

Perspectives on Digital Humanis



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Editors

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 Springer
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Preface

“This is absolute nonsense.” This was the reaction of the audience, both academics and non-academics, participating at the First International Conference on IT and

Tourism, in Innsbruck in 1994. Beat Schmid (University of St. Gallen, Switzerland) spoke about electronic markets and Larry Press (UCLA, USA) about digital agents.

Now, only 28 years later, this “nonsense” runs the world, Information Technology and its artifacts act as the operating system of our life, and it is hard to distinguish between the real and the virtual. We cannot imagine a world without it, and—besides running the world—it contributes and will continue to contribute to solving important problems. However, this comes also with interconnected shortcomings, and in some cases, it even puts into question the sovereignty of states. Other critical problems are echo chambers and fake news, the questioned role of humans in AI and decision-making, the increasingly pressing privacy concerns, and the future of work.

This “double face” is why we started the Digital Humanism initiative, with a first workshop in April 2019 in Vienna. Over 100 attendees from academia, government, industry, and civil society participated in this lively 2-day workshop. We talked about technical, political, economic, societal, and legal issues, benefiting from contributions from different disciplines such as political science, law, sociology, history, anthropology, philosophy, economics, and informatics. At the center of the discussion was the relationship between computer science/informatics and society, or, as expressed during the workshop, the co-evolution of information technology and humankind. The major outcome was the Vienna Manifesto on Digital Humanism, now available in seven languages, which lays down the core principles of our initiative.

Since then, we have organized a set of workshops and panel discussions. These events, forced by the pandemic to be online, have drawn a growing worldwide community. In addition, we succeeded in establishing a core group of internationally renowned intellectuals from different disciplines, forming a program committee that jointly “governs” and directs the Digital Humanism initiative.

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We share the vision that we need to analyze and to reflect on the relationship between human and machine, and, equally important, to influence its development for better living and society. Technology is for people and not the other way around. We chose the term Digital Humanism, which was introduced—in the Germanspeaking world—by Julian Nida-Rümelin and Nathalie Weidenfeld with their book *Digitaler Humanismus* (Piper Verlag, 2018). We want to stress that humans should be at the center of the digital world. Technological progress should improve human freedom, peace, and progress in harmony with nature.

Today, the spirit of humanism should inspire the developments of our society, which is largely reliant on digital technologies. As such, we distinguish Digital Humanism from the Digital Humanities, the study of human society and culture

pursued by digital means. In contrast, Digital Humanism aims at rethinking our current digital practices, including research, development, and innovation in the digital domain. As such, it maintains a positivist goal for technology to create societal progress rather than just innovation for the sake of economic growth.

The term humanism, taking a historical perspective, refers to two rather different movements. The first denotes the period between the mid-fifteenth until the end of the sixteenth century (Renaissance Humanism), with a rediscovery of antiquity in the arts and in philosophy, and in which scholars, philosophers, and artists were called and called themselves “humanists.” Aesthetics and ethics became centered on humans rather than on the supernatural or divine. The best-known iconic representation of Humanism is Leonardo da Vinci’s Vitruvian Man, where a human enclosed in a circle is shown as the archetype of the principles of harmony and proportion advocated in Vitruvius’ book *De Architectura*. A second period of humanism flourished in the Enlightenment period (end of eighteenth century), and the French revolution was largely inspired by the principles of human freedom and democracy rooted in the humanistic spirit of that time. Humanism was associated with educational and pedagogical ideals that focused on values such as human dignity and humanity. Naturally, the two movements share a range of common concepts and interests, some of which remain relevant for Digital Humanism today, for example, a strong focus on human rights and how to maintain them in the digital realm.

There are, however, critics of these classical notions of humanism. Especially, the educational ideal of humanists has been criticized as supporting beliefs in European cultural supremacy. Furthermore, a focus on the human subject always requires critical examination regarding who that subject precisely is and which of its many traits should be considered essential. However, Digital Humanism today certainly has no supremacy or colonial mission; quite the contrary, it is critical of already existing colonial tendencies in today’s digital technologies. This is evidenced by our stance on digital sovereignty and geopolitics, for example. Similarly, the question of which traits of human nature should be focused on is a subject of discussion in Digital Humanism, especially since the relation of the individual and the society is a major concern of digital humanists.

In the context of the Enlightenment, proponents of Digital Humanism should also be aware of the critical theory of the Frankfurt School of philosophy. Its prominent members Adorno and Horkheimer provide a critical analysis of the process of

empowerment from rationality, and the resulting de-mystification would in principle apply to any technological process that aims to increase the power of the individual. This certainly applies to most digital technologies. But already Habermas, a later member of the Frankfurt School, has pointed out that throwing out rationalism would also mean discarding its many important contributions to law, democracy, and science—and thus also to technology. One can even draw an interesting reinforcing link of Digital Humanism to the dialectic of the Enlightenment:

individual decisions are an important source of digital innovation, but this source can also lead to a dangerous gain in power to manipulate masses collectively. In addition, digital humanists also warn about the power of the knowing caste (as indicated by Horkheimer and Adorno) or, as a digital humanist might say, the power of platforms. And where abstraction was identified as a tool to manipulate, and formulae as tools to create predictability, digital humanists are now wary of digital tools and big data abstractions with very similar concerns. Machine-based abstraction has become a prerequisite for dealing with the complexities of our world. The alignment of such abstractions in Information Technology with human values and with the complexity of our natural environment are core objectives of Digital Humanism, and they remain a task ahead.

Digital Humanism is young, so, understandably, there are different definitions, understandings, and perspectives, and it has different historical roots. In some sense, we are still in the process of theory building, with respect to understanding the interplay between man and modern technology as well as to framing possible approaches to alternative designs. With this book, we take a step into this direction, where we aim to be inclusive and integrative. We invited renowned international colleagues with varying institutional and disciplinary backgrounds to contribute in an open way with their thoughts and ideas. In the end, we received 46 contributions from 60 colleagues, providing their views on the present and future of the digital world. We think that this approach (including also a peer review phase) worked well; the free format approach and the shortness of contributions make for an accessible variety of perspectives. We offer you here the result of this endeavor.

Although no grouping is perfect, we tried to assign the contributions to 11 parts. We start with the Vienna Manifesto on Digital Humanism, as it is the basis of our joint undertaking and lays down core principles.

- The first part, Artificial Intelligence, Humans, and Control, examines the tension between technology-driven and human-driven decision-making; it looks at the difference between humans and machines and asks whether we are losing control.
- Participation and Democracy examines the interplay between digital technologies and democratic practices and takes into consideration diversity issues, also in a geographical context.
- Ethics and Philosophy of Technology studies the extent to which digital technologies change our ethical and epistemological perspectives, and also the other way around: what role ethical considerations should play in technology development.
- Information Technology and the Arts addresses how the notion of creativity is changed by technology. It connects Digital Humanism with artistic practices as

well as our cultural heritage while highlighting also the importance of culture and art for digital innovation. Science fiction, for example, is a driver of digital innovation.

- **Data, Algorithm, and Fairness** looks at the potential that digital technologies have to both reinforce and ameliorate unfair treatment of groups of humans. It deals with complex questions that may arise from an overly strong focus on the individual rather than a societal perspective. It considers the attention economy and effects that arise from the characteristics of internet search.
- **Platform Power** examines the economic and societal role of today's megaplatfroms, such as Google, Facebook, and Twitter, looking at their dynamics, on the important role they played in the pandemic, and their impact in specific industries and their business models.
- **Education and Skills of the Future** considers how the future of work will affect education, the impact of technology on the skills needed in future, and what and how we should teach our young.
- **Digital Geopolitics and Sovereignty** looks at the contradiction of the inherent global dimension of the digital world and the limits of national governance structures. What is the future of sovereignty in digital times?
- **Systems and Society** addresses societal issues such as the future work, how to deal with changes imposed by the digital world, how to frame technological design, and how to formulate corresponding political answers.
- **Learning From Crisis** addresses the role of technology in the human reaction to the global pandemic of 2020–2021, and it draws important lessons for a probable next (global) crisis.
- **Realizing Digital Humanism** reflects on possible next steps and on the level of research, writing on a more general societal and political level. As one contribution states, it seems easy to describe the problem, but it is hard to solve it.

Digital Humanism is a fundamental concept; it is about our future as humans and as society, not only in the digital world. As such, it is not only an academic undertaking, it is also a political issue. We need to engage with society, having a mixed audience, from academics to political decision-makers, from industry and institutions to civil society and non-governmental organizations, and it is not only about science, research, and innovation. Equally important are education, communication, and influencing the public for democratic participation. We hope that this collection of essays provides an essential contribution to this important endeavor.

We want to thank our colleagues for their contributions, also for responding on time (at least most of the time) to our usually “urgent” requests. It was a pleasure to work with you—thank you. We also thank our donors who made this volume possible. We follow an open access strategy, with the content being accessible both via our website as well as being published by Springer. Donors are the City of Vienna (Kulturabteilung), WWTF (Vienna Science and Technology Fund),

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The work here is about the need to interfere with the process of digitalization, to change this process. But who will be the agent of change? Our hope is that this book will motivate you, our readers, to contribute and to participate in our journey into the future. In the end, it is up to us, the citizens of the world.

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Vienna Manifesto on Digital Humanism

VIENNA, MAY 2019

“The system is failing”—stated by the founder of the Web, Tim Berners-Lee—emphasizes that while digitalization opens unprecedented opportunities, it also raises serious concerns: the monopolization of the Web, the rise of extremist opinions and behavior orchestrated by social media, the formation of filter bubbles and echo chambers as islands of disjoint truths, the loss of privacy, and the spread of digital surveillance. Digital technologies are disrupting societies and questioning our understanding of what it means to be human. The stakes are high and the challenge of building a just and democratic society with humans at the center of technological progress needs to be addressed with determination as well as scientific ingenuity. Technological innovation demands social innovation, and social innovation requires broad societal engagement.

This manifesto is a call to deliberate and to act on current and future technological development. We encourage our academic communities, as well as industrial leaders, politicians, policy makers, and professional societies all around the globe, to actively participate in policy formation. Our demands are the result of an emerging process that unites scientists and practitioners across fields and topics, brought together by concerns and hopes for the future. We are aware of our joint responsibility for the current situation and the future—both as professionals and citizens.

Today, we experience the co-evolution of technology and humankind. The flood of data, algorithms, and computational power is disrupting the very fabric of society by changing human interactions, societal institutions, economies, and political structures. Science and the humanities are not exempt. This disruption simultaneously creates and threatens jobs, produces and destroys wealth, and improves and damages our ecology. It shifts power structures, thereby blurring the human and the machine.

The quest is for enlightenment and humanism. The capability to automate human cognitive activities is a revolutionary aspect of computer science/informatics. For many tasks, machines surpass already what humans can

accomplish in speed, precision, and even analytic deduction. The time is right to bring together humanistic

ideals with critical thoughts about technological progress. We therefore link this manifesto to the intellectual tradition of humanism and similar movements striving for an enlightened humanity.

Like all technologies, digital technologies do not emerge from nowhere. They are shaped by implicit and explicit choices and thus incorporate a set of values, norms, economic interests, and assumptions about how the world around us is or should be. Many of these choices remain hidden in software programs implementing algorithms that remain invisible. In line with the renowned Vienna Circle and its contributions to modern thinking, we want to espouse critical rational reasoning and the interdisciplinarity needed to shape the future.

We must shape technologies in accordance with human values and needs, instead of allowing technologies to shape humans. Our task is not only to rein in the downsides of information and communication technologies, but to encourage human-centered innovation. We call for a Digital Humanism that describes, analyzes, and, most importantly, influences the complex interplay of technology and humankind, for a better society and life, fully respecting universal human rights. In conclusion, we proclaim the following core principles:

- Digital technologies should be designed to promote democracy and inclusion. This will require special efforts to overcome current inequalities and to use the emancipatory potential of digital technologies to make our societies more inclusive.
- Privacy and freedom of speech are essential values for democracy and should be at the center of our activities. Therefore, artifacts such as social media or online platforms need to be altered to better safeguard the free expression of opinion, the dissemination of information, and the protection of privacy.
- Effective regulations, rules and laws, based on a broad public discourse, must be established. They should ensure prediction accuracy, fairness and equality, accountability, and transparency of software programs and algorithms.
- Regulators need to intervene with tech monopolies. It is necessary to restore market competitiveness as tech monopolies concentrate market power and stifle innovation. Governments should not leave all decisions to markets.
- Decisions with consequences that have the potential to affect individual or collective human rights must continue to be made by humans. Decision makers must be responsible and accountable for their decisions. Automated decision making systems should only support human decision making, not replace it.
- Scientific approaches crossing different disciplines are a prerequisite for tackling the challenges ahead. Technological disciplines such as computer science/informatics must collaborate with social sciences, humanities, and other sciences, breaking disciplinary silos.

- Universities are the place where new knowledge is produced and critical thought is cultivated. Hence, they have a special responsibility and have to be aware of that.

- Academic and industrial researchers must engage openly with wider society and reflect upon their approaches. This needs to be embedded in the practice of producing new knowledge and technologies, while at the same time defending the freedom of thought and science.
- Practitioners everywhere ought to acknowledge their shared responsibility for the impact of information technologies. They need to understand that no technology is neutral and be sensitized to see both potential benefits and possible downsides.
- A vision is needed for new educational curricula, combining knowledge from the humanities, the social sciences, and engineering studies. In the age of automated decision making and AI, creativity and attention to human aspects are crucial to the education of future engineers and technologists.
- Education on computer science/informatics and its societal impact must start as early as possible. Students should learn to combine information-technology skills with awareness of the ethical and societal issues at stake.

We are at a crossroads to the future; we must go into action and take the right direction!

SIGN AND SUPPORT THE MANIFESTO:



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Part I

Artificial Intelligence, Humans, and Control

Decolonizing Technology and Society: A Perspective from the Global South



Anna Bon, Francis Dittoh, Gossa Lô, Mónica Pini, Robert Bwana, Cheah WaiShiang, Narayanan Kulathuramaiyer, and André Baart

Abstract Despite the large impact of digital technology on the lives and future of all people on the planet, many people, especially from the Global South, are not included in the debates about the future of the digital society. This inequality is a systemic problem which has roots in the real world. We refer to this problem as “digital coloniality.” We argue that to achieve a more equitable and inclusive global digital society, active involvement of stakeholders from poor regions of the world as co-researchers, co-creators, and co-designers of technology is required. We briefly discuss a few collaborative, community-oriented technology development projects as examples of transdisciplinary knowledge production and action research for a more inclusive digital society.

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1 Inclusion, Coloniality, and the Digital Society

People from poor environments, e.g., in the Global South, are not often included in debates about the digital society. This is surprising, as impacts from digital technologies do have far-reaching consequences for their lives and future. Nowadays, the rapid co-evolution of society and technology is calling for reflection, deliberation, and responsible action. Scientists are posing the question: “Are we humans defining technology or is technology defining us?” (Lee 2020), but who are “we” in this question? Who is defining technology, and who has the knowledge, the assets, and the decision-making power?

A way to understand the impacts of digital transformation for people in the Global South is to observe the digital society through a decolonial lens. This helps to understand the, often tacit, patterns of power in the social and technological fabric. If we consider the digital society to be an image of the physical world, it will have inherited, along with other aspects, historical patterns of inequality. These patterns are referred to as “coloniality” (Mendoza 2021, pp. 46–54; Mignolo and Walsh 2018, pp. 1–12; Quijano 2016, pp. 15–18).

At the moment of writing, about three billion people in the world are unconnected from the digital society – a phenomenon often called the digital divide – but this number is rapidly decreasing. Being connected, particularly through the Internet and Web, is generally seen as the key to a better life. With the breathtaking pace in which the Internet is rolled out even in remote corners of the world, universal connectivity, with full endorsement of the United Nations,¹⁹ might well soon be completed. The follow-on question is: will omnipresent connectivity bring social justice, equality, and a more sustainable and prosperous world closer to all?

The World Wide Web, the backbone of the digital society, was designed, according to its inventor Tim Berners-Lee, as “an open platform that would allow everyone, everywhere to share information, access opportunities and collaborate across geographic and cultural boundaries” (Berners-Lee 2017). However, despite being a global common, the Web’s wide penetration also makes it into a dominant standard. Through its ubiquity, the Web exerts pressure toward uptake, even if this uptake may harm the individual user. The alternative – refusing to be part of it – results in isolation. This phenomenon, which is described by David Grewal as network power, is common for networked standards (Grewal 2008, pp. 20–28). It makes the digital society into a hegemonic system from which – especially from the perspective of the Global South – there is no escape, despite the price users, communities, and even countries have to pay with their money or data, to become part of it.

When we observe the current structure of the digital society, we see that it is physically, economically, and socially extremely centralized and concentrated in the

¹⁹ See, e.g., <https://www.un.org/development/desa/en/news/administration/internet-governance-2.html> (Accessed 1 May 2021)

Global North, where to date the forbearers of many digital innovations reside. For example, the “cloud” is concentrated in large datacenters in wealthy countries. The commercialization of ICTs, influenced by the said centralization, further puts a large chunk of any wealth gathered by innovations in the Global South into the accounts of Big Tech (Zuboff 2019, pp. 63–96). The unequal competition in terms of storage, connectivity, funding, and adoption hampers startup-driven innovation in the Global South.

While digital technologies such as mobile phones are becoming cheaper and more widespread in all corners of the world, control over what can be installed sits in the hands of prominent private tech firms. Governance and decision-making of technology are in the hands of the private tech firms and still, at best, bound by norms and regulations set in countries of the Global North. And these are just a few examples of technological coloniality.

Technological coloniality can be observed in many sectors of society. In Argentina, for example, a country that lacks technological autonomy, the digital market is dominated by transnational corporate tech firms. These parties are taking over roles and functions from the State, for example, in education. They are providing – through philanthropic gifts in the frame of so-called corporate social responsibility – digital services to higher education institutes in exchange for market penetration, tax savings, branding, and policy influencing. The commercial activities of the Big Tech companies are targeting youngsters in particular with media, music, video, entertainment, and fake news. This further leverages trends of privatization (Pini 2020, pp. 37–40).

With new forms of digital communication and online education, intensified in 2020 during the COVID-19 pandemic, there is growing evidence of algorithms being used for surveillance of access, production, and circulation of information, goods, and services in society. These scenarios are seen in many countries, Argentina included. “Free” Internet, provided in exchange for user data, is the business model in which personal data are exploited as raw material (Zuboff 2019, pp. 70–73). Data, knowledge, expertise, and high-performance infrastructures are kept and mined by an increasingly smaller number of transnational corporations, using highly advanced digital technologies for value extraction and profit. While interventions “free of costs” and “free Internet connectivity” are justified as societal benefits, the influence of the private tech sector in vital sectors of society reveals the corporate coloniality.

Coloniality can be observed in many instances of technology. For example, in Artificial Intelligence (AI) algorithms, which previously were held to be objective and value-free, discriminating biases have been discovered (Mohamed et al. 2020, pp. 659–663). There are various examples of discriminating AI, as a result of biases that are hidden in the underlying data: e.g. an algorithm that autonomously whitens black and Asian faces; an application, based on a face recognition algorithm, that opens the door of an office for white faces only, but fails to recognize black faces.²⁰

²⁰ <https://www.oneworld.nl/lezen/discriminatie/racisme/zwart-dan-rijdt-de-zelfrijdende-auto-jouder-aan/> (Accessed: 1 May 2021)

These trivial examples show biases embedded in apparently value-free technology, in which existing patterns are unconsciously replicated. These biases pop up unexpectedly in autonomous smart systems and may intentionally or unintentionally exacerbate inequalities. Artificial Intelligence is a technological domain that urgently needs to be innovatively decolonized.

2 Community-Oriented, Transdisciplinary Models and Inclusive Platforms as Alternative

At the brink of new technological breakthroughs, many scientists, aware of their responsibility, propose to bring together the brightest minds from various sectors and disciplines to discuss directions and propose solutions for the digital society (e.g., Berners-Lee 2019). The authors of this paper stress the importance to include, in these important platforms, also people from poor regions, e.g., in the Global South, and make their voices heard and their perspectives visible. To do so, we propose community-oriented research and collaborative technology development. While this can offshoot innovation in low-resource environments in unexpected ways, it can also be a source of inspiration for new forms of transdisciplinary knowledge production. We discuss a few examples.

In low-resource environments in Africa, many people do not have access to information which is relevant for their daily work. For example, smallholder farmers need local weather forecasts and data on actual rainfall and information on prices at local markets, on treatment of animal health, on the water quality in local wells, etc. However, information access is hampered not only due to a lack of Internet access: also cultural and social factors exist, for example, low literacy or language. These access barriers exist for the majority of rural communities in the Northern Region of Ghana.

In response to local needs, an exploratory design-science action-research project, dubbed *Tibaŋsim*, was carried out in Northern Ghana, to develop new modes of digital access and information sharing for rural communities. *Tibaŋsim* was deployed in five communities from the East Gonja District of the Savannah Region of Ghana. These are typically small communities with about 20 to 30 households. In this project, the *Tibaŋsim* information system was developed, built on local initiatives and adapted to the local conditions. *Tibaŋsim* provides farming-related information that is being collected, (re-)produced, and entered into the system by the community members themselves, so that it can be shared locally. It uses only technologies that are locally available: voice-based (GSM) mobile telephony and local community radio. The information is delivered to the users in their own local language(s) (Dittoh et al. 2021, pp. 1–23). Here, we see that it is not just about connectivity or platform access as such: the collaborative work on relevant and adequate information content is at least as important.

Similar initiatives have been carried out in Mali in the period 2011–2021. At the request of the national Malian smallholder farmer organization AOPP,²¹ a digital platform was developed to support their members – smallholder cereal seeds producers – in the seed trade. As soon as the first version of the Web-based seed trade platform was evaluated, it became clear that local requirements and contextual barriers had been overlooked by the technical developers (Vos et al. 2020, pp. 13–14). The system had to be adapted and re-designed in closer dialogue with its users. This second iteration resulted in a mobile, voice interface, spoken in the local language Bambara, as to be useful for farmers without literacy skills. This resulted in a complex set of requirements, as the platform should meet the requirements of the legacy non-digital local seed trade, the language and speech requirements, as well as the technical challenges to make it work in the absence of ubiquitous Internet connectivity.

In Sarawak, Malaysia, researchers and indigenous communities have worked together for over a decade, in search of sociotechnical solutions for local problems. One of the initiatives is eBario,²² a project that aimed at connecting the unconnected remote village of Bario to the digital society. The initiative consisted of a transdisciplinary university-community partnership between one of Borneo ethnic minorities, the Kelabit community, and the Institute of Social Informatics and Technological Innovations of the University Malaysia Sarawak. The project brought many unexpected spin-offs for the indigenous community, who took joint knowledge creation as a new pathway. The joint efforts transformed the project into a living lab for innovations in healthcare, local cultural preservation, and agriculture. The eBario model has been replicated in six sites: Long Lamai and Ba’Kelalan sites in Sarawak, Pos Lenjang and Pos Sinderut sites in Pahang, and Pos Gob and Pos Bala sites in Kelantan. Among its achievements is the development of community-led, lifelong learning initiatives. Improved skills, incomes, and social communications were outcomes of the eBario project for participating communities. At a national level, the project has influenced policy-making for rural development. For academics, it brought new insights how to do ICT4D research that also seeks to improve the lives of marginalized and underserved communities (Harris et al. 2018, pp. 63–68). Projects such as these show that it is not just about universal connectivity per se: significant effort has to be spent on collaboratively shaping the societal impacts of connectivity as the key to reaping benefits of digitalization.

What we learn from the above initiatives in low-resource environments is that whereas mainstream computer science and Artificial Intelligence are only focusing on high-performance systems, high-end computing, networking, and big data, it is also scientifically challenging and societally relevant to investigate how to design small-scale solutions, decentralized systems, and green, energy-efficient technologies. For example, recent studies on small, inexpensive devices as the so-called “Kasadaka” platform²³ have demonstrated the potential of decentralized,

²¹ <https://aopp-mali.com/> (Accessed 1 May 2021)

²² https://www.itu.int/osg/spuold/wsis-themes/ict_stories/themes/case_studies/e-bario.html (Accessed 1 May 2021)

²³ <https://www.kasadaka.com/> (Accessed 1 May 2021)

inexpensive platforms, hosted locally on small hardware as inclusive platforms for local communities in Mali, Burkina Faso, and Ghana (Baart et al. 2019, pp. 202–219).

Another important point in this research is that of contextualization. For example, deployment of Artificial Intelligence generally requires high-performance infrastructures. Artificial Intelligence's most popular branch, Machine Learning, uses heavy computing and needs sustainable data storage to process and store large amounts of data. Such infrastructure is not available in many countries of the Global South. Another issue is related to user data which raises privacy and security issues and requires regulatory frameworks that unfortunately are still in their infancy in many African countries. Still, there are alternative forms of AI, e.g., knowledgebased reasoning systems, that will work better under low-resource circumstances and can run on decentralized local systems. Examples include knowledge engineering for indigenous knowledge, co-designed by local farmers and AI specialists, or expert systems of traditional African medicine co-developed by local and AI experts (Lô et al. 2017). These topics are currently being studied in field-based pilot research projects.

The above examples are real-world research projects with a modest reach. Despite their small size, these projects show the importance of transdisciplinarity, involving local communities, not as passive subjects, but as co-researchers and co-creators. This model is also applicable in academic education. Currently, mainstream curricula in Computer Science and Artificial Intelligence introduce students only to high-end domains of technological innovation. Not many educational programs are devoted to community-centered technology development in resourceconstrained environments. Yet, the challenges of the global digital society are calling also for ICT professionals with the knowledge, skills, and responsibility to deal with these challenges. Collaborative technology development, reflection, and joint deliberation with respect for local agency and innovation can open new avenues toward responsible and societally oriented knowledge production and ethical technology development, striving for more equality and less coloniality in the (digital) society.

3 Conclusion

From the above discussions, it becomes clear that coloniality is a reality also in the digital society. Universal Internet connectivity does not necessarily equate to truly inclusive connectedness. According to African philosopher Achille Mbembe, we must realize that coloniality is more than academic discourses and representations (Mbembe 2001). It is a systemic problem, materialized in the real world and felt in everyday life by many people. If we want to build a more human-centered, participatory, and democratic digital society – inclusive also for the most vulnerable communities – new ways of collaboration, innovation, and co-creation are needed. In this chapter, we have tried to present some directions on how this could be done.

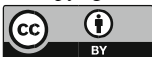
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Part III Ethics and Philosophy of Technology