Klaus Kornwachs

AI AND THE REINVENTION OF WORK

From Routine to Meaningful Activity

HANSER

Kornwachs
AI and the Reinvention of Work

Klaus Kornwachs

AI and the Reinvention of Work

From Routine to Meaningful Activity

HANSER

About the author:
Klaus Kornwachs, Argenbühl

Print-ISBN: 978-1-56990-190-8
E-Book-ISBN: 978-1-56990-249-3
ePub-ISBN: 978-1-56990-429-9

Bibliographic information of the German National Library:
The German National Library lists this publication in the German National Bibliography; detailed bibliographic data are available on the Internet at http://dnb.d-nb.de.

www.hanserpublications.com
www.hanser-fachbuch.de
Editor: Julia Stepp
Production Management: Melanie Zinsler
Cover concept: Marc Müller-Bremer, *www.rebranding.de*, Munich
Cover design: Tom West
Cover picture: © Tom West, using graphics from © stock.adobe.com/sabida
Typesetting: Eberl & Koesel Studio, Kempten
Printed and bound by: CPI Books GmbH, Leck
Printed in Germany

Contents

Preface

It was in 1982 that Ralf Dahrendorf (1929–2009), once a hopeful FDP political newcomer and later president of the renowned London School of Economics, asked in the weekly newspaper DIE ZEIT whether we were running out of work.[1] His question was directed at the losers of the rationalization of industrial working life. According to his analysis, two factors could lead to the loss of jobs: on the one hand, the higher qualification requirements, which could cause previously well-qualified workers to drop out of the labor market, and on the other hand, the advances in automation, which could drastically reduce the supply of jobs.

Later buzzwords such as "service society" or "knowledge society" were not yet in circulation. But what did Dahrendorf mean by work at that time? Did he mean the collectively agreed employment at that time, which contributed to the gross national product of Western countries mainly in the form of production activities? Or did he mean a fundamental change in work itself and its place in a person's biography? Rather, Dahrendorf was asking whether a change in the world of work would lead to more or less of the same, or to something completely new coming on the scene.

After the events of 1989, the question of work became more topical than ever before: The dissolution of the "Eastern Bloc," as it was called, had abruptly changed the perception of a human-socialist design of the world of work that was still considered possible. The West seemed to have "triumphed" over socialism *in praxi* as well as over the utopian design of such a world of work, and in the West, market-liberal ideologies and their varieties began to dominate. What followed was a discussion about the "End of History," as a much-discussed book[2] was titled, and about globalization, which had begun long before 1989. It was about the privatization of public enterprises and services and about the first thoughts on the virtualization (then called *e-work*) of work. The "Future of Work" became one of the most frequently mentioned titles in publications and books.[3]

In the 1990s, after the reunification in Germany, discussions revolved around issues such as

- the right to (paid) work,
- the question of whether the new federal states would become the "extended workbench of the West,"
- unemployment in the industrialized countries,
- the worldwide relocation of jobs to low-wage countries,
- the widening income gap within and between states, often referred to as the North-South divide,
- the de facto withdrawal of the state from essential areas of public welfare, which can be observed in industrialized countries,
- the rise of neo-liberal thinking in economics and politics,
- the question of solidarity in an international labor market and beyond,
- whether an unconditional basic income would be a solution or an exacerbation of the fundamental problems addressed by these issues.

All of this stood in strange contrast to the fact that, although much was written about work and its organization there was hardly any philosophical debate about work that would have been noticed by the German public in any significant way. However, the desire was already there at that time: This philosophical debate, i. e., the persistent questioning and illumination of the conceptual prerequisites of our talk about work and our life with work, should take place again and again in view of the rapid changes, and it should be conducted in a broad public. To date, the debate has been dominated by the question of whether rationalization through automation contributes to unemployment or to overcoming it.

In the meantime, technological development in the world of work, in private and global communication, but also with regard to the indicators of the state of our planet[4] has accelerated with a force that—phenomenologically—is reminiscent of exponential growth processes. Added to this was the politically intended global deregulation of international financial and capital flows as early as the 1970s,[5] and with it the internationalization of markets and thus also of labor markets. In the two decades around the turn of the millennium (i. e., 1990–2010), these developments have led to massive shifts of coordinates in the world of work as well as in our general living environment, which such a philosophical discussion would have to take into account. It is therefore high time to rethink about work.

In the years between 2010 and 2020, the development of modern communication and information technology has changed once again, with the buzzwords now being Industry 4.0, Big Data, algorithms, and artificial intelligence. This transforma-

tion of the technical and organizational conditions of work, somewhat imprecisely referred to as "digitization," has already significantly changed the content and forms of work and will continue to do so at an accelerated rate. It is precisely the exploitation of technical possibilities through the immensely increased availability of computing capacity and new programming techniques, also somewhat imprecisely called artificial intelligence (AI), that reinforces the impression that AI is re-spelling work.

Around 2005, there was a tendency to dissolve the separation between work time and leisure time. Until then, except for artists, this separation had been seen as an essential dividing line within the structure of individual's life plan, with consequences that extended into the realm of morals and duties. Categories of work now began to invade leisure, and moments of leisure began to invade the world of work.[6] It was noticeable that many organizational-social developments were triggered by the technical development—not least the question of a dissolution of boundaries and thus a new determination of the place of work and working hours. The buzzwords "flexibilization," "tele-cooperation," and "teleworking" appeared, followed by "*e-commerce*", "*e-business*," and "home office" (= German term for "working from home") as Anglicisms from the language of business economists and controllers. The demand for a reasonable relationship between working hours and self-determined time (now called work-life balance), changing mobility requirements, and an increasing segmentation of work biographies accelerated the perceived disappearance of familiar job profiles and lifelong skills. New job profiles emerged, most of them with English names, even in Germany. And once again, the coordinates of a discussion about work shifted.

Since work cannot be conceived or understood without technology and technology cannot be conceived or understood without work, a discussion of the topic of work would also have to include the discussions on the philosophy of technology that have taken place in recent years. Here, there has been a change in the interpretation and understanding of technology in the face of its informatization (now called digitalization) and increasing biologization. These processes are still in full swing today and they have been accelerated due to the pandemic of the years 2020 and beyond.

In many cases, we no longer fully understand all the steps and actions in our work, even if we wanted to and had all the necessary information at our disposal. Work has become more abstract than ever before. There are two reasons for this: One is the dependence of work on appropriate knowledge and skills, and thus the dependence on the availability of appropriate information at the right time in the right place. Secondly, the sensory perception of the work process—that is, what was done by hand—is disappearing behind the surface of the technology that supports or even replaces the work process. This, too, has led to a shift in coordinates as early

as the 1980s, which sociologists have tried to analyze with the concept of the knowledge society.

By now it should have become clear: The use of formal, i. e., ultimately mathematical, means changes the content, forms, and processes of human work. This ranges from the surveying used in the construction of the tunnel on Samos in ancient times to today's artificial intelligence. We are already seeing glimpses of what this technology is capable of, but that is probably nothing compared to what is likely to come. Should we fear these changes or should we welcome them? Are we helpless at the mercy of an unstoppable force sold to us as progress? My answer at this point is a resounding 'no.' After all, all of us, experts and consumers alike, are also the ones who have unleashed this development, and therefore, as buyers of such technology, we are also responsible for shaping it. It is not artificial intelligence itself to be feared, but some of the business models that make AI possible in the first place.[7]

For this very reason, there can be a great deal of uncertainty and a pervasive feeling of loss of control. This book was written to do something about that feeling. It is intended to sketch out a conceptual outline through thought-provoking impulses and historical as well as systematic attempts at clarification, which could have an orientation function—albeit always only a provisional one—for the future design of the world of work and our approach to work.

* * *

This book also has a backstory. It is based on lectures and seminars that I have given on this topic in Stuttgart since 1985, later in Cottbus, Budapest, Vienna, Dalian, and Ulm. It revisits the content of the papers published and lectures given during this period and can therefore draw on observations of the changes in the world of work that have occurred since then. Accordingly, the analysis of the coming changes is based on a well-proven foundation: By looking at where we have come from, we can better understand where we are going—or better yet, where we should be going. If we want to play a responsible role in shaping the future, we cannot remain like a rabbit in front of the snake, no matter how fascinating or frightening all this may be.

Since the 1980s, when I was a researcher at the Fraunhofer Institute for Industrial Engineering in Stuttgart, I have been studying the transformation of work, be it in production, services, or technology design. Not only has human work taken on different organizational forms and evolved, but the question of what work actually is, whether it is still needed at all, and what distinguishes it from human activity in general has also been asked again and again

Karl Marx had also tried to answer this question, and he was probably the first to place work at the center of his philosophical anthropology: Man creates himself only through his work. And so, he is also a product of the circumstances of his

work. These circumstances, however, are determined by economic conditions such as property and power. Therefore, these conditions must be changed. His answers, even if he did not want them to be, were influenced by the philosophy of German idealism and based on a certain deterministic understanding of history. By 1989 at the latest, it became clear that history had taken a different course than that of permanent class struggles, and that his answers were no longer sufficient for a modern technologized world. The image of man today is no longer laborist,[8] i. e., shaped exclusively by his work, but by scientific knowledge and ethical as well as ideological convictions, by the possibilities he has at his disposal in terms of actual technology and organization, and by insights into the social and cultural dynamics in which his life-world is embedded.

Because the world of work is constantly changing, it has done so while I have been writing this book. I have tried to consider the developments that the Corona crisis has had on the way we work since 2020. The events of February 24, 2022, with the beginning of the Ukrainian war started by Russia, and the barbaric attack by Hamas on Israel in October 2023 are still so unmanageable that only a few additional notes have emerged before the English edition of this book went to press. The presentation of the natural language chatbot ChatGPT by the company OpenAI in November 2022 has led to a flood of discussions and articles that could not be considered completely before going to press. Since the assessment of the performance of this system and the rapidly following improved versions is still very inconsistent, possible consequences for the working world cannot yet be presented in a desirable way without further research. Here, too, I have confined myself to a few cautious hints and some literature references inserted subsequently.

For the international edition of this book, I have supplemented the relevant English language literature and modified or added some examples of the informatization of the world of work as the existing ones were very local and specific to Germany.

Editorial Note

The translation from German into English has been supported by using DeepL Translator Pro and Write. References and quotations have been taken from the English translation or original English literature; German and French language quotations have been translated by me.

For the sake of better readability of the texts, the generic masculine gender is used throughout this book. Therefore, the information refers to members of both sexes. This was already the practice of the Romans.[9]

Acknowledgement

If one studies a subject for the length of time indicated above, one always has interlocutors who help one along, who discuss, criticize, and give advice. To list them here would make the book even longer, and so I would like to thank all those who have taken the trouble to engage with my thoughts and who have responded to them constructively and critically.

I would like to dedicate this book to my wife Irma, with whom I have had, and sometimes still have, perhaps the most interesting personal disputes about the philosophical and practical concept of work. She thinks about work and its everyday organization in a completely different way than I do. And that is a good thing. For that, I thank her from the bottom of my heart.

Autumn 2024

Klaus Kornwachs

Annotations

[1] Dahrendorf (1982).

[2] Fukuyama (1992).

[3] This is still the case today. For a surprisingly critical foresight see Makowsky (1984).

[4] Steffen et al. (2015) aggregated the global trends of socio-economic developments from 1750 to 2010. The trajectories of values for world population, gross national product, energy consumption, fertilizer consumption, paper production, transport volume, telecommunications, and international tourism show a recognizable exponential growth since 1950 at the latest. Indicators such as dam construction and water consumption show weak saturation trends since the 1980s. The globally aggregated trends of indicators of the state of planet Earth such as carbon dioxide, nitrogen oxides, methane, stratospheric ozone, surface temperature, ocean acidity, tropical deforestation, or degradation of surface biosphere show the same pattern of exponential increase. At the same time, land reclamation and ocean fishing are no longer increasing at the rate they were until about 1960.

[5] A first step toward unlimited and unrestricted monetary transactions was the 1973 denunciation of the Bretton Woods Agreement, which since 1944 had regulated currency exchange rates among 44 participating nations. This treaty was the answer to the chaotic developments of the twenties and thirties and the world economic crisis (Great Depression). However, fast-growing industry, and especially the big banks, saw bureaucratic control as a burdensome brake. By 1970, the U. S., Germany, Canada, and Switzerland had abandoned capital controls. The result was the collapse of the fixed exchange rate system, as speculators, who valued currencies according to different investment opportunities, could now set the rates among themselves. See also Martin/Schumann (1996), p. 73.

[6] First propagated, then semi-solidly described, e. g., by Opaschowsky (1991): Values that were and are predominant in the world of work, such as diligence, punctuality, cleanliness, correct performance of duties, planning- and success-oriented action, subordination within a hierarchy, and acceptance of task sharing and assignment, and others, diffuse into the leisure sphere. Today, holidays, pleasures, clubs, and the like are now planned with military precision, and many an employee would not accept the burden, strain, and stress of organizing a club party in his working life. Conversely, the values of leisure time, such as hedonism, the desire to have fun, self-realization, free determination of one's own activity in terms of scope, load and duration, and other leisure-oriented ideas are spreading into the world of work. We speak of fun work, of the pleasure of work, and even of the workaholic, i. e., of satisfying oneself through work that can become an addiction.

[7] Kornwachs (2019 KIG).

[8] From *labor* (Latin), work, effort, toil.

[9] *"Pueri appellatione etiam puella significatur"* (the term "boys" is also used to refer to girls). Cf. Corpus Iuris Civilis, Digestae, Book 50, Title 16, Lex 163, § 1. Quoted from *http://www.thelatinlibrary.com/justinian/digest50.shtml*. An extension to other conceivable genders in the sense of a social constructivist definition is thus implied with serenity.

1 Introduction

1.1 Questions and Theses

1.1.1 We Need to Think About Work and Technology Together

The relationship of human work to nature, to technology, to information, to social participation and to the human self-understanding has permanently changed. Globalization and digitalization, but especially the new rise of artificial intelligence in the context of digitalization, have begun to accelerate these changes. This is experienced as disruptive by people who are not constantly observing the developments: The snail of progress creeps slowly, and you no longer look closely. Suddenly, it has covered several meters. In addition to this almost trivial experience, however, there is the fact that the term disruption is now being propagated as a positive value by interested parties.

The research and development program of artificial intelligence has developed again after some stagnations (so-called AI winters) in the 90s and 00s.[1] The driving factors for this were the new availability of fast computing power and the immense expansion of storage capacities and the associated drop in their prices.[2] After impressive successes in originally more playful (chess, Go, etc.) or knowledge-oriented fields (neuroinformatics, cognitive science), artificial intelligence as a technological development and application project is now preparing to support and partly take over control, monitoring and design services in the working world and not only there. This has led to a broad re-launch of the debate on the future development of the world of work and thus also of our social structures. Since the release of ChatGPT in November 2022, the discussion has started to heat up.

It is feared that many human activities that have seemed necessary in the past, will cease to exist in the near future, and furthermore, that many activities that we have called “work” in the past would no longer be work at all in the conventional sense. This discussion continues to produce new books, and this phenomenon

alone testifies to a great deal of uncertainty and makes a redefinition of the concept of work seem advisable. After all, what is at stake in all these discussions is the meaning of work for the shaping of a life worthy of a human being, i. e., the *conditio humana*.

However, technological developments and changes in the forms and modes of work, as well as the gradual changes in the concept of work based on these developments, cannot be understood either practically, historically, or philosophically if they are considered in isolation and without reference to each another. Although the interactions between technology, organization, and work have often been studied in sociological and management terms, these studies have rarely been used to provide a common interpretation of the dynamics of technology *and* work. This is all the truer since it was the introduction of computers into production and offices in the 1980s that massively changed the processes and structures of operational work. This was followed by the gradual automation of services, which is still ongoing today and is far from complete. Now, adaptive artificial intelligence (AI) systems are coming together with robots, processing centers and outsourced offices. These distributed work systems equipped in this way are preparing to optimize the processes in which they operate more or less independently.

Previous approaches to the discussion of the concept, practice, and future of work have mostly remained within the respective disciplines.[3] This book therefore attempts to develop an integral view in a systematic approach, starting mainly from the philosophy of computer science, AI, and technological sciences, which has precisely this *conditio humana* in mind, but also the social effects and desirables.

The starting point for such a systematic design of the understanding of a changed world of work, which will be a world of activity, must therefore be a consistent thinking together of the changes in work with the changes in technology. What the so-called digitalization has brought about and will bring about in the future cannot be determined by one-sided sociological, cultural-philosophical, or even political analyses of work, nor by approaches that are certainly meritorious but can be found in each case in isolation in the technical and scientific disciplines. It is not enough to look at work solely from the point of view of the technical sciences, computer science, or even from the point of view of labor studies or economics. In the end, a look at philosophical anthropology can be helpful, but is not sufficient either.

Previous disputes about the concept and significance of work originated

- from the discussions in the 1980s about the disciplinarily fragmented self-image of labor sciences such as ergonomics, work organization, industrial psychology, occupational medicine, etc., labor economics and the sociology of work,
- from macroeconomic conceptions of labor as a factor of production alongside land and capital, and microeconomic conceptions as monetarily quantifiable, exchangeable output and value added,

- from conceptual historical analyses of the history of the meaning of work, but these hardly cover the period after 1970,
- from anthropocentric views of work as a constituent of being human, as in Karl Marx, for example,
- from ethical to religious patterns of interpreting human work, e. g., work as creatorship, fulfillment, duty, and atonement,
- from the direct work facilitations and changes due to the technological development,
- and last not least, but currently, by the re-emerging fear that intelligent robots and systems (IR) could displace many classical employment relationships (jobs as well as job descriptions) or make them completely superfluous.

All these approaches are undoubtedly of great value, including problem-solving value, but for the most part they remain within their respective disciplinary interpretive frameworks. The following analysis of the transformation of human work by artificial intelligence (AI) into a controlling and shaping activity attempts to go beyond a concept of work in which both the work process and the work result are seen merely as naturalizable and monetarily quantifiable factors, i. e., as something that can be performed, sold, needed, and bought. Work, both as a process and as a result, has always changed with technology, and the development and production of the technology necessary for work has also been work. Therefore, these changes must be redefined in the context of an interpretation of technology, because the interpretation of technology has also changed.

Many strands of development have contributed to this new understanding of technology, which also encompasses the organizational environment, the technical actions as well as the goals and effects,[4] in information and communication technologies, in biotechnology and medical technology as well as, for example, in nanotechnology and new materials, but also in theory formation in sociology, in organizational theory, and also in philosophy.[5] Finally, it must be taken into account that the above-mentioned and other branches of technology may converge to form new, as yet unforeseeable technologies, i. e., they may functionally grow together,[6] and surprises in future developments can never be ruled out. This also means that artificial intelligence, which is the subject of such intense discussion today, and its convergence with Metaverse concepts and potentialities of the software of visualization in computer games, will not be the last technical development possibility whose impact and scope we will argue about.

In order to be able to carry out the analysis mentioned above, it is necessary to take into account aspects that can hardly be found in the respective disciplinary fields alone:

- The relationship between labor and nature, first taken up by Marx's question of labor as a struggle against nature, has changed under a transformed understanding of nature. This is closely related to the question of how science and technology are possible in nature at all. The attempts to answer this question, in turn, determine the relationship between labor and technology.
- The question of the definition of work within the framework of a philosophical anthropology and its individual as well as social shaping in dependence on the respective image of man is answered differently for cultural reasons. This has led to different work cultures which, in the context of globalization, meet each other as individual cultures in their diversity—also with conflicts. However, it can also be observed that the differences between the work cultures are beginning to dissolve, ultimately leading to a global work culture.
- Work, at least in modern times, is associated with necessity and duty on the one hand, but also with social participation, with social and societal status and with individually and socially mediated recognition on the other. Therefore, the lack of "gainful" work in the context of unemployment does not only have an impact in the area of sensitive income and asset losses. It also leads to a lack of participation in social life and to a deprivation of recognition, even to the point of contempt. The question of the justification of a right to work makes this connection unusually clear.

1.1.2 Questions

The questions to be asked are therefore located in a border area that spans between the technical sciences on the one hand, which play a major role in the design of working conditions, and philosophy on the other. New technologies have always enabled and forced changes in forms of work. But in the current phase of upheaval, persistently and inaccurately called digitalization, this change is not only faster than usual, but also more radical. People like to call it disruptive. The reasons for this changed dynamic should also be questioned. However, a new way of thinking about the role and function of work for the individual, the economy and society, which is forced by this, not only changes the view of possible options of technical design at work as well as in leisure time, but it can also stimulate the development of new technologies and their conditions of reception. Therefore, we can also expect changes in terms of acceptance or non-acceptability of new technical possibilities and of trust or mistrust in technical development.

Other questions arise:

- In ethics, which includes the question of justice in the distribution of goods, there is the problem as to what degree of automation human work must still be

seen as a duty to make an overall contribution to the management of life in a society. And artificial intelligence accelerates automation. In addition, there is the question of how technology can shape the world of life in such a way that even people who are less qualified than they may one day be required to be, are able to participate in simple activities in a meaningful way.

- The German term "Informatik" in the sense of computer science—and this includes AI, if it is understood as a programming technique—has led and will continue to lead to the informatization and thus to a complete change in the contents, forms, processes, and conditions of work. In particular, applied computer science has raised the question of the conditions of work organization, but has not yet answered it satisfactorily.[7] In fact, information, and communication technologies (ICTs) are accelerating the development towards a global labor market, without any safeguarding mechanisms in sight at the global level like those that have been developed partially at the national level. One thinks here of the welfare state's cushioning of excessive asymmetries in market-economy developments.
- In philosophical anthropology, the previous identification of man with work (work in the sense of the process as well as the result) would have to be critically questioned. Is man only what he works? If one tries to clarify the preconditions for this identification, it is necessary to confront these considerations not only with cultural, ethical, or theological interpretations, but also with approaches from the philosophy of technology and the practical experiences made in this process of change.
- In the economic sciences, with their tendency toward the total economization of all aspects of life and subject matter, human relationships and other, emotional aspects are largely ignored. Here, the question must be raised, whether there are also non-monetarily quantifiable activity relationships and reward systems, without which there is presumably no special motivation for performance, for technological development or for the further development of new forms of organization.

1.1.3 Theses

To begin with, I would like to propose the following working theses as a suggestion:

1. Conventional work will presumably shift away from moving activities[8] to predominantly communicative, shaping, correcting, and controlling activities as a result of the technical possibilities, especially the use of AI systems. This does not mean that these activities are already meaningful. Simpler skills will be devalued, making it more difficult for larger parts of the population to partici-

pate in value-creating processes. Solutions would have to be developed to compensate for the resulting loss of identity and status (cultural, social, and economic). Apart from the proposal of an unconditional basic income, there are no other solutions yet in sight, except for the emerging developments of a metaverse. However, it does not look like we will be able to rest on our laurels—globally speaking—in the face of climate change, pandemics, and armed conflicts. So, we are not going run out of work in the sense of having a mountain of tasks ahead of us. We will manage the tasks differently than before, though.

2. Making life easier by reducing technologically the amount of work and stress we have comes at a price: On the one hand, there is the threat of transparency in every professional and private activity through the disclosure of the data required to "calculate" precisely this facilitation. On the other hand, if the results and decisions of artificial intelligence (AI) systems were no longer comprehensible, there could be the danger of a culture of constraint that allows only limited leeway.

3. The classical forms of work[9] will no longer be salvageable—so we need to take care of the socially stabilizing conditions that have so far been maintained and guaranteed by these traditional forms of work. These include the right to acquire property, the right to training and education, the formation of identity, the possibility of social participation, the organization of solidarity, and the transparent management of expectations and recognition regimes.

4. In systemic terms, the automated world of work may well reach the level of automation of automation. This means that highly automated to self-optimizing production and service systems may develop. The criteria for the orientation of this optimization that goes beyond an economic evaluation of value chains have not yet been discussion. We must learn better what we want.

5. It is also to be feared that such production and service systems, which may be distributed worldwide, will be offered by companies which tend to develop monopoly-like structures as a result of merging processes. These will hardly be controllable by national laws and they will probably determine our needs, if not our wants, to a large extent. This will certainly no longer be a world of work in the conventional sense, where ideally what is needed would be produced. We will therefore have to further develop new rules for international labor markets, the beginnings of which are already visible.

1.1.4 About the Structure of the Book

The book begins by spelling the concept of work and then takes a narrative look at the current changes in the world of work in various fields, from agriculture as to the Net as a new place of work. The aim is to show that changes in the world of work have now already begun to take place because of the computer's triumphant march through the factories, but that a new "triumphant march" is now in the offing, namely that of algorithms. This is only a somewhat fuzzy way of speaking, though. At this point, it is already important to specify the concept of the algorithm and to take it out of the zone of journalistic and operational fighting terms: Algorithms ultimately presuppose mathematically formulated models about the domains in which they are to be applied. These models are made by humans and reflect their limited knowledge, but also their interests.

A brief look at the changes in the workplace in the view of man and the world shows: The main factors of this change were the economic conditions, the technical possibilities and, last but not least, the qualifications of people available through education and training, rather than philosophical or religious convictions. These were mostly adapted to the need for explanation as a subsequent justification for the existing conditions.

In order to understand how information-processing and information-generating machines can support and replace human work at all, it is shown that modeling, algorithms, and programming based on them ultimately represents a *"restructuring of human work by formal means."*[10] This digitalization, which is primarily a formalization, leads to the dissolution of what we have hitherto considered to be conventional forms of work. This is probably the trigger for a new form of alienation, which is playing an increasingly important role in the debate on artificial intelligence.

The triumph of AI can be understood in terms of the drivers of this development: Economic pressure usually leads to rationalization through the exploitation of technical possibilities. The direction in which this rationalization takes place depends not only on legal regulations, but also to a large extent on the skills available. This applies to every innovation and thus also to every rationalization. In this context, further perspectives of multiple use (so-called *dual use*) arise: Complicated handling systems in production plants, care robots or semi-autonomous mine-clearing systems, to name just a few disparate examples, can be programmed according to similar models with comparable algorithms.

The replacement of former human work, i. e., physical work, by machines and automated systems, leads to a shift of activities towards observation, control, decision making, giving instructions, and designing new systems and processes. This has been discussed for la long time and is not new. What remains as work in the actual sense is perhaps the development work on the automation of the automation, the

structure of the physical-material components and the organization of the self-optimization of the systems. Programming of the programming is only a part of it.[11] The newly developed chatbot ChatGPT, which can also write programs and develop designs of control concepts on demand, is here only a further consistent development.[12]

However, it is too early to talk about a far-reaching dematerialization of work.[13] Certainly, machines will be built by machines that "take away" the work from us, but things will still have to be moved from one place to another, and the temporal and systemic beginning of work in production ultimately lies in making materials and raw materials available. Therefore, it will be unavoidable to carry out one or the other hand movement ourselves. This is especially true in the case of unsuccessful technology, i. e., in the case of accidents and their disposal.

The book concludes with a prospective outlook on the areas discussed at the beginning. It shows that the limits and possible dangers of AI lie less in its logical possibilities than in our ability to develop and use technology in ways that were not intended by the inventor. Thus, AI may prove to be an amplifier of error. However, AI and its capabilities in this way also rehabilitate the strength of human inadequacy as a possible corrective factor. Therefore, in the spirit of vigilant stewardship, we must take our technical creatures by the hand, and with a firm grip. In this way, the book aims to contribute to the discussions about how we want to live, act, and work, and how we can face the new challenges, not only organizational but ultimately ethical, of a rapidly changing world.

1.2 Work Can Be Spelled Out—a First Approach

1.2.1 Very Briefly ...

We begin with a naive question: What constitutes work? My first attempt was to spell the German word for "labor", namely "ARBEIT."[14] This requires a preliminary remark. Using the letters of a word to find concepts associated with it is a common, but rather association-based, language game that should not be confused with an epistemological method. Nevertheless, it is appealing because it can be thought-provoking. Obviously, such a language game cannot be easily transferred into another language. The English edition of this book therefore uses the German language game and provides explanations for it.

What do these six letters "A.R.B.E.I.T" say? The first letter **A** says that work has to do with effort (Anstrengung). We could also use the term recognition (Anerkennung), though. This term will be important in this book. The second letter **R** refers