness, noises, temperature or pressure – sensors make it possible to read out the surrounding situation sensitively on different levels. On the basis of this information, mobile devices can interpret the context in which a person is currently to be found.

CASE: Mobile article retrieval via image recognition

The kooaba company has developed a new application for mobile devices which makes it possible to link entire magazines and newspapers via mobile image recognition without having to alter the editorial content graphically. The reader can then not only participate in mobile marketing activities such as competitions, but also forward content to friends and archive it online in PDF format.

Driving force 3: Smart Information Processing

On the Outernet there will be an exponential increase in information. To master this information explosion a new generation of intelligent information processing is needed: the smart Web.

Semantic information processing on the smart web With the Smart Web, computers will become capable of understanding information semantically. For example, if the user enters a query into the semantic search engine Powerset.com, a real answer is given. The question “how tall is Queen Elizabeth II?”, for instance, will generate the answer namely “1.63 metres”. Semantic tools can also be used to augment conversations with additional information: Thoughttrail.com, for example, analyses chats and automatically imports

related content.

The web diversity will become the web of importance

When context information such as time, place and user profiles are taken into account, the relevance of search results increases. This is already beginning to happen: Google's mobile application 'Voice Search' automatically takes the location into consideration for search queries. If, for example, "movie showtimes" is spoken into the mobile phone, all the cinema schedules in the immediate surroundings are displayed.

Smart web + Social software = enduring communities

If the Smart Web is combined with social software (social networks, wikis, blogs, etc.) a more specific and more intensive connection between people is created. The community functions that we know from the Internet get out on to the street and into real life. As online communities on the Outernet are enhanced by the factors of time and place, they are transformed into enduring communities.

CASE: Location-based information from the community

The joint project of the location-based networks Brightkite and the augmented reality browser layer (via iPhone), which encourages users to take photos or post something. By simply pointing the camera at any place the user can receive all the information available from the social network in real time on the display. In this way, the service provides a real-time view of the location based network.

Driving force 4: Next-generation I/O devices

In order for the Outernet to be able to assert itself successfully, mobile devices which can be operated intuitively are needed. For this reason, all eyes are turned to the new generation of input and output devices.

The iPhone shows how it's done

The iPhone can be seen as one of the main reasons why people no longer scoff at the Mobile Web and its applications. Yet the multi-touch usability of the iPhone is only the beginning: numerous new materials, media and technologies are currently under development that will make mobile communications even more intuitive.

From OLEDs to wearable electronics

Motion sensors, flexible LED displays (OLEDs) and speech recognition systems have already found their way into mobile devices. In the future, they will be joined by technologies such as gesture control, face recognition and electronic ink (e-ink). Haptic displays, which make digital information tactile on the display surface, are also now practicable. As the technology is becoming not only more efficient, but also smaller, the concept of the wearable computer is drawing closer all the time: it is conceivable that smart glasses, retina implants or even control over brainwaves will also become reality one day.

The virtual extension of reality

Augmented reality (AR) does not describe a technology, but a way of perceiving the environment – virtually extended reality. Augmented reality can be understood as a layer model that enriches reality with virtual levels and thus merges the real and the digital realms of experience. An example of an AR system is the mobile travel guide “Wikitude”. It augments the user’s view of the surrounding world by overlaying additional digital information on the mobile phone’s camera image.

CASE: The smart mobile travel companion

Wikitude is a mobile phone application which uses augmented reality to overlay information about the surroundings on the real image of the mobile phone’s camera. With GPS and a digital compass, the position and viewing direction are recognized and relevant information (e.g. about places of interest) is retrieved from the Wikipedia database. With this innovative

mash up it will be possible for users to have an extensive, mobile travel guide at hand at all times.

Theory 1: The whole world will become a hyperlink

In the age of the Outernet the physical world functions like a website. Every object can be clicked on like a hyperlink in order to access information, services and communication offers.

The technological infrastructure for this is already in place today

The mobile devices currently available are sufficiently equipped, and the production costs for RFID tags, microchips and sensors have been reduced to an economically acceptable level. In view of the rapid technological progress being made, there are now very few people who still doubt the prediction made by Marc Weise, senior scientist at the Xerox research centre, in 1991: "In the 21st century the technology revolution will move into the everyday, the small and the invisible."

Objects will become selling spaces, places will become anchor points

The Outernet will radically change our relationships with one another and with objects around us in the world: when real objects – such as cars, billboards, or urban trains pulling into stations – become hyperlinks, then people, objects and information will enter into a new relationship with each other. Objects must therefore be seen and designed in the future as interfaces and – even more so – as potential selling spaces. Due to the possibility of interlinking, physical locations become anchor points around which local communities form and at which context-relevant information is exchanged.

CASE: On the Outernet the internet will explode into the real world

“People, systems and products link up directly with each other and interact. Via mobile devices which are constantly connected wirelessly to the internet, the Web will conquer the street and only then will it realise its true potential.” Nils Müller, founder and CEO of TrendONE

Theory 2: Computers will become invisible

Computers will be so small in the future that they will be practically invisible. This will make it possible to embed computers in everyday objects, in our clothes and even in our bodies.

The environment will become sensitive and reactive

Progress in microelectronics and nanotechnology is bringing the vision of the comprehensive informatisation of the world closer all the time. RFID tags, sensors and microchips can now be produced with such small dimensions and so cost-effectively that they can be integrated into everyday objects and items of clothing. Computers will therefore disappear from our field of vision and embed themselves seamlessly in the physical world. Our environment will become sensitive and reactive, adapting automatically to our needs.

Smart objects allow intuitive operation

Even when computers almost literally vanish into thin air, they will nevertheless be ubiquitous. They operate invisibly in the background and act as intelligent helpers in our everyday lives. Examples of smart objects are a car tyre that tells you when it is losing air, or medication that draws attention to the fact that it is past its use-by date. As smart objects possess intuitive user guidance, technically inexperienced users can also use them without difficulty – unlike the conventional Internet.

Computers and information will become intimate

As computers become embedded in our environment, the physical distance between user and desktop will be removed. Computers integrated in textiles, intelligent contact lenses and

retina implants will make the relationship between people and computers much more intimate: media content and data will get much closer to the recipient – they will ‘touch’ us in the true sense of the word.

CASE: BEOBLE.ME: Outernet social network

beoble.me combines different functions of the Mobile Web and Web 2.0 in one platform and aims to become the new social network of the Outernet. Users of beoble.me can determine at any time which friends and members of their network are nearby and which bars and restaurants in the surroundings are recommended. They can phone and mail each other and get to know new members without having to exchange mobile phone numbers or similar contact data.

Theory 3: Information and networks will become ubiquitous

Networks are the capital of the future because access to resources and not possession of them will be of crucial importance in the future. The Mobile Web and corresponding terminal devices allow us ubiquitous access to information, services and networks.

Different spheres of identity will merge

On the Outernet, access to digital information is no longer physically limited, while on the Internet a distinction is still made between online and offline and thus between real and virtual identity. By removing this boundary on the Outernet the different partial aspects of our social identity become merged. In the age of the Outernet it will therefore become necessary to create a uniform self-image that coherently integrates the different spheres of identity.

Communities will become more spontaneous

On the Outernet, communities will become more spontaneous, more dynamic and more specific. The joining together of the community members is not only based on their common interests, but also on their location. The flash mobs organised online and carried out offline are a good example of instant community building in the age of the Outernet.

Communities will become more enduring

As the thread to the virtual community is never broken on the Outernet, an 'ambient intimacy' emerges. This term describes the sense of feeling close to people despite the fact that they are at a different location. The practice of being in constant contact with friends via digital communication technologies can lead to the stabilisation of communities. On the Outernet, communities will therefore become more erratic on the one hand, but also more enduring on the other.

CASE: Electronic visual aid for the blind

Physicians in Tübingen have developed a kind of electronic retina for blind people: the retina chip. The wafer-thin chip, on which sit 1,540 photocells plus electronics, is implanted beneath the nerve cell layer of the patient's retina. As with a healthy eye, the light falls through the lens, shines through the nerve cells of the retina and then hits the chip's photocells. The retina chip facilitates visual acuity of six percent – sufficient to recognise people's faces.

Theory 4: Reality will be reintegrated and augmented

On the conventional Internet, data is uncoupled from the dimensions place and time. This is in contrast to the Outernet, where data assumes a direct contextual relevance. Instant messengers such as Skype, microblogging services such as Twitter and social communities such as Facebook have already successfully incorporated the time factor. The location and time context dramatically increases the relevance of data – and thus

becomes a killer application.

Real interaction is reintegrated

On the Outernet a comprehensive reintegration of real interaction processes into the digital environment takes place. When someone reports on an experience in real time via Twitter, a direct link is established between reality and virtuality and reality reintegration occurs.

Several versions of the real world

The reintegration of reality into the digital world is mirrored back into the real world on the Outernet. This is done by enriching and extending the real world by means of augmented reality. As augmented reality complements our perception by adding digital layers, our environment becomes customisable: depending on which filters we use, we perceive our environment differently.

CASE: The mobile augmented reality browser

The company SPRXmobile has developed the 'layar' application which makes the browser of mobile phones capable of displaying local data in augmented reality. When the surroundings are filmed using the mobile phone's camera a radar on the display indicates the distance to places of interest. If, for example, the user is searching for houses for sale, these are displayed showing a picture and the purchase price as soon as the mobile phone is pointed at the house in question.

Theory 5: Environmental perception will become more selective

The merging of online and offline appears to be increasing the complexity of our world beyond measure. In fact, the Outernet is much more about reducing complexity: as with an ad blocker, unimportant information can be suppressed and important information included

via augmented reality.

Selective environmental perception is a natural process

The possibility of consciously selecting information will make the world a place with more options and therefore greater clarity in the age of the Outernet. The phenomenon of selective environmental perception is a natural process and one we are all familiar with: depending on our interests and needs, we focus our attention on certain details in the environment. It is therefore not necessary to relearn how to use the different filters through which we perceive our environment on the Outernet. However, as augmented reality visually highlights information, the selectiveness of perception will become more explicit and more specific.

Communities of interest become communities of perception

What are the effects of selective environmental perception on social interaction? One consequence could be the formation of communities on the basis of the currently activated perception mode: Beatles fans, for example, who walk around Liverpool in “Beatles mode”, perceive the environment through the same filter. The common interest community of the Beatles fans thus becomes a common perception community at the real location. Social communities become more specific and shared experiences more exclusive on the Outernet.

CASE: The proactive browser for the mobile web

Aloqa is a provider of location-based services which supplies users proactively with location information. Thanks to Aloqa, companies and businesses wishing to draw attention to their location will no longer have to develop suitable software for each mobile telephone in the future. The user is spared the laborious task of typing search terms into the mobile phone as the location-related information on preconfigured topics (such as dining out or live music etc.) appears in the display by means of the push method.

Consequences: Marketing

The Outernet expands our possibilities for communication in all directions and makes interaction even more personal, more selective and more optional. Marketing has been aware of this paradigm shift since the emergence of Web 2.0. on the Outernet, the focus of marketing will therefore be on adapting even more individually and sensitively than before to the needs of the customers. Communication on the Outernet takes place primarily via the most personal medium to date – the mobile phone.

Contextual targeting as a starting point

The mobile phone enables brands to reach customers in a more targeted way (ubiquitous advertising). In the future, contextual targeting (location, time, profile, mood, status, etc.) will be the starting point for all marketing activities. This will make it possible to approach customers on the basis of their current situation and mood – leading to mood marketing in its purest form.

Brands as point of orientation

How can contextual targeting be employed without the customers feeling pestered?

Orientation is the keyword here: if brands already provide orientation in the real world, they should be able to do the same in a mixed world of reality and virtuality. The right tip at the right time in the right place – this is how concrete added value with contextual relevance is created. Special offers limited in terms of time and place (e.g. mobile coupons) can be an effective way of establishing contact with customers.

Advertising as a service

Advertising will become a service and the brand a good friend. The application “Passport to Greatness” from Guinness or the “soundwalk” from Louis Vuitton show what it can actually look like. In addition, mobile augmented reality applications such as Layar or Wikitude.me provide an indication of how a mixed reality can be created on the Outernet

which is filled with content not only by the users, but also by commercial providers.

Marketing becomes transparency marketing

On the Outernet, transparency increases dramatically. Resourceful technologies like the iPhone application “Amazon mobile” already challenge marketing to provide more transparency: with “Amazon mobile” users can photograph products in stores and are immediately notified of the cheapest supplier of the product in question. The product can then be purchased with one click. Marketing is also increasingly challenged when it comes to relevance as context factors such as geographical location and user profile must be taken into consideration on the Outernet. Marketing will therefore develop more and more in the direction of transparency marketing and position itself as an efficient complexity reducer.

Consequences: Life

The Outernet will change our lives even more dramatically than the Internet. This will not take place from one day to the next, but in a constant, evolutionary process. However, the opportunities arising from the Outernet are already emerging today.

The Outernet promotes individuality

The Outernet promotes individuality by providing us with individually tailored information. This enables us to act more efficiently and make more informed decisions. A virtual personal assistant supports us in our everyday lives by taking our preferences (context layer) and our frame of mind (mood layer) into consideration.

The Outernet promotes the independence of older people

The Outernet will even be manageable for young children and the elderly. This is particularly relevant in view of the ageing structure of society: concepts such as ambient-assisted living or home monitoring make it possible for even the very elderly to lead an anxiety-free and

self-determined life outside over-burdened nursing homes.

The Outernet strengthens subcultures

The Outernet makes it possible to rediscover the world every day. One of the consequences of this is that sub-cultures become more differentiated. Entry into niches can be more erratic and is usually only temporary: gothic today, eco tomorrow – depending on time, location and mood.

Who will become the trusted partner?

In spite of all the convenience it offers, the Outernet also raises questions regarding data security: who will be the trusted partner to whom I entrust my data, and who helps me to keep track of my activities? Will there be an MOT-like authority that administers the personal data, or will private providers perform this task? The job will probably go to whoever comes up with the most coherent personal identity management concept. After all, situation-dependent partial identities (occupation, shopping, party, etc.) have to be administered somehow.

Consequences: Business

The Outernet offers a wide variety of cross-industry business opportunities. It is therefore never too soon to start thinking about new products, services and business models.

The point of sale is shifting to the mobile phone

The combination of Mobile Web and Web of Things will result in all objects becoming communication channels and selling spaces. If we like the shoes of the person sitting next to us, we focus on them with our mobile phone and can immediately see the model, price and a possibility to order in the display. The point of sale is therefore shifting to the mobile phone, transforming the world into one big shopping mall. As a consequence, the stationary trade will have to compete with millions of products which are shopping windows and

check-out at the same time. Physical shops will therefore have to develop into places offering an experience – from point of sale to point of experience.

New services are emerging

The comprehensive networking on the Outernet gives rise to new services. The analysis of movement patterns allows, for example, car insurance premiums to be calculated much more accurately. Location-based services such as the localisation of businesses or location-based mobility and entertainment offers increase time efficiency and create transparency. Dating and gaming will also be boosted: profile-matching services based on the direct surroundings invite users to participate in spontaneous speed dating; multi-player games in augmented reality mode move computer games into the physical environment.

Products become hybrid products

On the Outernet physical products become hybrid products by including further (in some cases also premium) services in addition to the original product benefits. Examples are football trading cards that provide access to an online exchange, or medication that not only relieves the symptoms of a disease, but also provides information about its geographical proliferation.

The segment of one becomes reality

In the age of the Outernet, products and services can be customised on the basis of user profiles. In addition, offers can be tied to a place and time, creating an artificial shortage and suggesting a certain uniqueness. This represents a possible strategy to counteract price wars arising from the high degree of transparency on the Outernet.

Recommended course of action:

You have to get better in believing the impossible! One thing is clear: everything is going to change – and fast! The Outernet characterises a technological development which has already begun, is gaining pace and will have a fundamental effect on our lives. But how

should companies respond to this process?

The sentence “You have to get better at believing in the impossible!” was uttered by Kevin Kelly of Wired magazine and describes precisely the way we must approach the Outernet. The recommended courses of action listed here should be seen as stimuli for our thoughts to open a door into the future.

1. Communication

As a result of the Outernet, the first thing to change will be how to approach customers and target groups in the future. Information will be placed in a context and the channels and measures to reach the target group will explode. One-to-one communication will become possible and target groups previously considered unreachable will move within grasp. The drastic rise in communication channels will make the creation of a campaign architecture increasingly complex. The gathering and sharing of campaign experiences within the company will become more and more important for the meaningful allocation of the marketing budget.

To make the variety controllable requires that...

- a commitment to test and learn is made
- communication is geared consistently to the ROI
- a campaign-tracking system is installed to monitor the success of the channels and measures
- the continuous adjustment of the channels and measures takes place based on conversions.

2. Brand

The digital fingerprint of a brand can be experienced on the Internet today. Campaign websites, Web TV and social media are now used to offer the customers a digital brand

experience.

However, the digital brand experience usually ends at the edge of the computer screen – in isolated cases it manages the leap to mobile devices or game consoles. Yet it is precisely the digital devices which are experiencing such rapid development. Microsoft Surface, for example, offers a multi-touch and multi-user experience that allows a completely new kind of brand showcasing at the POS. Furthermore, the first video-in-print solutions are making the leap from prototypes to mass market readiness. Video-in-print is the integration of moving images into print products. Displays, loudspeakers and batteries are made so thin that they can be integrated into magazines. This gives companies the opportunity to engage in interaction with consumers at existing and at new touch points and to expand the dialogue.

Brand companies must therefore...

- develop a device strategy to identify relevant devices for the company and to integrate them into the brand presence
- define a digital brand experience to guarantee a uniform multimedia presence on all channels
- establish the screening of new digital stimuli to ensure that the digital brand experience is maintained continuously.

3. Services

The driving force 'next-generation I/O devices' alone as well as the topic augmented reality (AR) of the Outernet make it obvious which service extensions will become possible as a result of enriching the real world with virtual information. The virtual postbox, for example, represents an enormous service gain for the customer, who can have a virtual postbox corresponding to parcel dimensions projected on to the desk via PC and web cam. The customer then places the real object in the projected postbox to check whether it is the correct size. If we add the other driving forces of the Outernet we get an idea of how big the service influence of the Outernet is.

Companies must therefore ...

- establish service quality management to augment existing services with the potential of the Outernet
- establish innovation management to identify additional services for the customers
- involve employees and customers actively in the process of service optimisation and extension.

4. Source of business

The music industry is the prime example of how the internet can threaten existing business models and how, from that, new business models are developed,(e.g. itunes.) The Outernet will have an even greater impact on existing and potential business models because it will affect a much larger area of our lives.

Wikitude is one of the first Outernet business models to be based on two driving forces: localisation and next-generation i/o devices. By combining these two driving forces it is possible to transform android phones or the iPhone into a mobile travel guide. The Wikitude browser superimposes itself like a layer on the camera lens, and the real world is augmented with travel information from Wikipedia and Qype reviews.

The power behind the Outernet and the possibilities it offers for this business model are demonstrated by Amazon with its mobile application 'Amazon Remembers'. This application allows users to upload photographs of objects to the Amazon store (e.g. chairs, shoes or TVs) and receive product recommendations for mobile purchase in return. By doing this, Amazon moves the Pos from the internet into the real world, allowing it to compete with conventional retailers.

The Outernet can therefore be good and evil at the same. It has the power to bring about new business models and to jeopardise existing business models. One of the biggest challenges for companies will be to assess the potential or the dangers of trends in good

time.

Companies must therefore ...

- look further to the competition
- regard the critical analysis of their own business model as a matter of course
- reinvent and redevelop themselves every year.

In the end, what remains is the simple, old formula: relevance. Only those companies which have relevance for the customer in an increasingly complex world will be able to enter into a dialogue with a view to establishing and developing a relationship. And only those which understand their customers and act accordingly will achieve relevance. In the future, the business of the companies will be determined by 'management by consumer insights'.

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