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Thomas Rusche

Digital Transformation of Our (Economic) Society

J.P. Bachem Media

In the decades before Pope Leo XIII composed the encyclical *Rerum Novarum* in the year 1891, a technological process of change driven by the Industrial Revolution had set in which has molded our society up to today. A needy working class arose that, initially, saw no advocate. Wrong prophets were heeded and with their socialist pamphlets promised a classless paradise on earth. In the Industrial Revolution Pope Leo XIII recognized the degraded workers and the socialist promises of redemption as a challenge in the world's history. He responded to this in his *Rerum Novarum*, the mother of all social encyclicals.

More than 125 years later, the world again finds itself with the 'new things' of the digital transformation in an upheaval whose only constant factor is the increasing dynamics of change. An uneasy population fears for its wealth, populist nationalists find unexpected acclaim and win elections with their slogans that deride Christian and democratic basic values such as liberty, equality and justice.

1. Aspects of Digital Transformation

The dynamics of digitalization owes its technological breakthrough to the coded transmission of information with an exponential increase of the computing power. ¹

Today's smartphone, for example, wields a mightier computing power than all NASA computers combined which made possible the first landing on the moon in 1969. This explosive performance will lead to more grave changes in the next 5 years than in the past 50 years.

1.1. Digitalization of Human Acting

Man is born as a deficient being in need of other people's concern in order to survive. In analogous relationships, children learn the alphabet of life. Talking and laughing with one another, playing and crying, emotional eye contact and feeling human closeness are of a molding importance for the mental and physical development of the human being. However, parents, even at home, are more and more often busy online. They follow their Instagram-Accounts (photo-online-service) check their Facebook-news and, digitally distracted, do not hear their crying babies. Children experience their parents permanently busy with their digital devices. At the dinner table, members of the family are connected via online. Personal talks are interrupted when a cell phone text pops up. Even in prams, grown-ups leave their three-year-old offspring with a smartphone to go shopping undisturbed. Before children learn the traditional cultural skills such as arithmetic, reading and writing, they acquire an electronic user competence in a playful way. In their parents' home, they experience a merging of analogous and digital worlds. In this manner, a digital chat with the son studying abroad via Skype is experienced as real likewise as an analogous table discussion with the daughter living at home.

The sexual integrity of the human being is threatened by multifarious infringements in the digital cyber world. Children watch and experience on the Internet uncontrolled hardcore pornography and extreme representations of violence. Peer-to-peer-violence such as the shameless publication of intimate pictures of peers which previously were exchanged unsuspectingly (sexting) is also widely spread as is cyber-grooming in which adults prepare sexual offline-meetings targeting and conditioning minors online by shameless materials. To hide their identity users do not use their real name but adopt a virtual second identity for the cyber world. These FNRPs (Fake Not Real Person) are to be kept apart from computer bots which, on the Net, are programmed machines which create the illusion of a human identity.

Just in view of the anthropological difference to machine intelligence, the developmental boosts of Artificial Intelligence (AI) are remarkable. Therein brain research has become a

'provider' for the development of artificial neuronal nets. Supported by large computing capacities, they solve problems by means of learning algorithms quasi independently. Contrary to humans, the computer enters the world without a brain. Thanks to neurologically processed sensual impressions, infants can abstract and refer from e.g. toy cars to a real automobile on a road. For a comparable learning process, electronic computers would have to be fed with large quantities of data before they could recognize patterns. In so doing, they initially make mistakes. However, each corrected mistake reduces just this error in the following interpretation of patterns. AI technology conquers from street traffic to preventive health care all areas of life of a human being: thus computers differentiate malign moles from benign ones with greater precision than a qualified medical specialist. Digitalization of the health system is in full sweep. Man will have to learn to trust the computer. When? Whenever the machine is better at recognizing patterns because of its greater computing power.

With his/her smartphone in his trousers pocket or her handbag, the user always bears the mobile Internet on himself or herself. Electronic providers gain increasing importance correspondingly. For humans, Google becomes a life assistant that helps finding directions, petrol stations and restaurants. Google Scholar opens permanent access to international top research and opens up the most comprehensive library to the world's body of knowledge. On the Net we can have everything and instantly. Digital providers link the things which Man needs for living and sketch a world map of all possibilities. The computer knows the consumer's profile, knows where the user lives and works, the friends s/he has, where s/he buys what, what music, texts and films s/he consumes, where s/he likes going out for dinner and on holiday.

This data makes possible service providers on the Internet for everybody that discloses themselves and life habits online and enables them to set up a life-world index comprising not only basal data such as year of birth, gender, education, marital status and employer but also relationships with friends, habits of consumption and most intimate preferences all represented in a behavioral grid. This highly personal information is traded as precious data material to provide the consumer with e.g. digital newsletters and recommendations for products the same way as with analogous serial letters and mail circulars.

1.2 Disruption of the Entrepreneurial Organization

Every business process of a company can be rendered into digitalized programs. This requires large data quantities. For digitally transformed enterprises, data turn into claims for prospecting gold. By means of gathering data, management make decisions precisely to the point, in retailing chances for higher turnover are used, and in the production line costs are minimized.

As large computing capacities become available at cheaper and cheaper rates, digitalized start-ups see mostly a lower barrier of entry, especially so, as the demand for capital for warehouses, hardware, 'brick and mortar' is little. As commonly known, Alibaba, the world's biggest retailer, owns no inventory, Airbnb, the biggest provider of overnight stays, no hotel estates, big taxi company Uber no taxis &c.

The winners of the disruption build platforms and link-up demand and supply without themselves providing nor possessing the goods offered and demanded.

Platforms make use of the trend of the *Sharing Economy*, the systematic providing and reciprocal borrowing and lending of goods and resources. The automobile as a status symbol increasingly loses its meaning. Owning one, two or even three cars, which, in case of doubt, are parked at the wrong place, is less desirable than falling back on a 'car to go' anytime and anywhere.

Platforms help themselves to the cloud-computing and reach their audience via software nets which they do not have to set up themselves at considerable costs, but which they use via interface without financing hardware and IT-development. For cloud clients, this is efficient as only the service actually used is charged for. When software nets link up with electronic production structures, industry 4.0 can jump on this bandwagon in which the individual production of products is cost-efficiently possible leading to strategic advantages of specialization.

In the netted designing of thoroughly digitalized services of product and performance, start-ups in most cases act in a more agile fashion than enterprises established in pre-digitalization times, which, organized by a rigid linear hierarchy, leave little room for creatively organizing projects in which digital concepts are bred and realized. Such incubators are the nuclei of a new digital wave of founders which, within the framework of a creative process of destruction, push analogous, encrusted enterprises out of the market. Due to digital network effects, digital providers relentlessly grow and, like monopolies, take over pool positions.

Digital transformation provides working people with an ever-increasing flexibility², the time-clock loses its meaning. Home office and annual work accounts are spreading not only among start-ups but also in traditional enterprises and make better a better balance between private and job lifetime. However, this is not always successful. The company cell phone becomes an electronic chain if permanent availability is expected. Someone who can do his/her work digitally any time and any place must be able to act self-responsibly. Efficiency precedes presence. Measuring efficiency, however, is also revolutionized by digitalization. Digitalized ticket-systems furnish co-workers continuously with standardized work-tasks whose processing speed is checked IT-supported. Close-meshed electronic reporting on performance is to stimulate humans for high achievement. Standardized tasks such as typing dictations and feeding in cash register data, however, are done by computers.

In view of this digital transformation, do not only secretaries and cashiers lose their jobs but other job profiles also disappear in all income brackets. Besides readers of utility meters and travel agents, highly qualified tax consultants, jurists and managers will not be needed anymore if they lack digital literacy in executing their profession and cannot furnish a qualitative, emotional additional value.

1.3 Upheaval of the Community

From 2014 to 2019, the load of data transmitted on the digital Net in Germany will have almost tripled: From 720 billion Gigabytes to 2 trillion; for this impact the digital infrastructure is not prepared. The technological deficit in digitalization manifests itself in digital roads full of 'potholes', fragmentary broadband and only few glass fiber connections. Someone who is travelling in Europe knows how often one ends up in no signal areas, be it in the car, train or hotel.³ There is lack of a highly functioning digital infrastructure.

In view of an ever-increasing acceleration of technological development, the deficit of legal regulation, and with it of a lawless realm, also grows; in general terms, this applies to the completely unregulated Dark Net. Comparable to analogous No-Go-Areas in derelict parts of cities, trading arms, drugs and human trafficking are digitalized here and used for financing international terrorism. But on the 'official' Internet it is difficult to prosecute criminals. As an example, unclear penal punishment is mentioned which (does not) threaten(s) adults targeting minors for social contact on the Internet. The Children and Young Persons Act, which, in the analogous world, becomes effective in the censorship of (cinema) films, magazines and restricted admission to bars and nightclubs, fails in the digital world.

Though shared reading and storing WhatsApp-news require the legal approval of the user, this duty of seeking authorization, however, is circumvented in many different ways. If the user does not agree, there is threat of exclusion from digital media.

The lack of a digital educational structure poses a special challenge. Occasionally, Germany's grammar school students are trained for 'Powerpoint' and 'Word' but often there is no competent IT-class instruction. In analogously structured school lessons, digitalization is taught only from the perspective of the consumer, without imparting skills of programming or processing which are of greatest relevance for shaping the digital transformation.

The digital permeation of global politics impacts parts of the population as unprepared as it does politicians. Social media offer all users, also political activists and conspirators unheard communicative chances of multiplication. The global community is threatened by radical messages on the Internet which often are full of hatred and untrue. Populists, secret services and professional propagandists program chatbots that spread their abstruse messages on the social networks. These self-teaching

autonomous machines equipped by artificial intelligence leave other participants of communication in the dark that they are no humans but computers spreading pre-programmed messages. They canvass for candidates, political parties or products denounce these and spread false news about alleged rapes and arson.

Despite the principal openness of social networks, individuals inform themselves in the echo chambers of their own prejudices and pseudo truths. Filter balloons bubble up which lead to a segregation of different worlds of meaning and make possible a *dé-reality* (Hannah Arendt) of information which, as fake news, enhanced by algorithms, influence political processes. Cyberattacks and hacker assaults stall utility networks (electricity and water), telephone services, enterprises and government authorities. The citizens' trust in the stability of democratically legitimized political institutions is jeopardized, the legitimacy of free elections influenced and, thereby, put in question. Democracy itself is put at risk which is attacked by totalitarian systems by means of digital warfare worldwide.

2. Digital Transformation in the Light of Social Ethical Principles

Social ethical principles provide for the “social processes, structures and institutions an obligatory framework of order”.⁴ This order of ethics has been developed for an analogously structured industrialized economic society. Are these principles still relevant in a digitally transformed world? Factually, this moral sphere of the digital world seems to decouple itself from the analogous culture. In view of the technologically driven societal upheavals, how can principles and values rationally be grounded and applied to situations adequately – offline as well as online? Seen from the perspective of the deficit of legal regulations and digital failure of political decision – makes the social ethical question arise the more urgently so that the moral vacuum in the cyber world does not escalate into a menace to the analogous habitat of humans.

Reflected in terms of social ethics and democratically legitimized, the digital transformation can foster a global cooperation of politics and media, economy and technology, strengthening environmental protection as well as improving social standards. How? Through a worldwide exchange of information, internationalization of law and an adjustment of living conditions of all people who unite on social networks.

2.1 Personality and Sociality

Man is more than a data profile that can be put into algorithms. As an image of God, s/ he is endowed with a self-evident, unalienable dignity. The human person is an end in itself. Never must Man be turned means for other purposes. This unconditional respect of Man is valid, as is Jesus statement from his court speech, in the analogous world as well as in the digital world: “Verily I say unto you, inasmuch as ye have done it unto one of the least of these my brethren, ye have done it unto me.” (Mt 25, 40) Virtual encounters in cyber space are experienced mostly in a more detached

way than analogous face-to-face situations. Merely the spatial difference robs the interaction its immediacy.

In www looms an aloofness threatening the integrity of Man who is seemingly only mobbed or sexually molested virtually. Though no immediate physical consequences pose threats, the psycho-physical stress of virtual attacks is immense, especially so with minors. "Where human compassion is violated, God's Contract is broken."⁵ Man is in need of fellow-Man to become a personality. The human person finds its "fulfillment only when touching others. It is open, can be spoken to and is set for dialogue."⁶ The social ethical double principle of personality and sociality expresses that Man through encounter becomes Man and that social interactions are the condition for the development of his moral and personality development.

Obviously, social media enlarge these spaces of encounter. Everywhere and at any time people of all races and nations, occupations, genders, and social classes form relationships by means of Facebook, Instagram, Skype, Snapchat, Twitter or Whatsapp as a universal Network. The Internet provides the human being as a community being set for dialogue with far-reaching possibilities of communication beyond family, friends and professional colleagues. Everybody has a right of access to the Internet for communicating in free social interaction. These digital possibilities of interactions are to be supported by the state. At the same time, enterprises and legislature are to prioritize data security and guarantee the right to self-determination for personal data.

Digitalization is no value in itself but rather a technical means to help socially unfold personality through communicative networking. Ultimate end is above all humaneness. Every technological progress – judged social ethically- makes sense only when serving (worldwide) realization of humaneness.

2.2 Solidarity and subsidiarity

Christian Social Teaching in the age of digitalization studies the dramatically changing framework of conditions governing living life among humans. How can this technologically driven process of change be shaped so that, against the backdrop of Christian compassion and empathy, it leads to strong solidarity among people and nations? The Christian message of love fulfills itself in perfect human mutuality. Discovering oneself in the mirror of fellow-man means, at the same time, to stand by his side and understand all his wishes and anxieties and offering one's help.

Though digital technology makes possible universal communication, it often seduces to a total social isolation of the individual. The individual is thrown back to his/her own devices in view of the virtually many but in concrete terms not really binding communications and feels left alone. In addition, the digital spaces of resonance can lead to an overestimation of individualized attitudes and foster a Me- culture that seduces, among other things, to an excessive production of selfies. It appears I am constantly being asked, are to assess everything from my perspective, send tweets, like others or exclude them. Social networks, in contrast to an extreme individualization, can lead to a collective behavior in which the individual in a communicative surge of shit storm (avalanche-like negative criticism) and bashing (severe insults) is captured, sharing messages without second thought fomenting wanted or unwantedly populist propaganda machinery.

In the digital world, too, there is need for preparedness of reliable social intercourse which offers everybody large areas of freedom and secures necessary support. In a solidary community, i.e.

staunch community, the stronger helps the weaker. At the same time, the principle of subsidiarity allows the individual to regulate and achieve what s/he can do him/herself without being patronized by other individuals, organizations or state authorities. This subsidiary ranking and differentiation of individual micro level, entrepreneurial meso level and state macro level simultaneously make clear a far-reaching responsibility of the individual for society at large. How can the individual contribute to the development of the community and e.g. as a user of the Internet protectively shield mobbed colleagues, denounced politicians and scandalized political institutions?

Lacking or available financial means and social relationships, poverty or wealth, as well as (lacking) education decide on the access to the digital world. This *digital divide* of our society deserves the active solidarity and subsidiarity: somebody born into this digital world enjoying respective resources helps the pre-digitally socialized human beings who, on their part, oblige themselves to a continuous digital education. Digital natives prepare pre-digital fellow-men for coming technological changes. Everybody seeks to learn, within his/her means, responsibly handling new technologies. This corresponds to the social ethical motto that the human being gains perfection by his activities (omne agens agendo perficitur). Responsibly handling personal data is also imparted. Enterprises open internal digital spaces of communication (Intranet) and make possible for their co-workers the electronic linking with their stakeholders (e.g. suppliers and clients). Co-workers are digitally qualified and put to work adequate to their competence. For unfolding digital potentials for development, each co-worker is entrusted with a space of decision-making as large as possible and secured the necessary technological support. Enterprises protect co-workers from electronic mobbing and technological over-exertion at the workplace. Responsible enterprises leave their sorted out computers to aid organizations such as Digital Helpers 7, which refurbish the devices and distribute them for free use by socially-digitally under-privileged people, e.g. destitute immigrants.

In the digital era, the social-ethical responsibility of enterprises does not only comprise the humane shaping of the processes of change in enterprises but also the order of the framework itself. It is enterprises that push the process of digitalization globally because of an economic interest. How can the formation of monopolies (the winner takes it all) and cartels be prevented? What are possibilities to set up fair digital conditions for competition?

2.3. Justice and Mercy

In the former Federal Republic, Catholic Social Teaching essentially contributed to the development of the social market economy and today asks for a more just alternative to the Anglo-Saxon capitalism marked by Utilitarianism. Taking part in the digital process of transformation of society on the grounds of unevenly distributed chances and individual skills, one must demand with the principle of justice that "human beings despite all other differences must be recognized as basically equal and, therefore, despite all possible inequality, at least be given the same chances to unfold their potentials."⁸ Christian ethics of binding human compassion therefore turns against ethics of optimizing fomented by digital technologies at the expense of ostracized minorities due to their lack of digital qualifications. The world is more and more dominated by digital technology. Therefore, the right to analogous free spaces must be secured. Digital non-users are to be protected from discrimination. Analogous products and systems of distribution such as books, newspapers,

magazines and bookshops among others are to be promoted on the grounds of a diversity of opinions. 9

Technological changes and feared fault lines challenge the firm and constant will to give one's dues (*firma et constans voluntas suum cuique tribuendum*). For this, there is a need on the (inter-) national level for a Charter of Basic Rights that secures the right to an access to the Internet and protects the general free digital expression of opinion. Analogously formed legal regulations such as the protection of consumers and copyright are to be added corresponding to their digital development; legal institutes for data protection against data crime &c is to be newly created. Influencing politicians by bots is to be prevented, (national) security, in view of challenging cyberattacks, to be secured. Criminality on the Dark Net is to be prosecuted relentlessly. Internet services are to be obligated not to create lawless spaces or to condone them. The increasing possibilities of Big-Data-Analyses 10, e.g. the assessment of individual disease risks to fix insurance policies challenge the protection of data. State institutions and digital technological enterprises can jointly check and secure online compliance with legal standards on the Internet e.g. protection of juveniles. Realization of *iustitia legalis*, i.e. of the legal justice for creating international common weal requires an architecture of effective sanctions whose analogous elements are supplemented by law institutes.

On the Net, too, there must be fair fee regulations for digital services. How is justice of contract and terms of trade (*iustitia commutativa*) to be guaranteed so that these also lead to just prices on the Internet? As in the analogous business world, this requires that the services to be exchanged deal with real values that do not represent a fictitious value. Achievement and counter-achievement must reciprocate in value (*tantum-quantum*) and yield a mutual benefit. Thereby, the common weal of future generations must be heeded. Today the environmental costs for the logistics of goods in the Internet trade are as alarming as the enormous consumption of energy of digital systems and their hardware at the end. Therefore, there is need of not only a social but also ecological organization of the process of digital transformation (green IT).

Justice is the least measure of love we humans owe each other, mercy its superior measure. In the first place, "love and mercy have their place in close human relationships. But they are also a basic condition for people living together and among peoples." 11 Especially in a digitally transformed society is there a need for mercy which e.g. manifests itself in the right to oblivion and deleting digital unpleasant digital traces that people leave on the Net. In the digital world, too, mercy can become an "innovative and motivating source of social justice" 12 and becomes concrete, among other things, in an understanding, helpful handling with digitally demented people who have partially lost their sense of orientation in the analogous world and with pre-digital people who feel excluded from technological progress. In social-ethical terms, one should strive for seeking a well-balanced equilibrium between analogous and digital abilities which enable each human being to live a rewarding life in the real as well as in the virtual worlds.

How can "responsible imparting" 13 of social-ethical principles succeed under changing societal conditions? Wilhelm Weber (1925-1983) already postulated "Catholic Social Teaching capable of dialogue". 14 How can personality and sociality, solidarity and subsidiarity, justice and mercy be brought into the play of the protagonists? In order to judge and act, it is not only necessary to watch but also to listen to people. 15 In an intellectual dialogue of people concerned and involved with the process of digital transformation, 'new things' can be evaluated and principles adequate for the

situations and different fields of actions be put in concrete terms (cf. figure on pages 10/11) to make possible the *permanence of genuine human life* (Hans Jonas) worldwide.

This requires not only a theological education and the digital specialist's knowledge but also heeding the imperative for discourse: argue sensibly, be trustworthy, seek consensus and improve chances for dialogue.

Fig. 1 Social-Ethical Reflections on the Action Fields 'Digital Transformation'

Annotations: See original (German) version

The author

Thomas Rusche, Dr.rer.pol., Dr.phil., CEO of SØR Rusche GmbH, teaches business ethics at the WHU Vallendar.

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Level of Acting Social-Ethical Principles	Micro Level of the Individual	Meso Level of Enterprises	Macro Level of the State
Personality and Sociality	<ul style="list-style-type: none"> - Unalienable dignity of Man as an image of God more than a data profile of algorithm - Right to access Internet for free social interaction - Reduction of digital communication barriers 	<ul style="list-style-type: none"> - Prioritize data security - Improvement of communication conditions in company 	<ul style="list-style-type: none"> - Right to self-determination on personal data to be anchored in law - Secure personal human rights on Net
Solidarity and Subsidiarity	<ul style="list-style-type: none"> - Digital natives help the digital left behind - Obligatory continuous digital education - Responsible handling of personal data - Show and support fellow-men about digital changes 	<ul style="list-style-type: none"> - Protection against digital over exertion - Open digital spaces for communication in company (Intranet) - Link up stakeholders (e.g. suppliers & clients) - Support Digital Helpers - Protect workers from mobbing and shit storms - Continuous digital education - The digitally unqualified put to work intelligently 	<ul style="list-style-type: none"> - Set up digital infrastructure - Prevent formation of monopolies and cartels - Promote diversity of digital competition - Secure right to analogous world - No discrimination of digital non-users - Promote digital education at schools - Build an innovation-friendly framework
Justice and Mercy	<ul style="list-style-type: none"> - Fair fees for digital services - Equal pay for same work - Right to self- determination concerning personal data - Right to oblivion - Right to deleting digital traces - Protect users sharing intimate details on the Net - Lower digital energy consumption 	<ul style="list-style-type: none"> - Respect copyright - Net services respect protection of juveniles - Tantum-quantum - No offering of fictitious goods - Justice of price and trade - Protection of consumers - Use Green IT 	<ul style="list-style-type: none"> - Elaborate a digital Basic Law Charter - Overcome digital divide of world society - Secure data protection with effective sanctions - Protect free digital expression of opinions - Ban censorship, secure free access to sources of information - Secure right to access to Net - Fight criminality on the Dark Net - Environment-friendly goods logistics - Energy-saving electronics - iustitia legalis

Fig.1 Social-Ethical Reflection on the Action Fields ‘Digital Transformation’