University of Zurich[UZH]

IKMZ – Department of Communication and Media Research

Working Paper – Media Change & Innovation Division

Digital Trinity – Controllable Evolution – Everyday Religion

Characteristics of the Socio-Technical Transformation of Digitalization

MEDIA CHANGE and innovation a division of ikmz

Michael Latzer

FNSNF Swiss National Science Foundation

A revised version is forthcoming in:
Dolata, U., & Schrape, JF. (Eds.) (2022). Internet, Big Data und digitale Plattformen: Politische Ökonomie – Kommunikation – Regulierung. *KZfSS Kölner Zeitschrift für Soziologie und Sozialpsychologie - Sonderheft 62*.

January 2021

Abstract

How can the ubiquitous digitalization in the early 21st century be grasped and characterized? A media-change perspective that focuses on innovation-driven, complex co-evolutionary processes points to the following characteristics: digitalization is an intertwined co-evolutionary bundle of socio-technological transformation processes that reveals itself as a trinity of datafication, algorithmization, and platformization. It is embedded in the nano-bio-info-cogno-convergence (NBIC), accordingly linked to a transhumanism standing for the belief in a controllable human evolution, and characterized by the convergence of technology and religion in the form of an implicit everyday religion of the digital. These hallmarks of digitalization are reflected in an altered social order, which is driven by the interplay of governance by and of digital technology.

Key words: digitalization, co-evolution, internet, nano-bio-info-cogno-convergence (NBIC), datafication, algorithmization, platformization, implicit everyday religion, transhumanism, governance, social order, artificial intelligence

PLEASE CITE AS

Latzer, M. (2021). Digital Trinity – Controllable Evolution – Everyday Religion. Characteristics of the Socio-Technical Transformation of Digitalization. Working Paper – Media Change & Innovation Division. University of Zurich, Zurich. http://www.mediachange.ch/media/pdf/publications/trinity.pdf

CONTACT

Prof. Dr. Michael Latzer, m.latzer@ikmz.uzh.ch

University of Zurich
IKMZ – Department of Communication and Media Research
Media Change & Innovation Division
Andreasstrasse 15
8050 Zurich

http://www.mediachange.ch

@IKMZmediachange

This research project received funding from the Swiss National Science Foundation (SNF, Grant Nr. 176443).

1 Introduction

Discussions about digitalization are omnipresent. They are driven by science, politics, industry, and civil society. They cover all areas of life, focus on various technological innovations in the internet environment, promise solutions to problems, address risks, and are accordingly ramified and controversial.

This article takes a look behind the technologically sober facade of the concept of digitalization from a media-change perspective that understands change as an innovation-driven, co-evolutionary process under complex conditions (Latzer 2013a): Such a perspective focuses on the evolution of hybrid socio-technical constellations, understands innovations as co-evolutionary processes (Frenken, 2006), and sees the commonalities between biological and technological evolution in complexity theories with a selection paradigm (Ziman, 2000). Technology is interpreted as an institution (Reidenberg, 1998) and consequently as a governance mechanism; as an intermediary; and as an actor in the context of a distributed agency between humans and technology (Rammert, 2008).

Since digitalization is not a new phenomenon, it will first be placed in the context of the 20th-century digitalization debate in order to highlight continuities and changes (ch. 2). This is followed by a presentation of its main characteristics (ch. 3), summarized as the co-evolutionary digital trinity of datafication, algorithmization and platformization (3.1), NBIC convergence as a starting point of controllable human evolution (3.2), and the convergence of technology and religion towards an implicit everyday religion (3.3). These features are also reflected in the specifics of a digital order of society (ch. 4), and are summarized in a final chapter (5).

2 First phase of digitalization

Digitalization and its public discussion can be divided chronologically in two phases, the first in the second half of the 20th century and the second in the early 21st century. This article focuses on the second phase, but starts by pointing out some formative similarities and differences. What has changed are the central socio-technical innovations, the character of change and thus also the expected consequences. From a technological perspective, the first phase is characterized by the spread of digital computer technology, by the eponymous transition from analogue to digital technology in telecommunications (telephony, data

communication) and broadcasting, and by the beginnings of mass internet penetration following the market launch of the World Wide Web (WWW) in the early 1990s.

In science, politics and industry, these developments are conceptually understood as media convergence (Latzer 1997, 2009a, 2013b). This can be depicted as a self-reinforcing, co-evolutionary spiral movement of technological, economic, political and social innovations that culminates in a convergent societal communications system called mediamatics (Latzer, 1997, 2014). Digitalization is the central innovation at the technological level. It leads to a uniform digital code for traditionally separate subsectors of communications, it unbundles technology and the content transported, thus creating a highly flexible digital construction kit for the development of new applications – while simultaneously bringing about massive cost reductions compared to the analogue era. Altogether, this fundamentally changes the economic conditions. These are accompanied by corporate convergence in traditionally separate subsectors, with firms now offering bundles of services across subsectors (broadcasting, telephony and internet). The co-evolutionary innovation cycle is also spilling over to the political level. Policies take account of the changed economic conditions in digitized and convergent markets by pushing and coordinating liberalization of telecommunications and broadcasting worldwide (e.g. harmonized opening of telecommunication markets to competition in the EU at the end of the 1990s). With this politically promoted competition in communications markets and the resulting intensified technological innovations in devices and services, the self-reinforcing co-evolutionary innovation cycle is closing and has been spiralling into more and more areas, driven by the internet as a complex, adaptive system, as an innovation machine (Latzer 2013a).

In summary, the 20th-century digitalization debate primarily relates to the change from analogue to digital technology in telephony and broadcasting. It remains largely limited to communications policy and, on the provider side, primarily concerns the (traditional) players in the ICT sector, i.e. in telecommunications, electronic media and the computer sector. The politico-economic effects discussed in the context of digitalization concentrate on the liberalization and (partial) privatization of formerly nationally closed, monopolistic communications markets. Risks on the users' side are mainly rationalization effects and privacy restrictions (Latzer, 2014).

3 Second phase of digitalization

The beginnings of mass internet distribution at the end of the 20th century herald the second phase of digitalization. With the digital internet, a prime example of convergence in the communications sector established itself, challenging decades-old demarcations and categorizations in academia and politics, such as those regarding telecommunications/(mass) media, public/private communication, sender/receiver or producer/consumer.

The short but intense internet hype cooled only briefly around the turn of the millennium with the bursting of the internet bubble on the tech stock exchanges. It quickly resumed on the basis of the second generation of WWW-based services, described as Web 2.0 (O'Reilly, 2007) and marked by increased possibilities for interaction. Characteristic of this is the increasingly mobile, app-based internet use made possible by internet platform companies founded around the turn of the millennium (including Amazon 1994, Google 1995, Facebook 2004, YouTube 2005, Spotify 2006). These new types of companies shape the digitalization of the 21st century, displace incumbents with disruptive innovations and trigger intense pressure for reform across sectors in the direction of digital processes and products (e.g. Apple in the music market) (Christensen 1997; Latzer 2009b). From a functional perspective, platform companies, whose business models skilfully exploit multi-sided markets (Rochet and Tirole 2003), are often media companies (e.g. social media providers such as Facebook and Twitter), but classify themselves as IT companies in order to avoid sector-specific regulatory constraints (Napoli and Caplan 2017).

For their applications based on algorithmic selection (Latzer et al., 2016), companies such as Google and Amazon are also driving another wave of artificial intelligence (AI), which they use primarily for image and speech recognition. AI had already formed in the mid-20th century, but soon lapsed into an "AI winter" due to the lack of success of expert systems in practice (Floridi, 2020) and therefore did not play a leading role in the first phase of digitalization. In the second phase, however, it is celebrating a spring awakening in a prominent position, especially with advances in machine learning, although it is still a "weak/narrow AI" that simulates human intelligence to solve delimited, well-defined application problems in a rule-based way (OSTP, 2016).

3.1 Digital trinity: datafication – algorithmization – platformization

The second phase of digitalization differs from the first. However, a co-evolutionary spiral movement based on two convergences is also characteristic of the early 21st-century digital transformation.

From a media-change perspective, the digitalization proclaimed by all sides in science, politics and business in the early 21st century reveals itself in threefold form as (a) datafication, (b) algorithmization and (c) platformization. In their co-evolutionary interaction, these three socio-technical transformation processes result in a powerful unity. The interplay intensifies in a spiral and can be briefly characterized as follows: datafication creates big data – a new asset class – and thus reproduces areas of life. Algorithmization automates selection processes and assigns relevance to this data in order to extract economic, social and political capital from it. Platformization restructures markets and business models, also increasingly commercializing the social sphere and thus creating optimized organizational forms for further-reaching social datafication and algorithmization.

The cycle of the threefold digital transformation is *spiralling* deeper and deeper through modern societies, following a genuine logic and displaying several peculiarities.

(a) The online offer and with it the promise of digitally enhanced well-being is increasing, together with the online use and the data traces accruing along the way. Personal data is generated by the voluntary – if not always conscious – individual data disclosure in the course of the non-monetary exchange for online services (e.g. search terms and results), as well as in the background through metadata of use (e.g. location, type, duration). A significant expansion of *datafication* results from the internet of things (IoT) driven by the use of sensors. All objects can now also be identified and addressed, which in turn make independent observations to which all the other people and things in the network can react. This makes complex decentralized systems such as self-driving cars possible, which rely on comprehensive indoor and outdoor surveillance.

In sum, datafication produces (big) data and thus delivers seamlessly documented, individual online everyday life in real time (Weyer, 2019), it reproduces areas of life in terms of data, even entire cities and living environments by means of the IoT. Datafication is a specific form of doubling the world on the basis of digital data, which differs from previous media

doublings in its particularities and possibilities, for example from those afforded by the introduction of writing (Nassehi, 2019). What remains the same is that the patterns found by digital data – as was already the case with written or audio-visual doublings in newspapers, books and radio – are not one-to-one representations of the world (Nassehi, 2019). The intentional and unintentional omissions in the datafication, which not only document power constellations, but also subsequently lead to systematic distortions in the constructions of reality based on them, are of particular importance in this doubling.

Companies, politicians, states and private individuals seek to extract economic, political and social capital from the raw material generated by datafication. Ownership of and access to big data are contested in national and international power politics – and there is no recognized model for enforcing the ownership claims of the original data sources (especially private individuals). The dominant strategy for monetizing digital data collections is to influence the behaviour of individuals. Datafication in the form of close-knit digital data surveillance (van Dijck, 2014) creates the preconditions for this, which in turn diminishes privacy. This data surveillance as a source of big data differs from traditional surveillance in that it happens continuously, without any special reason and with real-time processing possibilities.

(b) *Algorithmization*, more or less automated problem-solving or data-processing procedures, is employed to make economic, political and social use of (big) data resources. This also results in new social inequalities, in power asymmetries due to unequal ownership of or access to big data and to elaborate algorithmic procedures that are increasingly based on AI. Moreover, it should be noted that trust in algorithmization presupposes a specific basic ontological understanding of a world that can be calculated and measured throughout. The shortcomings of big data used in analytics and internet services (Manovich 2011; Boyd and Crawford 2012), their biases, quality deficiencies (garbage-in-garbage-out) and non-representativeness (e.g. Twitter data) are also often ignored. The epistemological approach regarding how insights are obtained using big data has also changed. In extreme cases, it is assumed that theory-free correlations are sufficient for the algorithmic exploitation of big data (Wiegerling et al., 2018). However, the end of theories proclaimed in the first big-data euphoria (Anderson, 2008) is not convincing, since correlations only make sense in the context of theories and cannot be interpreted causally without it (Baecker, 2020). But in the practice of big-data processing and in the interpretation of algorithmic predictions and recommendations, a theoretical grounding is often missing.

On the one hand, the ideologies (Mager, 2012) behind datafication and algorithmization consolidate commercial, capitalist tendencies and extend the commodity character to the social. On the other hand, they tend to weaken the canon of values of the Enlightenment, which brought with it a secularization characterized by strengthened critical rationality – trust in people's reason and a turn away from the unquestioned belief in God as the guiding authority for action. Digitalization is increasingly acquiring religious characteristics (van Dijck, 2014), tending towards unquestioned faith in the power of action-guiding machines and big data as well as universal computing operations (Kelly, 2010), and thereby relying on a mythological level of big data (Boyd and Crawford 2012), on dataism (van Dijck, 2014), and data religion (Harari, 2016).

Critics of this development, such as the economist Shoshana Zuboff (2015), speak of a Faustian pact in surveillance capitalism, i.e. a devil's bargain that we enter into daily with Google and Co. by yearning for digital convenience and buying it with our digital data soul. The political economist Vincent Mosco (2017) also recognizes a myth, a new technology religion in the current digitalization and denounces the threat to a democratic, decentralized internet through a loss of privacy and heightened market power.

Algorithmization also means algorithmic constructions of reality and changed social orders that differ from mass-media constructions of realities (Just and Latzer 2017).

(c) The third manifestation of the digital in the early 21st century is a *platformization* of markets that is spreading across sectors. It creates the optimal conditions for growing datafication and algorithmization and drives them forward according to the economic success logic of multi-sided markets. As a special feature, the platformization by social media companies such as Facebook also permits the monetization and restructuring of social interactions within the framework of a "like economy" (Gerlitz and Helmond 2013). Behind this is another feature of internet platforms – their comprehensive curation and commodification of content and social relations (Dolata, 2019; Gillespie, 2018), which extends to the democratically problematic take-over of sensitive, formerly purely sovereign tasks, such as the censorship of content. Overall, platformization can be clearly traced in very many sectors and areas of life. Due to its significant social penetration, both an emerging platform society (van Dijck et al., 2018) and a platform capitalism have been proclaimed

(Srnicek, 2017). Although organizational forms of platforms between providers and customers vary, they share the economic logic of multi-sided markets (Rochet and Tirole 2003), the exploitation of indirect network effects between customer groups for pricing strategies and the development of business models optimized for this purpose. Platform companies, for example, squeeze themselves into (external) value chains between traditional providers and customer groups as "market makers" (e.g. search engines, travel or accommodation agents) and thus skim off data and profits. In addition to the two-sided markets for recipients and the advertising industry that already traditionally exist in the media sector, data traders are establishing themselves as another lucrative customer group of a multi-sided market, fuelling the transformation process of the digital trinity.

Internet platform companies have achieved astonishing market power through immense growth in recent decades. Seven of ten of the world's largest companies by market capitalization (s: statista.com), five from the US and two from China, have created gigantic market value in 2020 based on combined datafication, algorithmization and platformization. All of this is often interpreted as evidence of the displacement of oil by big data as the central resource of the global economy (OECD, 2014). But the comparison is only valid to a limited extent, because, unlike oil, data is not consumed. It is, however, an indication of where concentration is structurally conspicuously high, where the most profit can be made – and with strikingly few employees in relation to turnover (Dolata, 2020). This leads, among other things, to controversial debates about the net employment effects of digitalization and to proposals for a changed competition policy for digital platform markets, adapted to the new market realities and taking account of non-price competition and non-monetary exchange (Just, 2018).

3.2 Controllable evolution: Nano-info-bio-cogno-convergence and transhumanism

The convergence trend behind the digitalization debate and the co-evolutionary spiral movements of digitalization are now affecting wider circles than in the last century. They continue far beyond the boundaries of the communications sector. Since the turn of the millennium, high expectations and extensive political-scientific support have been accorded to "converging technologies". The hopes lie specifically in the nano-bio-info-cogno convergence, the synergetic combination of nanotechnology, biotechnology and biomedicine (incl. genetic engineering), information and communication technology as well as new technologies based on cognitive science (incl. cognitive neuroscience).

Digital technology, and prominently within it the internet and AI, is assuming the control and steering role in this convergence with regard to what is being conceived by cognitive science, built by nanotechnology and implemented by biotechnology (Dupuy, 2010). The US National Science Foundation (NSF) and in particular the National Nanotechnology Initiative (NNI) have been driving forces behind the NBIC convergence and the synergies to be drawn from it. The main application example for a workshop on harnessing the synergies of NBIC technological integration held by the NSF and the US Department of Commerce in 2001 was enhancing human performance through converging technologies (Roco and Bainbridge 2002). The promotion of NBIC convergence is intended to trigger a wave of innovation to increase welfare and quality of life. Among other things, it is intended to achieve performance improvements in learning and working, increases in sensory and cognitive abilities, improvements in human (brain)-machine interfaces, (permanent) monitoring possibilities of health conditions, and the enhancement of abilities through (nanotechnological) implants (Roco and Bainbridge 2002).

Behind the science policy emphasis on converging technologies and the application area of enhanced human performance is the conviction that the evolutionary development of humankind is not at its end point. This assessment is coupled with the belief in humanly controllable evolution, in the potential of scientifically and technologically designed evolutionary steps of humanity that can improve physical and mental abilities in the direction of transhumanism and thus increase health, well-being and welfare. Such ideas and initiatives can be found in the visions and strategies of transhumanists and internet entrepreneurs, such as the start-up Neuralink, founded by Elon Musk in 2016, which aims at enabling performance improvements by means of implantable brain-machine interfaces, or the biotech start-up Calico, co-founded by Google in 2013, which pursues the goal of life extension.

Transhumanism often plays a provocative role in the debate about the controlled scientific-technological evolution of humanity. It is only vaguely defined, is understood as a technological-philosophical movement, as a goal or as a belief in a designed further development of humanity, and attracts attention primarily because of its extreme utopias and dystopias (Bostrom, 2005; Fuller, 2017, 2019). The broad and sometimes contradictory movement of transhumanism also includes key proponents of the politically promoted NBIC convergence, including Mihail C. Roco and Williams S. Bainbridge of the American NSF

(Hurlbut, 2016). The basic idea of transhumanism is part of the millennia-old history of the quest for new human capabilities, a co-evolution of technological and human development that aims to overcome the limits of the human body and mind – especially in terms of ageing/mortality and intellectual, physical and psychological performance (Bostrom, 2005; Hurlbut, 2016; Tirosh-Samuelson, 2010). The collective term transhumanism was coined in the mid-20th century by biologist and neo-Darwinian evolutionary theorist Julian Huxley (1957) to describe the belief in a controlled evolutionary development of human capabilities. It gained greater popularity in the 1990s, driven by digitalization in a broad sense – through cybernetics, computer technology and science fiction (Fuller, 2017). The roots of transhumanism can be seen in figures as diverse as the Jesuit monk Teilhard de Jardin ("Noosphere") and the philosopher Friedrich Nietzsche ("Übermensch"/superhuman) (Bostrom, 2005; Fuller, 2019).

Extremely controversial positions made transhumanism prominent at the turn of the millennium and also contributed to the newly sparked digitalization debate in the context of NBIC convergence. Hans Moravec (1988, 1999), a computer scientist distinguished in robotics, took the separation of mind and body, initiated by René Descartes in the 17th century and important for the Enlightenment, to an extreme by predicting the possibility of transferring the human mind and consciousness to a hard disk (mind uploading) – and thus a form of eternal life through the preservation of the mind in a machine body. Eric Drexler (1986, 1992) created the futuristic basis for the controversial debate about the potential of molecular nanotechnology to recreate the human being. The award-winning innovator and Google strategist Ray Kurzweil (1999, 2005) has predicted not only the fusion of man and machine, but also the achievement of a technological singularity as early as 2045, a machine intelligence surpassing human intelligence – with the help of nanobots, among other things – which would ultimately take over the rule of humanity and thus mean its end. In this way, he took up the idea of a technologically created "superhuman intelligence" that would end the era of humans within three decades, as already published in 1993 by the scientist and science-fiction author Vernor Vinge (1993). Overall, science and science fiction are closely intertwined in terms of the potential for technology-driven change in humanity in transhumanism. Books and films such as *Blade Runner* (1982), *The Matrix* (1999), *Black Mirror* (2011), *Transcendence* (2014) and *Ex Machina* (2014) have popularized key transhumanist themes.

Transhumanism, which is to be understood as an extension of humanism, has been organized in the World Transhumanist Association since 1998 and also operates under the abbreviation H+ (Hansell and Grassie 2010). It also includes positions and scenarios that are more in line with the academic mainstream, such as those of philosopher Nick Bostrom (2014) about a superintelligence superior to humans and the possibility of it assuming world domination. Basically, transhumanists are concerned with the scientific-technological overcoming of current human biological limits in order to increase well-being. On a political level, in 2016 Zoltan Istvan popularized transhumanism, when he ran for the US presidential election as a representative of the Transhumanist Party, which he co-founded in 2014. One of the basic principles, which is also summarized in the Transhumanist Bill of Rights (Istvan, 2015), is morphological freedom, the right to freely choose changing identities, which also forms a bridge to the transgender debate (Bostrom, 2005; Fuller, 2019).

The bio-conservative, ethically, politically or religiously motivated critics of transhumanism, who come from both the right and the left of the political spectrum, classify its positions as neoliberal-capitalist driven, too simplistic, individualistic and thus promoting new inequalities (Bostrom, 2005; Hayles, 2010), in the extreme even as the "most dangerous idea in the world" (Fukuyama, 2004).

Controversial debates about the image of technology, the human-technology relationship, the potential of scientifically-technologically designed interventions in the evolution of humanity and about the political will and corresponding governance advances, form the political-philosophical background of the current digital transformation process. The underlying image of technology in the digitalization debate of the 20th century is changing from a tool that is inferior to humans (e.g. digital telephony) to a technology that is possibly superior to them. In this context, AI is at the centre of attention, embedded in (mobile) internet development and linked to the possibilities of nano- and biotechnological intervention, nourished by cognitive science, in the direction of (nano-)robots, cyborgs and trans- or post-human worlds. A particular challenge of NBIC convergence is that not only is digital information technology expected to re-ontologize (Floridi, 2007) the world in the sense of fundamentally changing the nature of things beyond radical re-engineering, but so are biotechnology and nanotechnology.

In general, ideas both of a technology superior to humans and those about technological interventions in human development arouse fears and call for regulatory restrictions on their development and use (Annas et al., 2002; Kass, 2002). This has been happening for some time in the field of bio- and nanotechnologies. With the current wave of digital transformation, there are increasing calls to restrict applications, especially in the context of artificial intelligence, for example for facial recognition applications (Chun, 2020; Döpfner, 2019).

In summary, the debate on controllable evolution, or transhumanism, reflects the features characteristic of the digital trinity at an extended NBIC level. For example, digital doubling in the form of mindfiles or the loss of the body in the pursuit of immortality. As will be shown below, a religious character gives a special touch both to the trinitarian transformation process and the belief in and striving for a controllable evolution.

3.3 The convergence of technology and religion: the implicit everyday religion of the digital

Another building block for understanding digitalization as a threefold, socio-technical transformation process of the 21st century is its religious character. This has emerged since the 1990s in the form of special expectations of salvation based on the combination of mass internet dissemination and the immense potential of converging technologies to intervene in human development. Digitalization, computers, the internet, robots and transhumanism as a collective term for aspirations of a technology-supported enhancement of mind and body are increasingly associated with religion and faith (Kao et al., 2020; Kimura, 2017; Tirosh-Samuelson, 2010, 2012).

On the one hand, the scientific and technological design efforts at a controlled human evolution are seen as an attempt to erase the boundaries between the human and the divine, to recreate the human as an image of God (Kao et al., 2020). The evolution of man towards a *Homo Deus* is argued by the historian Yuval Harari (2016), emphasizing the significant convergence of information technology and biotechnology, e.g. the decoding of biochemical algorithms by digital algorithms. Humans can acquire attributes previously reserved for the gods: omniscience (seamless data monitoring), omnipotence (creation of life, of non-biological intelligence and beings), omnipresence (ubiquitous digital technology) and eternal life (mind uploading, cryonics).

On the other hand, it is concluded that in the course of digitalization and NBIC convergence, it is not the human being but a superior technology that becomes the god, in particular the computer and the internet (Kao et al., 2020; Kelly, 2002). Behind this is the view that digital technology not only becomes effective as a tool in the direction of a god-like human being, but can itself become an autonomous actor with the god-like attributes listed above. The goal of the religious community "Way of the Future", founded in 2017 by a top Silicon Valley engineer, is accordingly the development of an AI deity (Harris, 2017).

The digital transformation, the digital trinity, is guided by a data religion, a *dataism* (Harari, 2016; van Dijck, 2014), characterized as dependence on big data (Kao et al., 2020) and a belief in redemptive insights achievable from it. Dataism can be understood as a secular belief, an ideology behind the datafication of society (van Dijck, 2014), a manifestation of the digital that makes use of comprehensive data surveillance to achieve the overarching goal of influencing behaviour and a controlled evolution of human development.

Religious communities are upgrading technologically, scientific principles and transhumanist thought are increasingly flowing into and merging with one another. Technology can serve to better achieve traditional religious goals, but in the 21st century it is also becoming religious itself (Geraci, 2016). Kao et al. (2020) point to the technological upgrading of traditional religious communities and the merging with transhumanist thought in the form of transhumanist church communities, e.g. the Turing Church, the Christian Transhumanist Association and the Mormon Transhumanist Association. Inter-religious *transreligions* are also emerging, such as the Terasem techno-religious movement initiated in 2004 by Martine Rothblatt (2012), which recognizes God in technology, classifies death as optional and offers to store people's comprehensive mindfiles (a form of uploading) on satellites for later reunification with a biological or nanotechnological body (Waters, 2015).

The connection between technology and religion is evident, their relationship ambivalent and not easily reduceable to a contradiction (Huxley, 1957; Kao et al., 2020; Stolow, 2013). The approaches of institutionalized religions and cultures to technological innovations differ, as can be shown with reference to robots and artificial intelligence (Geraci, 2006, 2020; Kimura, 2017). Historically, the shaping of technological development by religions over millennia is well recognized. The fusion of technology and faith also makes technological endeavours religious undertakings (Noble, 1997).

The religious influence on technology development through institutionalized religions is not contradictory, but is co-evolutionarily linked with the close connection of communication-technology development and NBIC convergence with military goals or weapons systems, which is also well documented in the history of technology (Eurich, 1991; Noble, 1997). This is not only because armed conflicts are often religiously motivated, but also because religions and associated norms are generally behind military values and objectives.

For the explanatory context of this article, the question arises as to how the religious nature of the digital transformation embedded in NBIC convergence is to be interpreted.

As in other areas of life and sectors, digital technology is used by already institutionalized religions as an additional tool to achieve their goals, such as organizing religious communities and spreading the faith. What is of interest here, however, is not so much sectoral case studies and theories of the effects of digitalization or internet use in institutionalized religions, as found in digital religion studies (Campbell, 2016; Helland, 2016), but the formation of a secular (everyday) religiosity inherent in, driving and shaping the phenomenon of digitalization, which is mainly studied by the sociology of religion. Digitalization is becoming religion-like as a system that assigns meaning and significance, both individually and socially, and is increasingly contributing to the social construction of reality by means of diverse algorithmic-selection applications (Just and Latzer 2017) and thus to the worldview and social order (Berger and Luckmann 1966; Luckmann 1967; Couldry and Hepp 2017). The religious aspect of digitalization is developing apart from, albeit connected to or in competition with, traditional religions, driven by the convergence of technology and religion in the sense of a blurring of boundaries, which has already progressed far since the Enlightenment. In this context, technological progress is now itself touted as a religious redemption from human limitations, finitude and "evil" (Geraci, 2016). The experience of technological transcendence through digital technology is becoming an everyday experience in the early 21st century. Novel religious communities have been founded on scientific principles and are also compatible with atheism and agnosticism, as illustrated by the positions of prominent transhumanists (Bostrom, 2005; Geraci, 2016; Huxley, 1957; Tirosh-Samuelson, 2010).

In its threefold form, digitalization assumes the social functions of religions. Algorithmization in the form of AI, on the basis of datafication and with the organizational possibilities of platformization, offers complexity reduction and a transcendence experience, conveys

ontological security (Giddens, 1991) and social cohesion, and makes the indeterminable determinable (Luhmann, 1977).

The threefold transformation process of digitalization shows the characteristics of an *implicit* secular everyday religion. The criteria of Edward Bailey's (2002) concept of implicit religion apply here to a large extent: the evidence of religiosity in the course of digitalization is high, but this is not considered religious by the actor themselves (therefore implicit). This can be attributed to the unconventional, secular nature of religiosity, which from the outside – at least in parts – looks very much like religion. A high level of commitment is also recognizable in the course of the digitalization phenomenon, an attitude that Bailey (1997) evaluates as a one-word definition of implicit religion. A similarly well-suited functional concept for framing the religious in the digital transformation process (described by Bailey (1997) as a twin concept) is that of (privatized) *invisible* religion (Luckmann, 1967), understood as a sense-making or meaning-giving (knowledge) system in an enlightened, secular world. It is an *everyday* religion practised in everyday life (Streib, 1998), a partly unreflected and routinized implicit or invisible religion.

Pärna (2010) has already identified a limited parallelism to traditional religions in the early phase of internet development from 1994 to 2001 and noted an implicit religiosity, primarily on the basis of the promises of salvation that accompanied the internet hype and the firm belief in the magical, guiding power of technology. What Pärna (2010) diagnoses for the early internet hype is even more true for the digitalization hype of the early 21st century. Accordingly, it is an implicit religion of everyday life, characterized by a belief in technology, progress and consumerism. Transcending human boundaries by means of technology is a characteristic of this (e.g. in the direction of omniscience, omnipotence and eternal life) and can be experienced in everyday life by means of digital technology or the consumption of digital goods and services. Traditional religious promises of salvation (from death and evil) and technological predictions (overcoming diseases, eternal life through mind uploading, superintelligence) are blurring (Geraci, 2016).

Starting with the internet, the hype has expanded to combinations of a wide variety of technologies, especially under the impact of NBIC convergence. Digital technology is not limited to one specific technology. Similar to the collective terms of AI and nanotechnology, it is not so much about assessments of specific technology, but of the underlying world views,

fundamentally concerning the belief in a controllable evolution of humanity, and in detail concerning the technological construction of intelligence and life, as well as targeted behaviour control and associated values concerning privacy and surveillance.

In the course of digitalization, a religion-like "technological solutionism" is also emerging, a belief in universal solvability through technology, which is spreading in combination with an "internet-centrism" of the early 21st century (Morozov, 2013). One danger of solutionism is that it reflexively relies on a technological solution even before the problem and the question have been precisely investigated and presented (e.g. a corona-tracing app). Driven by data belief (as opposed to knowledge), the religious expectations of the internet and related technologies such as blockchain, robotics and AI are not only found in science and science fiction, but also in the global political debates on digitalization. The believers in a data or technology religion are forming up on a profane level, e.g. in politics. The high expectations are laid down in countless national and sectoral digitalization strategies (e.g. UK Digital Strategy 2017) and are also used as election promises. Electoral parties outbid each other in announcements to solve the problems of the time with a broadly understood, religious-like digitalization. This raises the fundamental question of the relationship between the threefold digitalization and social order and control, and what role the religious character of the digital transformation plays here.

4 Digital order: special features and governance

Digital trinity shapes social order, comparable to religion and the state. This is favoured by the convergence of digital technology and religion as well as by a loss of trust in existing offers of order. The emergent digital order exhibits special features in the associated socio-technical transformation (4.1) and calls for adapted governance constellations in an increasingly complex digital world (4.2).

4.1 Classification and special features

Digitalization can be classified as one of the central development steps and transformations of the media system. From a media-archaeology perspective, Dirk Baecker (2016) – inspired by Niklas Luhmann's (1998) systems theory and Marshall McLuhan's (1964) media ecology – places digitalization in a series with the epochal media of language, writing and printing.

Like the preceding central innovations of dissemination or transmission media, digitalization generates an overflow of meaning (Luhmann, 1998), in the digital epoch in the form of an *overflow of control* at the human-technology interface that erodes the existing order and ultimately creates a new one (Baecker, 2016). Technology thus not only transmits meaning, but also produces it, and with it more opportunities for communication, including real-time communication in an internet of things (Weyer, 2019), and thus diverse possibilities for use and exploitation. The internet as a modular, open system combined with business models that are optimized for multi-sided platform markets is exemplary for the production of the overflow of control (Latzer 2013a).

According to Baecker (2016), digitalization, just like language, writing and printing before it, is thus driving the shift to a new media epoch that overlaps with the preceding ones. This epochal change begins in each case with disruptions of existing social forms, leads to corresponding adaptation processes and thus – after tribal (language), ancient (writing) and modern society (printing) – to a "next" society, specifically a digital society (Baecker, 2016). Following a similar logic and highlighting individual features of the threefold digitalization, reference is also made to the emergence of a Surveillance Society (Lyon, 2001), Black Box Society (Pasquale, 2015), Platform Society (van Dijck et al., 2018) and Real-Time Society (Weyer, 2019).

In addition to the overflow of criticism emanating from the printing press, which the "Gutenberg galaxy" (McLuhan, 1962) has been working on for half a millennium – and which is now additionally fed by digital media, especially social media – there is also an overflow of digital control (Baecker, 2016). Digital control possibilities are booming, for example on the basis of automatic, real-time data traces of people and things, high connectivity, scalability and ubiquity. The special challenge of digitalization is therefore how to deal with these diverse new conditions and options of social control so that a suitable new order of digital society can emerge that can deal with digital unambiguousness (in contrast to analogue ambiguity) and conceptually integrates communication with and between machines (Baecker, 2017), as happens in an exemplary way in science and technology studies (STS) by means of the actor-network theory (Latour, 2005). In this context, the increasing complexity of algorithmic systems, the growing opacity of increasingly autonomous technology and a crisis of control in decentralized digital systems must be taken into account. In view of the

overflow of control, the extent to which humans control technology or technology controls humans remains increasingly ambivalent (Baecker, 2017).

The disruptions and excessive demands on existing social institutions range from behaviour control based on data monitoring by states, companies and peers, to the control of human evolution in the direction of transhumanism, for example by digital enhancement technologies or designer drugs and genes. Consequently, the control function of digital technology in the course of the advance of NBIC convergence must also be considered here. The platform-economy business models use the potential of the overflow of control, they are economically and politically oriented towards the targeted manipulation of individual behaviour, compete for the attention and data of users and increasingly make use of artificial intelligence.

The ontological and epistemological changes in the course of digitalization also contribute to the overburdening of existing social institutions. The assumption of a world that can be represented and calculated in binary code in the tradition of Gottfried Wilhelm Leibniz, of a world as a data processing system (Boyd and Crawford 2012) and of organisms as algorithms (Harari, 2016), among other things, promotes an increasingly evidence- or data-based policy. On the one hand, in this context it should be noted that digital evidence and data are not so much exact representations as new creations. The extent to which the social can be represented by big data at all needs to be investigated, as well as whether personality traits can be read from digital behavioural data (Kosinski et al., 2013), and what distortions occur in the algorithmic creation of rankings (social scoring; recommendation services) and prognoses (Kinder-Kurlanda, 2020; Mau, 2017). On the other hand, it should not be ignored that algorithmic big-data applications that support decisions, such as predictive policing, become particularly problematic if a meaningful theoretical foundation for statistical data evaluation is dispensed with or is only rudimentary (Weyer et al., 2018). From the political side, there are now often missionary calls for freedom of information, for data exchange to be maximized by means of open data and for as much data as possible to be linked together (Harari, 2016). Recognisable patterns in big and small data are elevated to the central source of knowledge.

4.2 Governance in a complex digital world

The multifaceted governance of our everyday life *by* a combined datafication, algorithmization and platformization interacts with the explicit governance *of* this threefold societal transformation process (Latzer and Just 2020). Understanding governance by

technology in the context of digital trinity, including the disruptions and challenges to the existing order outlined above, is the basic prerequisite for the successful search for appropriate forms of governance of digitalization. This task arises under the digitally amplified properties of complexity – of non-linearity, emergence, self-organization, feedback loops and adaptation (Latzer 2013a) – and the insight that digitalization is closely linked to the creation and reduction of complexity in societies (Nassehi, 2019).

A brief summary of how governance by technology in the context of digital trinity influences reality construction, decision-making and social order is followed by selected starting points of a governance of digital trinity that take into account specificities such as complexity and faith in technology.

From a media-change perspective, changes in individual reality construction and social order are a core part of governance by technology in the context of digital trinity and thus through diverse algorithmic-selection applications. The strong mass-media imprint on the perceived world of the 20th century (Luhmann, 2000) is now complemented and overlaid by an algorithmically controlled reality construction (Just and Latzer 2017) that differs from the mass-media version in quite a few ways. These include networked gatekeeping, increasing personalization in the construction of reality by means of micro-targeting, power shifts due to changed actor constellations in the internet ecosystem and increased commercialization, including of the social sphere. At the same time, transparency, predictability and controllability decrease with the increasing complexity of digital-algorithmic environments (Just and Latzer 2017). When assessing the risk of algorithmic control of our everyday lives, a case-specific differentiation must be made according to the area of application, type and characteristics of intelligence (Baecker, 2020) as well as the degree of autonomy and controllability (Latzer and Just 2020), because global judgements often lead to misunderstandings and overreactions, as the controversial discussion about artificial intelligence shows.

Digital technology calculates and measures, and can do so better than humans, as various human-machine showdowns in chess and go have demonstrated to great public effect. This leads to a mortification of humans on the basis of machine-simulated human intelligence, but also creates high technological application potential. So far, digital technology has only become an algorithmic decision-making system that replaces humans in exceptional cases.

The blanket designation of all algorithmic selection applications as ADM (algorithmic decision-making) is misleading, because in most cases only an input for subsequent human decisions is calculated. The main benefit of AI is human-machine cooperation, not replacement. The basic architecture of computers produces syntactic machines, partially simulates human intelligence and thus ends up with weak AI. The extent to which further development towards semantic machines can take place, which also opens the way to strong AI, superintelligence and singularity, remains controversial. This is not ruled out, but it presupposes better knowledge of the basic biochemical processes of the brain, and a computer architecture that can reproduce these processes algorithmically, which is currently not foreseeable.

The great political and social explosiveness of the effects of a three-fold digitalization that have been outlined calls for democratic control. In summary, there are potentially welfare-enhancing effects, such as the creation of social and economic value, complexity reductions in everyday life, transaction-cost reductions and improvements in human decision-making. This is compromised by a number of risks that can affect well-being and welfare, such as manipulation, bias, discrimination, third-party control by and dependence on technology, abuse of market power, loss of cognitive abilities, and restrictions on freedom of communication and privacy (Latzer et al., 2016). These risks touch on fundamental rights, ethical values, the mediation of reality and social order, and the evolution of human capabilities.

Various design options in the form of governance approaches are available to manage the net effects of opportunities and risks, albeit under more difficult, complex general conditions than in an analogue world.

Basically, four groups of governance approaches are emerging in the control attempts of algorithmic systems, which are being promoted to varying degrees or in competition with each other by individual states, the European Union and international institutions (Latzer and Just 2020). They focus on and start primarily with 1) risks, 2) human rights, 3) ethical values or 4) overarching principles (trust, transparency, controllability, accountability) and differ, among other things, in their depth of intervention.

To implement the different approaches, the question arises as to the appropriate extent of the role of the state and the corresponding governance instruments. For risk-based approaches, a governance choice procedure (Latzer et al., 2019) offers a case-specific decision-making aid. The reputation sensitivity of the industry in question is one of the assessment criteria of this governance-choice procedure. Since it usually remains very high in algorithmic selection applications and the transparency of the procedures for users remains very low (information asymmetries), the consent of the faithful, i.e. the users' amen to variously preached data religions, is a central starting point of competition in the digital era. This consent is guided by the level of awareness, sensitivity and (technological) skills on the part of users, and at the same time is shaped by targeted manipulations, distortions and disinformation by commercial and political interest organizations.

In addition, the acknowledgement of the great complexity of the control object of the threefold digitalization and thus the limited controllability and predictability calls for changes in policy guidelines (Latzer, 2014). These include an adaptive policy based on periodic reviews and feedback loops, the promotion of co-evolutionary processes through stakeholder networking and access to knowledge, the promotion of competitive experiments instead of top-down selections between techno-economic alternatives (picking the winner).

The control of complex systems, on the one hand of the co-evolutionary, socio-technical transformation process of digitalization at the political level and, on the other hand, of digital products at the operational level, for example in transport (e.g. self-driving cars), energy supply or even superintelligent machines, also requires new modes of governance. However, approaches to central real-time control of decentralized systems are only just beginning to develop (Weyer, 2019). Hopes and efforts are being pinned on the development of collective intelligence for networks that integrate both human and technological actors. This borrows interdisciplinarily from economic, psychological, sociological and biological findings, including forms of decentralized control from the animal kingdom (ants, swarm behaviour in birds and fish), which are already being used in robotics and meant to be made applicable to social regulation (in the form of self-organization) with the help of the internet of things (Malone and Bernstein 2015).

Especially in the group of ethical and principle-based approaches, the focus is on the trustworthiness of algorithmic systems, linked to transparency, controllability and

accountability. An example of this is the pursuit of trustworthy AI, which is also being promoted at EU level with the support of ethics committees (European Commission, 2019) and implemented differently in individual countries (Larsson et al., 2020).

Trust and faith, the extent of which is decided at the individual level, are proven means of dealing with complexity or reducing it (Luhmann, 1968). Trust between stakeholders or citizens and system trust, which is increasingly governed or mediated by digital technology (Bodó, 2020; Keymolen, 2016), is considered a central prerequisite for the functioning of markets and societies. Since the Enlightenment, modern, secular societies have been characterized by the fact that trust in the form of blind faith in God as the central basis of one's own decisions and actions has been gradually replaced by trust in people's rationality and one's own abilities (Seiffert-Brockmann, 2015).

The implicit everyday religion of the digital transformation, the convergence of technology and religion, is leading to changes in this regard. As digital technology, increasingly perceived as superior, takes on a god-like function in the form of the internet, computers and artificial intelligence, there has been a resurgence of faith as blind trust, but now as faith (i.e. without knowledge) in digital technology (for example in rationally incomprehensible big-data predictions of automated algorithmic-selection applications), which is increasingly becoming the basis for action and thus for decisions. In the transition from trust in reason to faith in technology, it must be remembered that this tends to eliminate criticism, the unambiguousness of the digital becomes prevalent and, accordingly, there is little room for coincidences and the unforeseen (Keymolen, 2016).

Comparable to an oracle, AI-based algorithmic systems are consulted as action-guiding transcendent wisdom (Harari, 2016; Seiffert-Brockmann, 2015). This oracular function of digital, algorithmic applications (expert systems, prognosis and recommendation algorithms) replaces traditional instructions for action or leads to a rift between faith (in the sense of not knowing) in god-like, inscrutable machines (black boxes) and trust or confidence in one's own thinking and feeling (GPS apps, health apps, etc). This can lead to a loss of cognitive abilities, can contribute to distrust in reason, in one's own thinking, human abilities and sensibilities. This is not a simple substitute for an already institutionalized belief in God and rationally analysed decisions, but graduated mixed forms are becoming established. With

intelligent, digital machines, there has been a partial resurrection of god-like traits and states (Harari, 2016; Seiffert-Brockmann, 2015).

Faith – the unquestioned trust in God in the context of institutionalized religions – has partially been replaced by a likewise often rationally unquestioned trust in digital technology and big data in the context of data religions. Technology as a (privatized) everyday religion complements and replaces the integrative, socially controlling function of institutionalized religions. The social significance of big data-based digital oracles derives less from the accuracy of prophecies than from individuals' blind faith in big data and algorithms (Gransche, 2016).

A governance focus on creating transparency as an ethical value or rather as a pro-ethical condition (Turilli and Floridi 2009) aims to strengthen trustworthiness, but also a range of other ethical values such as fairness, controllability and accountability. For several reasons, this is a delicate political tightrope walk with a risk of crashing on both sides (Latzer, 2021). While too little transparency increases the risk of manipulation, a society that relies too much on transparency (e.g. by means of dataveillance) tends to abolish privacy and to replace trust with control. In addition, full transparency cannot be created in many algorithmic systems (rapidly changing, self-learning algorithms, programming based on division of labour), and it would also thwart the functioning of algorithmic systems (the risk of manipulation increases with transparency). Overall, the task is to take account of the complex interactions between ethical objectives and overarching principles in political governance proposals.

The tendency towards a transhumanist orientation and embedding of digitalization underlines the question of the appropriate starting point for the implementation of ethical principles. Two basic starting points can be observed in the direction of ethical self-restraint, with the technology-using human or with the machine itself. The latter, i.e. a moralization of technology by means of designs, presupposes that socio-ethical values can be implemented in machines in the first place (Kroes and Verbeek 2014).

Moreover, with a strengthening of transhumanist issues and corresponding everyday religions of the digital, additional governance challenges come to the fore, such as those concerning rules for changing identities, as they also arise in transgender issues and are discussed under

the term morphological freedom (Bostrom, 2005; Fuller, 2019), rights of machines (non-organic life) and the political handling of essentially prolonged life (Fuller, 2019).

5 Summary

From a co-evolutionary media-change perspective, this article takes a look behind the facade of a comprehensive social transformation soberly referred to as digitalization. Digitalization is divided chronologically into two phases. In the first (second half of the 20th century), the switch from analogue to digital technology in telecommunications and broadcasting is discussed as digitalization. The changes are captured analytically as a central part of convergence in the communications sector, and the discussion remains largely confined to it. The second phase of digitalization (early 21st century) extends far beyond the communications sector and is accordingly understood as the digitalization of society, with the focus increasingly shifting to the changed human-technology relationship. This socio-technical transformation can also be well understood from a co-evolutionary convergence perspective: hallmarks of digitalization are the embedding (a) in a nano-bio-info-cogno-convergence – coupled with the belief in a controllable evolution towards transhumanism – as well as (b) in a convergence of technology and religion, which, among other things, leads to an implicit everyday religion of the digital.

The particularities of the digitalization of society are manifested in the trinity of datafication, algorithmization and platformization. Digitalization and commercialization (including the social sphere) go hand in hand. The characterization as a trinity also refers to the richness of change in this digital transformation, its unity and religious character. The co-evolutionary interaction of these socio-technical transformation processes results in a self-reinforcing spiral effect, as was already structurally observable on a smaller scale in the first wave of digitalization.

In the second phase of digitalization, not only is a newly forming, convergent social communication system negotiated, but so is the human-technology relationship, the possibilities of a scientific-technologically controllable evolution of human abilities. In the process, digitalization (especially with a technologically unspecified AI) assumes the important control and steering function in the NBIC network and thereby triggers a considerable social crisis of control. The thematic impulses of a broadly understood transhumanism are telling in this regard and partly indicative of its development, however,

not as a matter of assessing or achieving utopian and dystopian scenarios, but rather regarding the direction and belief in a targeted development to overcome human limitations.

Faith and religion, as well as their convergence with technology in the course of digitalization, are gaining in importance along with the growing perception that technology is superior to humans. The role of a secular, private everyday religion in the digitalization process is of particular interest here, rather than the digitalization effects within institutionalized religions. Technological abilities that were previously only attributed to the divine, promises of salvation in the course of the internet hype and NBIC convergence, a mythological level of big data, transcendent insights through algorithmization and a high level of commitment all testify to an implicit or invisible everyday religion of the digital.

The trinity of datafication, algorithmization and platformization shapes reality construction and social order, while also assuming traditional functions of religions, such as complexity reduction, transcendence experience, ontological security and cohesion, and the explanation of the mysterious. The resulting order is the product of the interplay of governance *by* and *of* this threefold digitalization. Governance by digitalization leads to power shifts and inequality through data ownership and control, changes individual constructions of reality via digital (religious) everyday routines, and in the process reveals problematic ontological and epistemological peculiarities. These co-constructions between algorithmic, mass-media and non-technologically mediated everyday activities shape the order of societies and their character.

Data duplications of the world in binary code differ from the original; they are characterized by unintentional and deliberate (interest-related) omissions and distortions. The algorithmic part of construction systematically strengthens individualization as well as commercialization and at the same time weakens predictability and controllability. With NBIC-supported, transhumanist goals, such as life-extending digital images of people and a freely selectable change of identity, the political-ethical challenges increase.

Dealing with growing complexity due to the threefold digital transformation in the NBIC context becomes key to governance success. The acknowledgement of decreasing centralized controllability necessitates changed policy guidelines and governance modes. Attempts at steering – the governance of digital transformation trends – start with risks, human rights,

ethics and overarching principles. Strengthening the belief in digitalization as a privatized, implicit everyday religion has the effect of reducing complexity, but in doing so it counteracts the spirit of Enlightenment, which seeks to replace blind trust in God (the faith guiding action) with trust in people's rational understanding. With growing faith in an inscrutable technology that tends to be superior to humans, criticism, ambiguities and contingencies tend to be reduced. Digital algorithmic applications assume complexity-reducing oracular functions. Faith as an expression of blind trust becomes a commercial and political goal in a highly reputation-sensitive environment and the digital amen of faithful customers and citizens to diversely preached technology religions a contested success factor in the digital era.

Finally, the characteristics of digitalization outlined in this article suggest a further discussion of the fate of the "Anthropocene", which does not stop at the consequences of man-made climate change, but also includes those of the digital transformation process for the further development of humanity from a co-evolutionary perspective.

References

Anderson, C. (2008). The End of Theory: The Data Deluge Makes the Scientific Method Obsolete. *Wired*. https://www.wired.com/2008/06/pb-theory/

Annas, G. J., Andrews, L. B., & Isasi, R. M. (2002). Protecting the Endangered Human. *American Journal of Law & Medicine*, *28*(Issues 2 & 3), 151–178.

Baecker, D. (2016). Sociology of Media. In I. Baxman, T. Beyes, & C. Pias (Eds.), *Social Media – New Masses* (pp. 151–171). Diaphanes.

Baecker, D. (2017). Wie verändert die Digitalisierung unser Denken und unseren Umgang mit der Welt? In R. Gläß & B. Leukert (Eds.), *Handel 4.0* (pp. 3–24). Springer.

Baecker, D. (2020). Wir zählen nicht nur bis eins: Künstliche Intelligenz im Kontext. In K. Krenn, S. Hunt, & P. Parycek (Eds.), *(Un)ergründlich? Künstliche Intelligenz als Ordnungsstifterin* (pp. 27–48). Kompetenzzentrum Öffentliche IT.

Bailey, E. (1997). *Implicit Religion in Contemporary Society*. Kok Pharos.

Bailey, E. (2002). *The Secular Quest for Meaning in Life*. Edwin Mellen.

Berger, P. L., & Luckmann, T. (1966). *The Social Construction of Reality*. Penguin Books.

Bodó, B. (2020). Mediated trust: A theoretical framework to address the trustworthiness of technological trust mediators. *New Media & Society*, 1–23. https://doi.org/10.1177/1461444820939922

Bostrom, N. (2005). A History of Transhumanist Thought. *Journal of Evolution & Technology*, *14*, 1–25.

Bostrom, N. (2014). *Superintelligence*. Oxford University Press.

Boyd, D., & Crawford, K. (2012). Critical Questions for Big Data. *Information, Communication & Society*, *15*(5), 662–679. https://doi.org/10.1080/1369118X.2012.678878

Campbell, H. A. (2016). Surveying theoretical approaches within digital religion studies. *New Media & Society*, *19*(1), 15–24. https://doi.org/10.1177/1461444816649912

Christensen, C. M. (1997). *The Innovator's Dilemma*. Harvard Business School Press.

Chun, S. (2020). Facial Recognition Technology. *North Carolina Journal of Law & Technology*, *21*(4), 99–136.

Couldry, N., & Hepp, A. (2017). *The Mediated Construction of Reality*. Polity.

DCMS. (2017). *UK Digital Strategy*. https://www.gov.uk/government/publications/uk-digital-strategy/uk-digital-strategy

Dolata, U. (2019). Privatization, curation, commodification. *Österreichische Zeitschrift Für Soziologie*, *44*(1), 181–197. https://doi.org/10.1007/s11614-019-00353-4

Dolata, U. (2020). *Internet – Platforms – Regulation* [Working Paper]. https://www.econstor.eu/handle/10419/218821

Döpfner, M. (2019). A Harvard Business School professor says that it might be a good idea to shut down Facebook or Google for 'a day or a week in order to show that it is democracy that rules here'. *Business Insider*. https://www.businessinsider.com/harvard-professor-shoshana-zuboff-on-big-tech-and-democracy-2019-11

Drexler, K. E. (1986). *Engines of creation*. Anchor Books.

Drexler, K. E. (1992). *Nanosystems*. Wiley.

Dupuy, J.-P. (2010). Cybernetics Is Antihumanism. In G. R. Hansell & W. Grassie (Eds.), *H±* *Transhumanism and Its Critics* (pp. 227–248). Metanexus Institute.

Eurich, C. (1991). *Tödliche Signale*. Luchterhand Literaturverlag.

European Commission. (2019). *Communication: Building Trust in Human Centric Artificial Intelligence*. Shaping Europe's Digital Future - European Commission. https://ec.europa.eu/digital-single-market/en/news/communication-building-trust-human-centric-artificial-intelligence

Floridi, L. (2007). A Look into the Future Impact of ICT on Our Lives. *The Information Society*, *23*(1), 59–64. https://doi.org/10.1080/01972240601059094

Floridi, L. (2020). AI and Its New Winter. *Philosophy & Technology*, *33*(1), 1–3. https://doi.org/10.1007/s13347-020-00396-6

Frenken, K. (2006). *Innovation, Evolution and Complexity Theory*. Edward Elgar.

Fukuyama, F. (2004). Transhumanism. *Foreign Policy*, *144*, 42–43. https://doi.org/10.2307/4152980

Fuller, S. (2017). Transhumanism. In B. S. Turner (Ed.), *The Wiley-Blackwell Encyclopedia of Social Theory* (pp. 1–2). Wiley.

Fuller, S. (2019). *Nietzschean Meditations*. Schwabe.

Geraci, R. M. (2006). Spiritual Robots. *Theology and Science*, *4*(3), 229–246. https://doi.org/10.1080/14746700600952993

Geraci, R. M. (2016). Technology and Religion. In W. S. Bainbridge & M. C. Roco (Eds.), *Handbook of Science and Technology Convergence* (pp. 907–917). Springer.

Geraci, R. M. (2020). Rekodierung von Religion. In K. Krenn, S. Hunt, & P. Parycek (Eds.), *(Un)ergründlich? Künstliche Intelligenz als Ordnungsstifterin* (pp. 81–110). Kompetenzzentrum Öffentliche IT.

Gerlitz, C., & Helmond, A. (2013). The like economy. *New Media & Society*, *15*(8), 1348–1365. https://doi.org/10.1177/1461444812472322

Giddens, A. (1991). *Modernity and self-identity*. Polity Press.

Gillespie, T. (2018). *Custodians of the Internet*. Yale University Press.

Gransche, B. (2016). The Oracle of Big Data. *The International Review of Information Ethics*, *24*, 55–62.

Hansell, G. R., & Grassie, W. (2010). *H± Transhumanism and Its Critics*. Metanexus Institute.

Harari, Y. N. (2016). *Homo Deus*. Harvill Secker.

Harris, M. (2017). Inside the First Church of Artificial Intelligence. *Wired*. https://www.wired.com/story/anthony-levandowski-artificial-intelligence-religion/

Hayles, N. K. (2010). Wrestling with Transhumanism. In G. R. Hansell & W. Grassie (Eds.), *H± Transhumanism and Its Critics* (pp. 215–226). Metanexus Institute.

Helland, C. (2016). Digital Religion. In D. Yamane (Ed.), *Handbook of Religion and Society* (pp. 177–196). Springer.

Hurlbut, J. B. (2016). Technologies of Imagination. In D. A. Yerxa (Ed.), *Religion and Innovation* (pp. 213–228). Bloomsbury Academic.

Huxley, J. (1957). *New Bottles for New Wine*. Chatto & Windus.

Istvan, Z. (2015). *Transhumanist Bill of Rights*. U.S. Transhumanist Party. https://transhumanist-party.org/tbr-3/

Just, N. (2018). Governing online platforms. *Telecommunications Policy*, *42*(5), 386–394. https://doi.org/10.1016/j.telpol.2018.02.006

Just, N., & Latzer, M. (2017). Governance by algorithms. *Media, Culture & Society*, *39*(2), 238–258. https://doi.org/10.1177/0163443716643157

Kao, G., Hong, J., Perusse, M., & Sheng, W. (2020). Dataism and Transhumanism. In G. Kao, J. Hong, M. Perusse, & W. Sheng (Eds.), *Turning Silicon into Gold* (pp. 173–178). Apress.

Kass, L. R. (2002). *Life, liberty, and the defense of dignity*. Encounter Books.

Kelly, K. (2002). God Is the Machine. *Wired*. https://www.wired.com/2002/12/holytech/

Kelly, K. (2010). *What Technology Wants*. Viking.

Keymolen, E. (2016). *Trust on the line: A philosophical exploration of trust in the networked era* [Erasmus University Rotterdam]. https://repub.eur.nl/pub/93210/finale-versie-proefschrift-E-Keymolen-04032016.pdf

Kimura, T. (2017). Robotics and AI in the sociology of religion. *Social Compass*, *64*(1), 6–22. https://doi.org/10.1177/0037768616683326

Kinder-Kurlanda, K. (2020). Big Social Media Data als epistemologische Herausforderung für die Soziologie. In *Soziologie des Digitalen—Digitale Soziologie?* (pp. 109–133). Nomos.

Kosinski, M., Stillwell, D., & Graepel, T. (2013). Private traits and attributes are predictable from digital records of human behavior. *Proceedings of the National Academy of Sciences*, *15*, 5802–5805. https://doi.org/10.1073/pnas.1218772110

Kroes, P., & Verbeek, P.-P. (2014). *The Moral Status of Technical Artefacts*. Springer.

Kurzweil, R. (1999). *The Age of Spiritual Machines*. Viking.

Kurzweil, R. (2005). *The Singularity Is Near*. Viking.

Larsson, S., Bogusz, C. I., & Schwarz, J. A. (2020). *Human-Centred AI in the EU*. European Liberal Forum.

Latour, B. (2005). *Reassembling the Social*. Oxford University Press.

Latzer, M. (1997). *Mediamatik*. Westdeutscher Verlag.

Latzer, M. (2009a). Convergence Revisited. *Convergence*, *15*(4), 411–426. https://doi.org/10.1177/1354856509342342

Latzer, M. (2009b). Information and communication technology innovations. *New Media & Society*, *11*(4), 599–619. https://doi.org/10.1177/1461444809102964

Latzer, M. (2013a). Media convergence. In *Handbook of the Digital Creative Economy* (pp. 123–133). Edward Elgar.

Latzer, M. (2013b). Medienwandel durch Innovation, Ko-Evolution und Komplexität. *Medien & Kommunikationswissenschaft*, *61*(2), 235–252. https://doi.org/10.5771/1615-634x-2013-2-235

Latzer, M. (2014). Convergence, Co-evolution and Complexity in European Communications Policy. In K. Donders, C. Pauwels, & J. Loisen (Eds.), *The Palgrave Handbook of European Media Policy* (pp. 36–53). Palgrave Macmillan.

Latzer, M. (2021). Transparenz: Eine medienpolitische Gratwanderung. In W. Berka, M. Holoubek, & B. Leitl-Staudinger (Eds.), *Transparenz im Medienbereich*. Manz.

Latzer, M., Hollnbuchner, K., Just, N., & Saurwein, F. (2016). The economics of algorithmic selection on the Internet. In J. Bauer & M. Latzer (Eds.), *Handbook on the Economics of the Internet* (pp. 395–425). Edward Elgar.

Latzer, M., & Just, N. (2020). *Governance by and of Algorithms on the Internet*. Oxford Research Encyclopedia of Communication.

https://oxfordre.com/communication/view/10.1093/acrefore/9780190228613.001.0001/acrefore-9780190228613-e-904

Latzer, M., Saurwein, F., & Just, N. (2019). Assessing Policy II: Governance-Choice Method. In H. Van den Bulck, M. Puppis, K. Donders, & L. Van Audenhove (Eds.), *The Palgrave Handbook of Methods for Media Policy Research* (pp. 557–574). Springer.

Luckmann, T. (1967). *The Invisible Religion*. MacMillan.

Luhmann, N. (1968). *Vertrauen: Ein Mechanismus der Reduktion sozialer Komplexität*. F. Enke.

Luhmann, N. (1977). *Funktion der Religion*. Suhrkamp.

Luhmann, N. (1998). *The Society of Society*. Stanford University Press.

Luhmann, N. (2000). *The Reality of the Mass Media*. Stanford University Press.

Lyon, D. (2001). *Surveillance Society*. Open University Press.

Mager, A. (2012). Algorithmic Ideology. *Information, Communication & Society*, *15*(5), 769–787. https://doi.org/10.1080/1369118X.2012.676056

Malone, T. W., & Bernstein, M. S. (2015). *Handbook of Collective Intelligence*. MIT Press.

Manovich, L. (2011). Trending. In M. K. Gold (Ed.), *Debates in the Digital Humanities* (pp. 460–475). University of Minnesota Press.

Mau, S. (2017). *Das metrische Wir*. Suhrkamp.

McLuhan, M. (1962). *The Gutenberg Galaxy*. University of Toronto Press.

McLuhan, M. (1964). *Understanding Media*. MacGraw-Hill.

Moravec, H. (1988). *Mind Children*. Harvard University Press.

Moravec, H. (1999). *Robot*. Oxford University Press.

Morozov, E. (2013). *To Save Everything, Click Here*. PublicAffairs.

Mosco, V. (2017). *Becoming Digital*. Emerald.

Napoli, P. M., & Caplan, R. (2017). Why media companies insist they're not media companies, why they're wrong, and why it matters. *First Monday*. https://journals.uic.edu/ojs/index.php/fm/article/download/7051/6124

Nassehi, A. (2019). *Muster*. C.H. Beck.

Noble, D. F. (1997). *The Religion of Technology*. Knopf.

OECD. (2014). *Data-driven Innovation for Growth and Well-being* (p. 86). https://www.oecd.org/sti/inno/data-driven-innovation-interim-synthesis.pdf

O'Reilly, T. (2007). What is Web 2.0. *Communications & Strategies*, *1*, 17–37.

OSTP. (2016). *Preparing for the Future of Artificial Intelligence*. Obama White House Archives; Obama White House Archives.

https://obamawhitehouse.archives.gov/sites/default/files/whitehouse_files/microsites/ostp/NSTC/preparing_for_the_future_of_ai.pdf

Pärna, K. (2010). *Believing in the Net* [Dissertation, Leiden University]. https://openaccess.leidenuniv.nl/handle/1887/14622

Pasquale, F. (2015). *The Black Box Society*. Harvard University Press.

Rammert, W. (2008). Where the Action is. In U. Seifert, J. H. Kim, & A. Moore (Eds.), *Paradoxes of Interactivity* (pp. 62–91). transcript.

Reidenberg, J. R. (1998). Lex Informatica. *Texas Law Review*, *76*(3), 553–594.

Rochet, J.-C., & Tirole, J. (2003). Platform Competition in Two-sided Markets. *Journal of the European Economic Association*, *1*(4), 990–1029.

Roco, M. C., & Bainbridge, W. S. (2002). Converging Technologies for Improving Human Performance. *Journal of Nanoparticle Research*, *4*(4), 281–295. https://doi.org/10.1023/A:1021152023349

Rothblatt, M. (2012). The Terasem Mind Uploading Experiment. *International Journal of Machine Consciousness*, *4*(1), 141–158. https://doi.org/10.1142/S1793843012400070

Seiffert-Brockmann, J. (2015). *Vertrauen in der Mediengesellschaft*. Springer.

Srnicek, N. (2017). *Platform capitalism*. Polity Press.

Stolow, J. (2013). *Deus in Machina*. Fordham University Press.

Streib, H. (1998). Alltagsreligion oder: Wie religiös ist der Alltag? *International Journal of Practical Theology*, *2*(1), 23–51. https://doi.org/10.1515/ijpt.1998.2.1.23

Tirosh-Samuelson, H. (2010). Engaging Transhumanism. In G. R. Hansell & W. Grassie (Eds.), *H ± Transhumanism and Its Critics* (pp. 19–52). Metanexus Institute.

Tirosh-Samuelson, H. (2012). Transhumanism as a Secularist Faith. *Zygon*, *47*(4), 710–734. https://doi.org/10.1111/j.1467-9744.2012.01288.x

Turilli, M., & Floridi, L. (2009). The ethics of information transparency. *Ethics and Information Technology*, *11*(2), 105–112.

van Dijck, José. (2014). Datafication, dataism and dataveillance: Big Data between scientific paradigm and ideology. *Surveillance & Society*, *12*(2), 197–208. https://doi.org/10.24908/ss.v12i2.4776

van Dijck, José, Poell, T., & de Waal, M. (2018). *The Platform Society*. Oxford University Press.

Vinge, V. (1993). The Coming Technological Singularity. *Vision-21*, *94*, 11–22.

Waters, B. (2015). Is Technology the New Religion? *Word & World*, *35*(2), 143–150.

Weyer, J. (2019). *Die Echtzeitgesellschaft*. Campus.

Weyer, J., Delisle, M., Kappler, K., Kiehl, M., Merz, C., & Schrape, J.-F. (2018). Big Data in soziologischer Perspektive. In B. Kolany-Raiser, R. Heil, C. Orwat, & T. Hoeren (Eds.), *Big Data und Gesellschaft* (pp. 69–149). Springer.

Wiegerling, K., Nerurkar, M., & Wadephul, C. (2018). Ethische und anthropologische Aspekte der Anwendung von Big-Data-Technologien. In B. Kolany-Raiser, R. Heil, C. Orwat, & T. Hoeren (Eds.), *Big Data und Gesellschaft* (pp. 1–67). Springer.

Ziman, J. (2000). *Technological Innovation as an Evolutionary Process*. Cambridge University Press.

Zuboff, S. (2015). Big other. *Journal of Information Technology*, *30*(1), 75–89.